Appendix H.10

VISUAL IMPACT ASSESSMENT

SCIENTIFIC AQUATIC SERVICES

Visual Impact Assessment

REPORT PART OF THE ENVIRONMENTAL AUTHORISATION PROCESS FOR THE PROPOSED TOURNEÉ 2 SOLAR PHOTO VOLTAIC (PV) PARK, NEAR THUTHUKANI, MPUMALANGA PROVINCE.

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Report Reference:	SAS 22-1194
Date:	Amended August 2023

Website: http://www.sasenvironmental.co.za

EXECUTIVE SUMMARY

Scientific Aquatic Services (Pty) Ltd (SAS) was appointed to conduct a visual impact assessment as part of the environmental authorisation process for the proposed Tourneé 2 Solar PV Park near Tutukani, Mpumalanga Province. The proposed Tourneé 2 Solar PV forms part of the larger Tourneé Solar PV Cluster which will include two (2) 150 MW Solar Energy Facilities (SEFs).

The proposed Tourneé 2 Solar PV Park is located within the Lekwa Local Municipality, which is under the administration of the Gert Sibande District Municipality. The proposed Tourneé 2 Solar PV Park is located approximately 32 km south-west of Standerton and is situated adjacent to the Eskom Tutuka Power Station ash fallout facility. Tourneé 2 Solar PV Park is located on Portion 7 (a portion of portion 3) of the Farm Dwars-In-De-Weg 350 IS and Portion 6 of the Farm Dwars-In-De-Weg 350 IS.

The proposed Tourneé 2 Solar PV Park is situated in a rural area with a relatively low number of sensitive receptor; comprising mostly of farmsteads. Based on the field assessment, the undulating topography and dense vegetation associated with the farmsteads partially obscures the view towards the Tourneé 2 Solar PV Park, therefore the visual impact for the Tourneé 2 Solar PV Park is considered moderately low as the visual intrusion on the receiving environment will be low to moderate depending on the location of the vantage point.

According to the Strategic Environmental Assessment (SEA) Project (2019) the Tourneé 2 Solar PV Park does not fall within any Renewable Energy Development Zones (REDZ) nor within any corridor for ElectricaL Grid Infrastructure (EGI). According to South African Renewable Energy EIA Application Database (REEA) there is one approved application for a renewable energy facility (solar) within a 30 km radius of the Tourneé 2 Solar PV Park. This indicates that the larger region may be earmarked for renewable energy facilities in the foreseeable future, which may alter the landscape character on a broader scale.

With the Tourneé 2 Solar PV Park and surroundings being dominated by grasses interspersed with freshwater ecosystems and cultivated fields, the vegetative component will not be able to substantially assist in screening the Tourneé 2 Solar PV Park. The farmsteads do however have existing dense tree lines which may partially or completely obscure the view towards Tourneé 2 Solar PV Park. The local topography of the Tourneé 2 Solar PV Park is relatively flat to gently sloping with the surrounding landscape displaying undulating terrain. With the local topography of the Tourneé 2 Solar Park being relatively flat, it is unlikely to assist in absorbing and/ or screening the Tourneé 2 Solar PV Park. The field assessment did however indicate the undulating terrain of the surrounding area affecting the degree of visibility from various vantage points. The Tutuka ash dump will assist in screening and/ or absorbing the Tourneé 2 Solar PV Park, especially to receptors located to the south and north.

The sense of place associated with the Tourneé 2 Solar PV Park can be described as calm, tranquil and peaceful, with limited development and movement, with the exception of the shepherds moving with the livestock and the cultivated fields being tilled or harvested. The sense of place is however not unique to the Tourneé 2 Solar PV Park as it extends to the larger region. During the construction phase of the Tourneé 2 Solar PV Park, the sense of place will however be affected, shifting the mood to busy and disturbed with construction vehicles and potential need for some earth moving equipment, however, once the panels are operational there will be limited additional vehicular movement in and out of the area, thus returning the area to a calm and tranquil landscape.

The Tourneé 2 Solar PV Park being located in a rural area, results in limited sources of night-time lighting, as such the lighting environment is considered rural with low district brightness. Development of the Tourneé 2 Solar PV Park may potentially be a source of light pollution during the construction and operational phases, due to security lighting on the perimeter fence and at the buildings (substation, BESS and O&M Buildings). Overall, the impact significance of potential night-time lighting is expected to be moderately low and will be limited to a local area, as the Tourneé 2 Solar PV Park is not a development that requires a significant amount of lighting. This corresponds with Bortle's Scale – indicating that Tourneé 2 Solar PV Park falls within a Class 4 area (rural/suburban transition) where the light pollution is low and distant large objects are distinct. As such the introduction of lighting sources in a rural area results in the Tourneé 2 Solar PV Park likely to somewhat contribute to the effects of sky glow and artificial lighting in the region.

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With limited vantage points within the landscape toward the Tourneé 2 Solar PV Park, the visual impact is considered moderate to low, as summarised in the table below.

Summary table of overall significance:

DESCRIPTION OF IMPACT	**Overall Significance**	
	Without mitigation	**With mitigation**
Construction Phase		
Impact on overall landscape, visual intrusion and exposure for Farmsteads	Moderate	Moderate
Impact on overall landscape, visual intrusion and exposure for the gravel road	Moderate	Moderate
Impact on overall landscape, visual intrusion and exposure for the Tutuka Power Station Airfield	NA	NA
Potential impacts due to nighttime lighting	Low	Low
Operation Phase		
Impact on overall landscape, visual intrusion and exposure for Farmsteads	Moderate	Moderate
Impact on overall landscape, visual intrusion and exposure for the gravel road	Moderate	Moderate
Impact on overall landscape, visual intrusion and exposure for the Tutuka Power Station Airfield	Low	Low
Potential impacts due to nighttime lighting	Low	Low
Decommissioning Phase		
Impact on overall landscape, visual intrusion and exposure for Farmsteads	Moderate	Moderate
Impact on overall landscape, visual intrusion and exposure for the gravel road	Moderate	Moderate
Impact on overall landscape, visual intrusion and exposure for the Tutuka Power Station Airfield	NA	NA
Potential impacts due to nighttime lighting	Low	Low

From a visual resource aspect, there are no fatal flaws associated with the Tourneé 2 Solar PV Park. Hence, it is the professional opinion of the visual specialist that the development of the Tourneé 2 Solar PV Park, from a visual resource management perspective, can be considered for authorisation.

DOCUMENT GUIDE

The following table indicates the requirements for Specialist Studies as per Appendix 6 of Government Notice 326 as published in Government Notice 40772 of 2017, amendments to the Environmental Impact Assessment (EIA) Regulations, 2014 as it relates to the National Environmental Management Act, 1998 (Act No. 107 of 1998).

NEMA Regulations (2017) - Appendix 6		Relevant section in report
1a	Details of	
	(i) the specialist who prepared the report; and	Appendix H
	(ii) the expertise of that specialist to compile a specialist report including	Appendix H
b	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix H
c	an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.3
cA	an indication of the quality and age of base data used for the specialist report	Section 3.2
cB	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 5.1
d	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3.2
e	A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3 and Appendix A to F
f	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	Section 4
g	an identification of any areas to be avoided, including buffers	Was provided during scoping phase, and implemented in the design assessed during the EIA phase
h	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;	Was provided during scoping phase, and implemented in the design assessed during the EIA phase
i	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.5
j	a description of the findings and potential implications of such findings on the impact of the proposed activity including identified alternatives on the environment or activities;	Section 4 and 5
k	any mitigation measures for inclusion in the EMPr	Section 5
l	any conditions for inclusion in the environmental authorisation	Section 5
m	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 5
n	a reasoned opinion	
	(i)as to whether the proposed activity, activities or portions thereof should be authorised;	Section 6
	(1A) regarding the acceptability of the proposed activity or activities; and	Section 6
	(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 6
o	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Consultation with interested and affected parties (I&APs) will be undertaken as part of the project
p	summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Comments and responses that are raised by I&APs will be included in the EIA report compiled by the EAP
q	any other information requested by the competent authority	No information requested at this time

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GLOSSARY OF TERMS

Best Practicable Environmental Option	This is the alternative/option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term.
Characterisation	The process of identifying areas of similar landscape character, classifying and mapping them and describing their character.
Characteristics	An element, or combinations of elements, which make a contribution to landscape character.
Development	Any proposal that results in a change to the landscape and/ or visual environment.
Elements	Individual parts, which make up the landscape, for example trees and buildings.
Feature	Particularly prominent or eye-catching elements in the landscape such as tree clumps, church towers or wooded skylines.
Geographic Information System (GIS)	A system that captures, stores, analyses, manages and presents data linked to location. It links spatial information to a digital database.
Glint and glare	The two terms 'glint' and 'glare' refer to the unwanted reflection of the sun's rays by the face of a reflective surface. Glint is a momentary flash of light. Glare is a continuous source of excessive brightness.
Impact (Visual)	A description of the effect of an aspect of the development on a specified component of the visual, aesthetic or scenic environment within a defined time and space.
Key characteristics	Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
Land cover	The surface cover of the land, usually expressed in terms of vegetation cover or the lack of it. Related to but not the same as Land use.
Land use	What land is used for based on broad categories of functional land cover, such as urban and industrial use and the different types of agriculture and forestry.
Landform	The shape and form of the land surface which has resulted from combinations of geology, geomorphology, slope, elevation and physical processes.
Landscape	An area, as perceived by people, the character of which is the result of the action and interaction, of natural and/ or human factors.
Landscape Character Type	These are distinct types of landscapes that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur, they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes.
Landscape integrity	The relative intactness of the existing landscape or townscape, whether natural, rural or urban, and with an absence of intrusions or discordant structures.
Landscape quality	A measure of the physical state of the landscape. It may include the extent to which typical landscape character is represented in individual areas, the intactness of the landscape and the condition of individual elements.
Landscape value	The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a variety of reasons.
Receptors	Individuals, groups or communities who are subject to the visual influence of a particular project. Also referred to as viewers, or viewer groups.
Sense of place	The unique quality or character of a place, whether natural, rural or urban, allocated to a place or area through cognitive experience by the user. It relates to uniqueness, distinctiveness or strong identity and is sometimes referred to as *genius loci* meaning 'spirit of the place'.
Sky glow	Brightening of the night sky caused by outdoor lighting and natural atmospheric and celestial factors.

Skylining	Siting of a structure on or near a ridgeline so that it is silhouetted against the sky.
Specular Reflection	Specular reflection is a type of surface reflectance often described as a mirror-like reflection of light from the surface. In specular reflection, the incident light is reflected into a single outgoing direction.
View catchment area	A geographic area, usually defined by the topography, within which a particular project or other feature would generally be visible.
Viewshed	The outer boundary defining a view catchment area, usually along crests and ridgelines.
Visibility	The area from which project components would potentially be visible. Visibility is a function of line of sight and forms the basis of the VIA as only visible structures will influence the visual character of the area. Visibility is determined by conducting a viewshed analysis which calculates the geographical locations from where the proposed project elements might be visible.
Visual Absorption Capacity	The ability of an area to visually absorb development as a result of screening topography, vegetation or structures in the landscape.
Visual Character	The overall impression of a landscape is created by the order of the patterns composing it; the visual elements of these patterns are the form, line, colour and texture of the landscape's components. Their interrelationships are described in terms of dominance, scale, diversity and continuity. This characteristic is also associated with land use.
Visual Exposure	The relative visibility of a project or feature in the landscape. Visual exposure is based on distance from the project to selected viewpoints. Visual exposure or visual impact tends to diminish exponentially with distance.
Visual Intrusion	The nature of intrusion of an object on the visual quality of the environment resulting in its compatibility (absorbed into the landscape elements) or discord (contrasts with the landscape elements) with the landscape and surrounding land uses.
Zone of visual influence	An area subject to the direct visual influence of a particular project.

*Definitions were derived from Oberholzer (2005) and the Institute of Environmental Management and Assessment (2013)

LIST OF ACRONYMS

ARC	Agricultural Research Council
BAR	Basic Assessment Report
BESS	Battery Energy Storage System
BLM	(United States) Bureau of Land Management
BPEO	Best Practicable Environmental Option
DEAT	Department of Environmental Affairs and Tourism
DEM	Digital Elevation Model
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DTM	Digital Terrain Model
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
GIS	Geographic Information System
GN	General Notice
GPS	Global Positioning Systems
HIA	Heritage Impact Assessment
IAPs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
KOP	Key Observation Points
LI IEMA	Institute of Environmental Management and Assessment
LM	Local Municipality
m.a.m.s.l.	Meters above mean sea level
MAPE	Mean Annual Potential Evaporation
MAT	Mean Annual Temperature
MASMS	Mean Annual Soil Moisture Stress
MFD	Mean Frost Days
MW	MegaWatt
NEMA	National Environmental Management Act (No. 107 of 1998)
NGL	Natural Ground Level
NPAES	National Protected Areas Expansion Strategy
O&M	Operations and Maintenance
OHPL	Overhead Powerline
PV	Photovoltaic
PVSEF	Photovoltaic Solar Energy Facility
REEA	Renewable Energy EIA Application
REDZ	Renewable Energy Development Zones
SANBI	South African National Biodiversity Institute
SAS	Scientific Aquatic Services
SACAD	South African Conservation Areas Database
SAPAD	South African Protected Areas Database
SEA	Strategic Environmental Assessment
UNESCO	United Nations Educational Scientific and Cultural Organization

VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VRM	Visual Resource Management

1. INTRODUCTION

1.1 Background

Scientific Aquatic Services (Pty) Ltd (SAS) was appointed to conduct a visual impact assessment as part of the environmental authorisation process for the proposed Tourneé 2 Solar PV Park near Tutukani, Mpumalanga Province. The proposed Tourneé 2 Solar PV forms part of the larger Tourneé Solar PV Cluster which will include two (2) 150 MW Solar Energy Facilities (SEFs).

The proposed Tourneé 2 Solar PV Park is located within the Lekwa Local Municipality, which is under the administration of the Gert Sibande District Municipality. The proposed Tourneé 2 Solar PV Park is located approximately 32 km south-west of Standerton and is situated adjacent to the Eskom Tutuka Power Station ash fallout facility. Tourneé 2 Solar PV Park is located on the remainder of portion 3 of the Farm Dwars-In-De-Weg 350 IS and on portion 6 of the Farm Dwars-In-De-Weg 350 IS. The location and extent of the proposed Tourneé 2 Solar PV Park is depicted in Figures 1 and 2.

A VIA entails a process of data collection, spatial analysis, visualisation and interpretation to describe the quality of the landscape prior to development taking place and then identifying possible visual impacts after development. Assessing visual impacts is difficult as it is very subjective due to a person's perception being affected by more than only the immediate environmental factors (Oberholzer, 2005).

This report, after consideration and description of the visual integrity of the Tourneé 2 Solar PV Park and surroundings, must guide the proponent, authorities and Environmental Assessment Practitioner (EAP), as to the suitability of the proposed Tourneé 2 Solar PV Park Facility, from a visual and aesthetic point of view in consideration of the characteristics of the project and host region. This report should furthermore serve to inform the planning, design and decision-making process as to the layout and nature of the proposed activities.

Figure 1: Digital satellite image depicting the Tourneé 2 Solar PV Park in relation to the surrounding area.

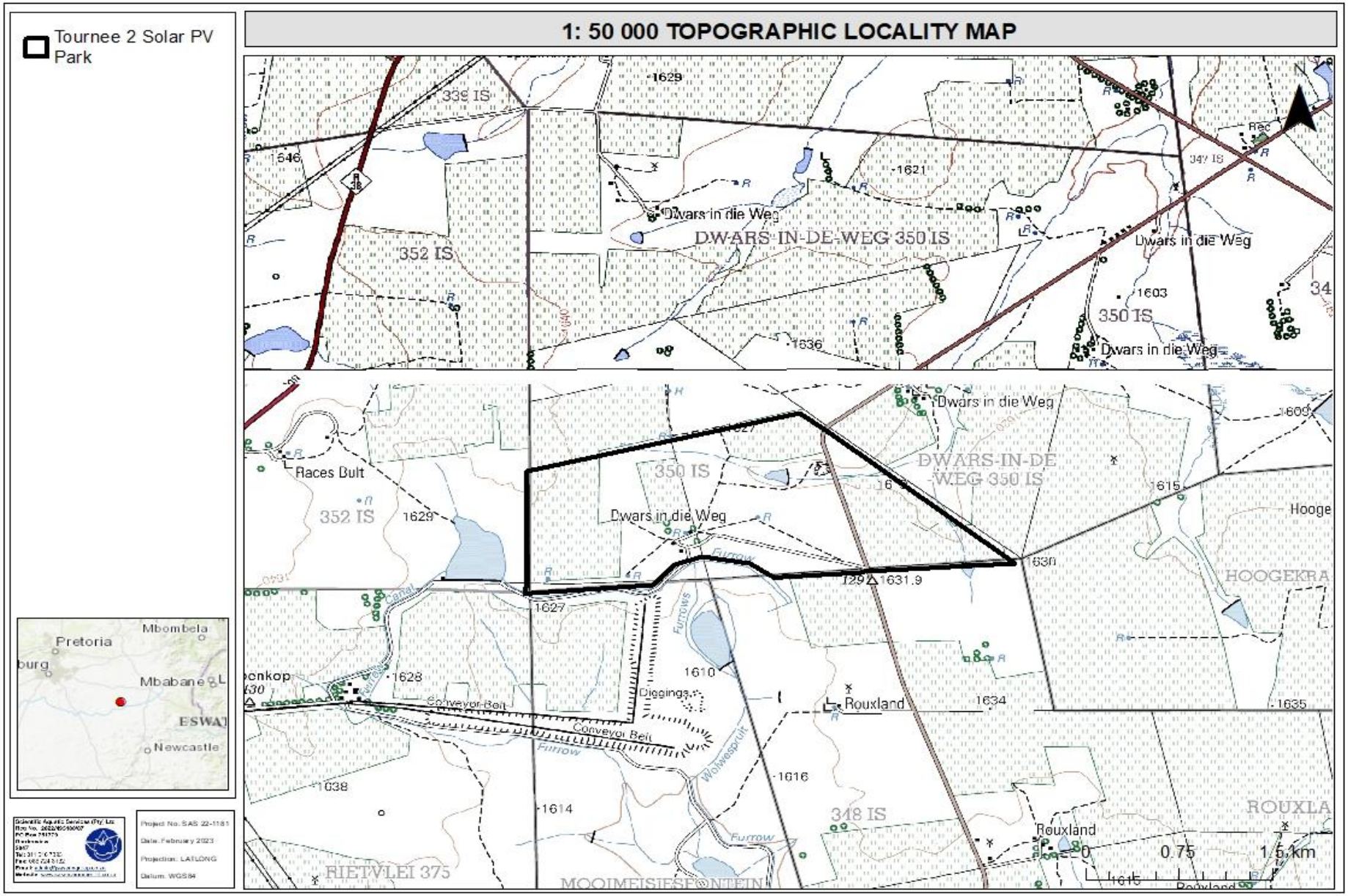


Figure 2: Digital satellite image depicting the Tourneé 2 Solar PV Park in relation to the surrounding area.

1.2 Project Description

The proposed Tournée 2 Solar PV Park will have a generating capacity of no more than 150 Megawatts (MW) and battery energy storage systems (BESS) of 600 megawatt-hours (MWh). Tier-1 bi-facial, single axis trackers are considered for the panels. The proposed Tournée 2 Solar PV Park will also include an on-site Independent Power Producer (IPP), which includes a back-to-back substation. The Battery Energy Storage System's main components include the batteries installed in rows of containers, the power conversion system (inverters) and transformers.

The purpose of the facility is to generate clean electricity from a renewable energy source (i.e., solar radiation) to contribute to the National Energy Grid. Table 1 below indicates a summary of the project details.

Table 1: Project details for the proposed Tourneé 2 Solar PV Park.

Farm Potions Combined Extent	573.78 hectares (ha)
Buildable Area (subject to finalisation)	~297 ha
Contracted Capacity of PVSEF	Up to 150 MW/600MWh. Area required – 40 000 m^2
Associated Infrastructure	Internal Roads up to 4 Metres (m) wide and up to 20 km long. Access Roads up to 8 m wide.
	Back to back substation (including facility substation, and Eskom collector/switching station) will consist of a high voltage substation yard to allow for multiple (up to) 132 kV feeder bays and transformers, control buildings, telecommunications infrastructure, access roads, etc. - 30,000 m²
	Independent Power Producer (IPP) site substation and battery energy storage system (BESS): Total footprint will be up to 7 ha in extent (4 ha for the BESS and 3 ha for the IPP portion of the substation).
	An up to 132kV Overhead Powerline ("OHPL"). The final interconnection solution will be dependent on the requirements of Eskom, which are still to be defined. Cables - Communication, AC and DC cables installed underground and overhead. AC cabling up to 33 kV between project components
	Paved areas (m²) - 2 500.
	Operation & Maintenance (O&M) building (m²) - 1 500.
	Construction phase: Construction camp area (m²) –5,000 (100 m x 50 m) Laydown area (m²) - 20,000 (100m x 200 m) Temporary concrete batching plant - Gravel and sand will be stored in separate heaps whilst the cement will be contained in a silo - 30,000 m² Septic tanks, and portable toilets.
	PV Modules (~297 ha).
Technical Specifications	Tier 1 bi-facial installed on single axis tracker mounting structures. Lithium Ion Batteries are proposed for the BESS Height: up to 6 m above ground level. Includes inverters and transformers. Fencing around development area.

Figure 3: Example of Bi-facial solar panels to be utilised for this project.

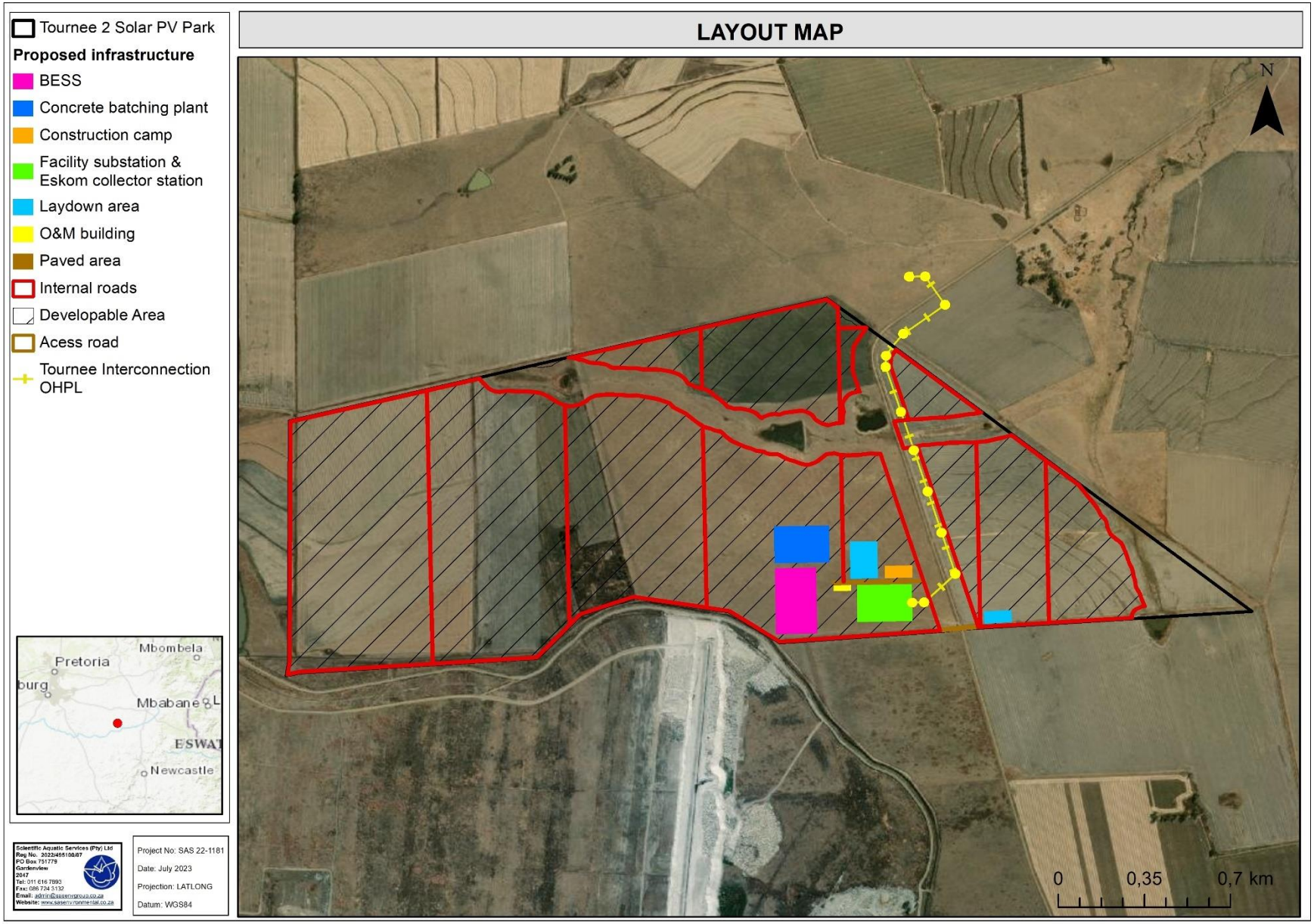


Figure 4: A digital satellite image depicting the layout of the proposed Tourneé 2 Solar PV Park in relation to the surrounding area.

1.3 Project Scope

The purpose of this scoping report is:

- To determine the Category of Development and Level of Assessment as outlined by Oberholzer (2005) and with this information undertake an appropriate Visual Impact Assessment;
- To describe the receiving environment in terms of regional context, location and environmental and landscape characteristics;
- To describe and characterise the proposed project and the receiving environment in its envisioned future state;
- To identify the main viewsheds through undertaking a viewshed analysis, based on the proposed height of infrastructure components and the Digital Elevation Model (DEM), as a mechanism to identify the locations of potential sensitive receptors sites and the distance of these receptor sites from the Tourneé 2 Solar PV Park, if necessary;
- To identify and describe potential sensitive visual receptors residing at or utilising receptor sites;
- To establish receptor sites and identify Key Observation Points (KOPs) from which the proposed project will have a potential visual impact, if necessary;
- To prepare a photographic study and conceptual visual simulation of the proposed project as the basis for the viewshed identification and analysis, if necessary;
- To assess the potential visual impact of the proposed project from selected receptors sites in terms of standard procedures and guidelines; and
- To describe mitigation measures in order to minimise any potential visual impacts.

1.4 Principles and Concepts of VIAs

Visual resources have value in terms of the regional economy and inhabitants of the region. Furthermore, these resources are often difficult to place a value on as they normally also have cultural or symbolic values. Therefore, VIAs are to be performed in a logical, holistic, transparent and consistent manner. Oberholzer (2005) identifies the following concepts to form an integral part of the VIA process:

- Visual resources include the visual, aesthetic, cultural and spiritual aspects of the environment, which contribute toward and define an area's sense of place;
- Natural and cultural landscapes are inter-connected and must be considered as such;
- All scenic resources, protected areas and sites of special interest within a region need to be identified and considered as part of the VIA;

- All landscape processes such as geology, topography, vegetation and settlement patterns that characterise the landscape must be considered;
- Both quantitative criteria, such as 'visibility' and qualitative criteria, such as aesthetic value or sense of place has to be included as part of the assessment;
- VIAs must inform the Environmental Impact Assessment (EIA) process in terms of visual inputs; and
- Public involvement must form part of the process.

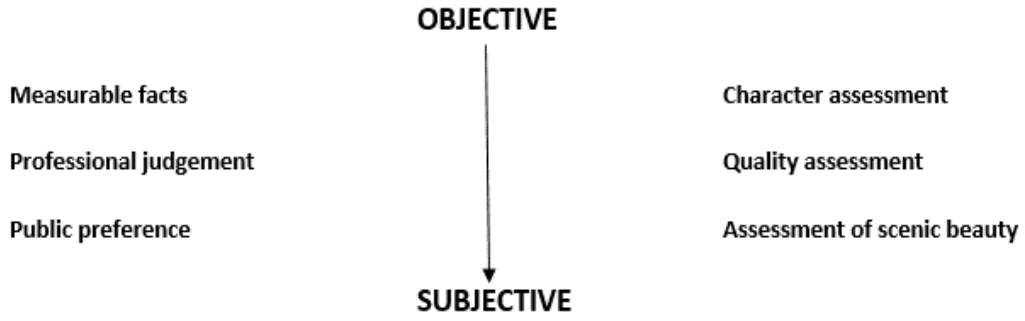
The guideline furthermore recommends that the VIA process identifies the Best Practicable Environmental Option (BPEO) based on the following criteria:

- Long term protection of important scenic resources and heritage sites;
- Minimisation of visual intrusion on scenic resources;
- Retention of wilderness or special areas intact as far as possible; and
- Responsiveness to the area's uniqueness, or sense of place.

1.5 Assumptions and Limitations

- No specific national legal requirements for VIAs currently exist in South Africa. However, the assessment of visual impacts is required by implication when the provisions of relevant acts governing environmental management are considered and when certain characteristics of either the receiving environment or the proposed project indicate that visibility and aesthetics are likely to be significant issues and that visual input is required (Oberholzer, 2005);
- Distance and terrain play a critical role when assessing the visual impacts of an area. Due to the undulating terrain of the area and relatively low height of the proposed PV structures and associated infrastructure, it was deemed necessary to identify all potential sensitive receptors within a 5 km radius, on a desktop-level, which would then be verified during the field assessment. The 5 km radius can be considered the "visual assessment zone". It should be noted that the visibility of an object decreases exponentially the further away the observer is from the source of impact;
- Due to a lack of guidelines for specialist visual impact assessments as part of the EIA process within the Mpumalanga Province, the "Guidelines for Involving Visual and Aesthetic Specialists in the EIA Process" (Oberholzer, 2005), prepared for the Western Cape Department of Environmental Affairs & Development Planning, was used; and
- Abstract or qualitative aspects of the environment and the intangible value of elements of visual and aesthetic significance are difficult to measure or quantify and as such depend to some degree on subjective judgements. It, therefore, is necessary to

differentiate between aspects that involve a degree of subjective opinion and those that are more objective and quantifiable, as outlined in the diagram below (The Landscape Institute and Institute of Environmental Management and Assessment (LI IEMA, 2002).



2. LEGAL, POLICY AND PLANNING CONTEXT FOR VIAs

Oberholzer (2005) indicates that current South African environmental legislation governing the BA and EIA process, which may include consideration of visual impacts if this is identified as a key issue of concern, is the National Environmental Management Act (NEMA) (Act No. 107 of 1998). This includes the 2014 NEMA EIA regulations as amended (published in General Notice (GN) No. R 982 as well as R 983 Listing Notice 1, R 984 Listing Notice 2 and R 985 Listing Notice 3).

In addition, the following acts and guidelines are applicable (Oberholzer, 2005):

The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
This act was developed in 2003 for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes

- Restricted activities involving national and protected parks:

According to the South African Protected Areas Database (SAPAD, 2022) Dataset, there are no protected areas located within a 10 km radius of the Tourneé 2 Solar PV Park, therefore the Protected Areas Act is currently not relevant to the proposed project. The National Protected Areas Expansion Strategy (NPAES, 2018) database did not identify any priority focus areas within the Tournee 2 Solar PV Park, however, adjacent to the Tourneé 2 Solar PV Park boundary (on the lower western boundary) a very small **Priority Focus Area** was identified, this does not intersect with the distribution of the Tourneé 2 Solar PV Park itself and therefore the proposed development will not impact any NPAES focus areas.

The National Heritage Resources Act (Act No. 25 of 1999)

The purpose of the Act is to protect and promote good management of South Africa's heritage resources, and to encourage and enable communities to nurture and conserve their legacy so it is available to future generations.

A heritage impact assessment has been commissioned as part of the EA for this project.

The Advertising on Roads and Ribbons Act (Act No. 21 of 1940)

Visual pollution is controlled, to a limited extent, by the Advertising on Roads and Ribbons Act (Act 21 of 1940), which deals mainly with signage on public roads.

Municipal Systems Act (Act No. 32 of 2000)

In terms of the Municipal Systems Act (Act No. 32 of 2000), it is compulsory for all municipalities to initiate an Integrated Development Planning (IDP) process in order to prepare a five-year strategic development plan for the area under their control. The IDP process, specifically the spatial component is based in certain areas and provinces on a bioregional planning approach to achieve continuity in the landscape and to maintain important natural areas and ecological processes. The Tourneé 2 Solar PV Park is situated within the Lekwa Local Municipality (LM), which is an administrative area of the Gert Sibande District Municipality (DM). The latest IDPs are not available for the municipalities.

Strategic Environmental Assessment (SEA) and Renewable Energy Development Zones (REDZ)

A Strategic Environmental Assessment (SEA, 2015 and 2019) was undertaken by the former Department of Environmental Affairs (DEA), which is now known as the Department of Forestry, Fisheries and the Environment (DFFE), in order to identify geographical areas most suitable for the rollout of wind and solar PV energy projects and the supporting electricity grid network. The Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015), aimed to facilitate the efficient rollout of wind and solar PV energy. These areas are referred to as Renewable Energy Development Zones (REDZs), in which development will be incentivised and streamlined. The Phase 2 assessment (2019) focused on utilising existing information to anticipate the impacts of wind and solar PV facilities and suggesting mitigation measures and identifying thresholds for cumulative impacts.

Sensitivity was determined using criteria that influence the value of visual/scenic resources, and ultimately their significance. The criteria are considered spatially, with the addition of buffers, based on the relative sensitivity of the feature or receptor. The study categorises four

levels of sensitivity, very high, high, medium and low sensitivity (DFFE, 2019). The criteria considered for the sensitivity levels determination includes visually sensitive landforms and water features, proclaimed or protected areas such as national parks or nature reserves, visually sensitive receptors such as settlements and routes, as well as heritage resources (DFFE, 2019). Table 2 below contains features and criteria considered during the visual assessment for the SEA, as well as the sensitivity rating with buffers, providing the basis for the sensitivity mapping (DFFE, 2019).

Table 2: Spatial data used in the landscape scoping assessment (DFFE, 2019).

Sensitivity Feature Class	Data Source & Date of Publications	Sensitivity Mapping Application		
		Sensitivity	Wind Buffer Distance increments from the feature class	Solar Buffer Distance
Topographic features, including mountain ridges	Inferred from Digital Elevation Model (DEM), 2015, National Geospatial Information (NGI).	VH	0 - 500m	0 – 250m
Steep slopes	Modelled from DEM, 2015, NGI.	Very High Sensitivity areas with slopes of more than 1:4	Feature	Feature
		High Sensitivity areas with slopes between 1:4 and 1:10	Feature	Feature
Major rivers, water bodies perennial rivers and wetlands with scenic value as identified by landscape specialists	National Freshwater Ecosystem Priority Areas (NFEPA) 2011	VH	0 – 500m	0 – 500m
		H	0 – 250m	0 – 250m
		M	250 – 500m	250 – 500m
Coastal zone	Surveys and Mapping 1:50 000 topographical maps of South Africa	VH	0 1km	0 – 1km
		H	1 – 2km	1 2km
		M	2 – 4km	2 – 3km
Protected Areas : National Parks	South African Protected Areas Database (SAPAD) – Q2, 2017, SANParks	VH	0 – 5km	0 – 2km
		H	5 10km	2 – 4km
		M	10 – 15km	4 – 6km
Protected Areas: Nature Reserves	SAPAD – Q2, 2017	VH	0 – 3km	0 – 1km
	South African Conservation Areas Database (SACAD) – Q1, 2017	H	3 – 5km	1 – 2km
		M	5 – 10km	2 – 3km
Private reserves and game farms	Provincial Private Reserves/Conservation Areas and Game Farms	VH	0 – 1.5km	0 – 500m
		H	1.5 – 3km	500 – 1km
		M	3 – 5km	1 – 2km
Cultural landscapes	Not mapped	VH	Feature	Feature
		H	0 500m	500m – 1km
		M	500m – 1km	1 – 2km
Heritage Sites Grades I, II and III	SAHRA, 2015	VH	Feature	Feature
		H	0 500m	0 500m
		M	500m – 1km	500m – 1km
Towns and villages	AfriGIS SG Towns, 2017	VH	0 – 2km	0 – 500m
		H	2 – 4km	500 – 1km
		M	4 – 6km	1 – 2km
National roads	NGI, 2016	VH	0 – 1km	0 – 500m
		H	1 – 2.5km	500 – 1km
		M	2.5 – 5km	1 – 2km
Scenic routes		VH	0 – 1km	0 – 500m

Sensitivity Feature Class	Data Source & Date of Publications	Sensitivity Mapping Application		
		Sensitivity	Wind Buffer Distance increments from the feature class	Solar Buffer Distance
	Western Cape Department of Transport, 2013	H	1 – 2.5km	500 – 1km
		M	2.5 – 5km	1 – 2km
Provincial and arterial routes		VH	0 – 500m	-
		H	500 – 1km	
		M	1km – 3km	
Passenger rail lines		VH	0 – 500m	0 – 250m
		H	500 – 1km	250 – 500m
		M	1km – 3km	500 1km
Small airfields	REDZs 1 SEA dataset, EGI SEA dataset, 2015	VH	0 3km	0 3km
Square Kilometre Array (SKA) corridors	Square Kilometre Array SEA	VH	0 36km	0 16km

VH = Very High; H = High; M = Medium; REDZ = Renewable Energy Development Zone
***Feature refers to the actual sensitivity feature class e.g. the actual delineated and declared heritage site, thus no buffer.**

The Tourneé 2 Solar PV Park is not located within any REDZ nor within any Electricity Grid Infrastructure (EGI) as per GN 113.

Furthermore, according to the South African Renewable Energy EIA Application Database (REEA, 2021) there are two approved applications for renewable energy facilities (wind and solar) within a 30 km radius of the Tourneé 2 Solar PV Park.

International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability

The IFC Sustainability Framework articulates the Corporation's strategic commitment to sustainable development, and is an integral part of IFC's approach to risk management. The sustainability framework comprises IFC's Policy and Performance standards on Environmental and Social Sustainability, and IFC's Access to Information Policy. The IFC Performance Standards (PS) are designed to assist the client in designing and implementing a project in a manner where risks and impacts associated with the project are identified and mitigated to ensure the project is completed sustainably. The applicant deemed it necessary that the environmental assessment had to consider, where applicable and/or include the Equator Principles as well as Performance Standards 1,3,4,6 and 8. For a detailed description of the Performance Standards please see **Appendix A**.

In the context of the visual assessment the following IFC Performance Standards are applicable:

- **IFC PS1** is applicable to all projects which pose potential risk and may have an impact on the receiving environment. IFC PS1 (2012) states that should the host country have

legislative control for the management of the environment that overlaps with the guidelines of the IFC standards, the more stringent measure should be implemented for the project. The objectives of IFC PS1 (2012), where applicable to the freshwater assessment, are summarised as follows:

- The identification and quantification of environmental risks and impacts associated with the proposed Tourneé 2 Solar PV Park, as well as the identification of -mitigation measures to be implemented at the site to minimise or avoid said risks and impacts (Please see Section 5 for the impacts and mitigation measures pertaining to the proposed Tourneé 2 Solar PV Park);
- To encourage and ensure that the client runs the project as sustainably as possible using efficient and effective environmental management plans; and
- To ensure that relevant stakeholders (e.g. local communities, government, etc.) are aware of the project and their respective communications and queries are responded to and managed effectively.

- **PS 3** recognizes that increased economic activity and urbanisation often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. The objectives of PS 3 is to:

  I. Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities;
  II. To promote more sustainable use of resources, including energy and water; and
  III. To reduce project-related greenhouse gases (GHG) emissions.

This assessment focused on the impact that the proposed development will have on the aesthetics of the landscape related to Tourneé 2 Solar PV Park and surrounding environment by implementing an approved Impact Assessment (Section 5). The impact assessment was applied assuming that the mitigation hierarchy as advocated by the DEA *et al.* (2013) would be followed, i.e. the impacts would be avoided, minimised if avoidance is not feasible, rehabilitated as necessary and offset if required.

- **PS 8** recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity. The objectives of this PS is to

protect cultural heritage from adverse impacts of project activities and support its preservation and to promote the equitable sharing of benefits from the use of cultural heritage.

According to the DWS National Web-Based Screening Tool (2022), the Tourneé 2 Solar PV Park is situated within an area that displays a low sensitivity in terms of Archeological and Cultural Significance.

Equator Principles

The Equator Principles are intended to serve as a common baseline framework for financial institutions to identify, assess and manage environmental and social risks when financing Projects.

Other

- Visual and aesthetic resources are also protected by local authorities, where policies and by-laws relating to urban edge lines, scenic drives, special areas, signage, communication masts, etc. have been formulated; and
- Other decision-making authorities such as the Department of Water and Sanitation (DWS) and relevant authorities of the local and district municipality, in terms of their particular legislative frameworks, may also require VIAs to support informed decision-making.

3. METHOD OF ASSESSMENT

3.1 Desktop Assessment

The method of assessment for this report is based on a spatial analysis of the Tourneé 2 Solar PV Park and the surrounding areas, using Geographic Information Systems (GIS) such as Planet GIS, ArcGIS, Global Mapper as well as digital satellite imagery, photographs, various databases and most relevant available data on the Tourneé 2 Solar PV Park and surroundings. The desktop assessment served to guide the field assessment through identifying preliminary areas of importance in terms of potential sensitive receptors possibly exposed to potential visual impacts.

The desktop study included an assessment of the current state of the environment of the area including the climate of the area, topography, land uses and land cover with data obtained from the websites of the South African National Biodiversity Institute (SANBI) and the Agricultural Research Council (ARC). All databases used were published within the last 5 years and contain up to date and relevant information.

During the desktop assessment, which took place prior to and in preparation of the field assessment, the 1:50 000 topographical map, as well as high-definition aerial photographs from Google Earth Pro were used to identify the dominant landforms and landscape patterns. These resources together with digital elevation data were utilised to establish a parameter within which potential sensitive receptors were to be identified via Google Earth Pro. These parameters can henceforth be referred to as the visual assessment zone. Based on the mountainous terrain of the area, the visual assessment zone encompasses a 5 km radius of the Tourneé 2 Solar PV Park, on a desktop level. The potentially sensitive receptors identified within the visual assessment zone during the desktop assessment was verified during the field assessment.

Detailed assessment methods used to determine the landscape characteristics of the receiving environment and potential visual impacts of the project are outlined in the relevant sections below as well as in Appendices A – F.

3.2 Field Assessment

A field assessment was undertaken during the summer season on the 7th and 8th of February 2023. The season in which the field assessment was undertaken does not have any considerable effect on the significance of the impacts identified, the mitigation measures, or the conclusions of the assessment since the vegetation cover does not vary significantly over the seasons, as the area is characterised by Soweto Highveld Grassland.

The field assessment included a drive-around and on-foot survey of the Tourneé 2 Solar PV Park and drive around in the visual assessment zone (5 km radius), in order to determine the visual context within which the proposed project is to be developed. The visibility of an object decreases exponentially the further away the observer is from the source of impact. Points from where the proposed solar facilities were determined to be visible were recorded (making use of Global Positioning Systems (GPS) to confirm these aesthetically sensitive viewpoints and potential sensitive visual receptors in relation to the proposed project.

4. PRELIMINARY VISUAL RESULTS

4.1 Public Involvement

A public involvement process will be initiated as part of the EA Assessment application process, whereby stakeholders are invited to provide input concerning the proposed

development. Should any comments be received during this process, the comments will be addressed and the report will be amended.

4.2 Development Category and Level of Impact Assessment

Through the application of the VIA methods of assessment as presented in Appendix A, it was determined that the proposed project can be defined as a Category 5 development, which includes renewable energy structures. According to the National Web-Based Screening Tool (2023), the overall Archaeological and Cultural Heritage Combined Sensitivity of the Tourneé 2 Solar PV Park is considered low, thus with the environment being classified as low cultural significance, a high visual impact is still possible.

The Screening Tool further indicates that the majority of the Tourneé 2 Solar PV Park has a very high sensitivity in terms of the landscape (solar) theme sensitivity as the area is believed to have mountain tops and high ridges. The eastern portion of the Tourneé 2 Solar PV Park is considered to have no sensitivity. Based on the field assessment it is evident that there are no high ridges or mountain tops within the Tourneé 2 Solar PV Park as the terrain within the Tourneé 2 Solar PV Park is gently sloping, with the surrounding landscape displaying undulating terrain, with no prominent outcrops or ridges in this specific area. In terms of the above-mentioned, the very high sensitivity as per the screening tool outcome is thus not supported and classification as a low sensitivity site is considered more appropriate. See Appendix I for the outcome of the Screening Tool and verification thereof.

Based on the outcome of the desktop and field assessments, it is evident that the number of potential sensitive receptors situated within the visual assessment zone is not more than 20, comprising of farmsteads and gravel roads. Since the Tourneé 2 Solar PV Park is located adjacent to the ash dump of the Tutuka Power Station, and within 5 km of the Tutuka Power Station, the proposed solar facility is located in an area where anthropogenic structures, and particularly those related to energy generation, form part of the skyline, and due to the relatively low height of the proposed infrastructure it will not be significantly visually intrusive on the receiving environment. Furthermore with the colour palette of the Tourneé 2 Solar PV Park it is likely to blend in with the silhouette of the ash dump especially to sensitive receptors located to the north, and the ash dump will completely screen view from sensitive receptors located south.

During the field assessment if was further evident that the undulating topography and cultivated fields in the surrounding area, either partially or completely obscures the view towards the Tourneé 2 Solar PV Park, therefore the visual impact for the Tourneé 2 Solar PV

Park is considered moderate as the visual intrusion on the receiving environment will be limited. The proposed Tourneé 2 Solar PV Park is therefore likely to have an overall moderate visual impact on the receiving environment, therefore a Level 3 Assessment was undertaken versus a level 4 Assessment that would be required for a project of high or very high sensitivity.

4.3 Description of the Receiving Environment

To holistically describe the receiving environment, this section of the report aims to determine the intrinsic value of the receiving landscape including aspects of the natural, cultural and scenic landscape, taking both tangible and intangible factors into consideration. General views of the landscape associated with the Tourneé 2 Solar PV Park and surrounds with respect to the terrain, vegetation cover (grasses and cultivated fields) and overall character are indicated in the figures below.

Figure 5: General view of the Tourneé 2 Solar PV Park, indicating the cultivated fields (top), the ash dump (middle) and grassland vegetation with gently sloping terrain (bottom).

Table 3: Summary of the visual assessment of the Tourneé 2 Solar PV Park and surrounds.

Climate (Appendix D)	As a result of climate variations throughout the year, the appearance and perception of the landscape within and surrounding the Tourneé 2 Solar PV Park changes with the seasons. Early morning and evening mist often associated with these areas, can limit the visibility of the proposed infrastructure at different times during the day, particularly at further distances. Since the Mpumalanga Province falls within the region that is characterised by summer rainfall, the visibility of the proposed infrastructure is likely to be lower during the summer months especially during periods of high rainfall.	**Landscape Character and Quality**	The Tourneé 2 Solar PV Park is located in a rural area forming the landscape character of the Highveld plateau with a colour palette of mostly green with periodic shades of brown (when fields are harvested). The Highveld plateau is relatively widespread, indicating that the landscape character is relatively common. The landscape is considered homogenous in terms of vegetation and colour palette, and the undulating terrain is fairly common in the larger Mpumalanga Province, and with the Tutuka Power Station forming part of the skyline, the scenic quality of the area is considered moderately low.
Land Use and Visual Receptors (Appendix E, Figure 7)	The Tourneé 2 Solar PV Park is situated in cultivated fields interspersed with open grassland utilised for grazing, and freshwater ecosystems. Due to the dominant land use of the area being agricultural practices, the majority of sensitive receptors located within the visual assessment zone comprised of farmsteads. Since the Tutuka Power Station and the associated ash dump form part of the skyline (i.e. dominant in the landscape) the farmers are used to industrial infrastructure in the landscape, hence the farmsteads are considered moderately sensitive receptors. According to SAPAD (2022), SACAD (2022) and NPAES (2019) the Tourneé 2 Solar PV Park is not located within a 10 km radius of any protected or conservation areas. Since the Tourneé 2 Solar PV Park is situated within a relatively remote area, the only roads present within a 5 km radius are farm roads, which are utilised infrequently and	**Topography**	The local topography of the Tourneé 2 Solar PV Park is relatively flat to gently sloping. With the local topography of the Tourneé 2 Solar PV Park being relatively flat, it is unlikely to assist in absorbing and/ or screening the Tourneé 2 Solar PV Park. The ash dump will however assist in absorbing the Tourneé 2 Solar PV Park. The field assessment did however indicate as distance increases the visibility of Tourneé 2 Solar PV Park decreases, as such the undulating terrain does have an effect on the visibility of the Tourneé 2 Solar PV Park. Please refer to Figures 7 and 8 for the elevation and slope models of the area.

	predominantly by the farmers and workers and the R38 (2 km west) and R39 (4.4 km south) roadways. Due to their momentary views and experience of the receiving environment motorists are classified as low sensitive receptors, however glint and glare from any shiny surface may momentarily distract a motorist from the road. Even though SEAs (2019) do not take into account farm roads, it is recommended that some form of buffer be placed on the road traversing the Tourneé 2 Solar PV Park, to ensure the safety of the road users. As such, a 50 m buffer, as a minimum, around the road was recommended during the Scoping Phase of the project, where no solar panels should be placed. This buffer was reduced to 30m during the EIA Phase since the road is mostly utilised by farmers and workers.	**Sense of Place**	Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. It is created by the land use, character and quality of a landscape, as well as by the tangible and intangible value assigned thereto. The sense of place associated with the Tourneé 2 Solar PV Park is related to the landscape character type, defined as rural, relatively flat to gently sloping with limited anthropogenic movement. The Tourneé 2 Solar PV Park can be described as calm, tranquil and peaceful, with limited development and movement, with the exception of the shepherds moving with the livestock and farmers working in the cultivated fields. The sense of place is however not unique to the Tourneé 2 Solar PV Park as it extends to the larger region. During the construction phase of the Tourneé 2 Solar PV Park, the sense of place will however be affected, shifting the mood to busy and disturbed with construction vehicles and potential need for some earth moving equipment, however, once the panels are operational there will be limited additional vehicular movement in and out of the area, thus returning the area to a calm and tranquil landscape.
Vegetation Cover (Appendix D)	The Tourneé 2 Solar PV Park falls within the Grassland biome and Mesic Highveld Grassland bioregion according to the spatial data from 2018 Final Vegetation Map of South Africa, Lesotho and Swaziland. The field assessment indicated that the Tourneé 2 Solar Park is characterised by three habitat units: grassland (still regarded as indigenous vegetation), freshwater ecosystems and transformed habitat (cultivated fields) (Appendix D). For further detail on the vegetation characteristics of Tourneé 2 Solar PV Park, refer to the biodiversity report (STS, 2023). With the area dominated by grasses of moderate to low heights, the vegetative component of the Tourneé 2 Solar PV Park and immediate surrounds will not be able to assist in screening the Tourneé 2 Solar PV Park. The farmsteads do however have existing dense tree lines which may partially obscure the view towards Tourneé 2 Solar PV Park.	**Night-Time Lighting (Appendix F)**	The Tourneé 2 Solar PV Park is located in a rural area where the only sources of lighting are the farmsteads and Tutuka Power Station. The lighting environment of the region is therefore considered rural (Zone E2 [Low District Brightness]). Development of the Tourneé 2 Solar PV Park may potentially be a source of light pollution during the construction and operational phases, due to security lighting on the perimeter fence and at the buildings (substation, BESS and O&M Buildings) and temporary construction camps. Overall, the impact significance of potential night-time lighting is expected to be moderately low and will be limited to a local area, as the Tourneé 2 Solar PV Park is not a development that requires a significant amount of lighting. This corresponds with Bortle's Scale – indicating that Tourneé 2 Solar PV Park falls within a Class 4 area (rural/suburban transition) where the light pollution is low and distant large objects are distinct. As such the introduction of lighting sources in an area with low light pollution results in the Tourneé 2 Solar PV Park to somewhat contribute to the effects of sky glow and artificial lighting in the region. It should however be noted that the undulating topography will reduce the range of visibility of the proposed lighting from the Tourneé 2 Solar PV Park.

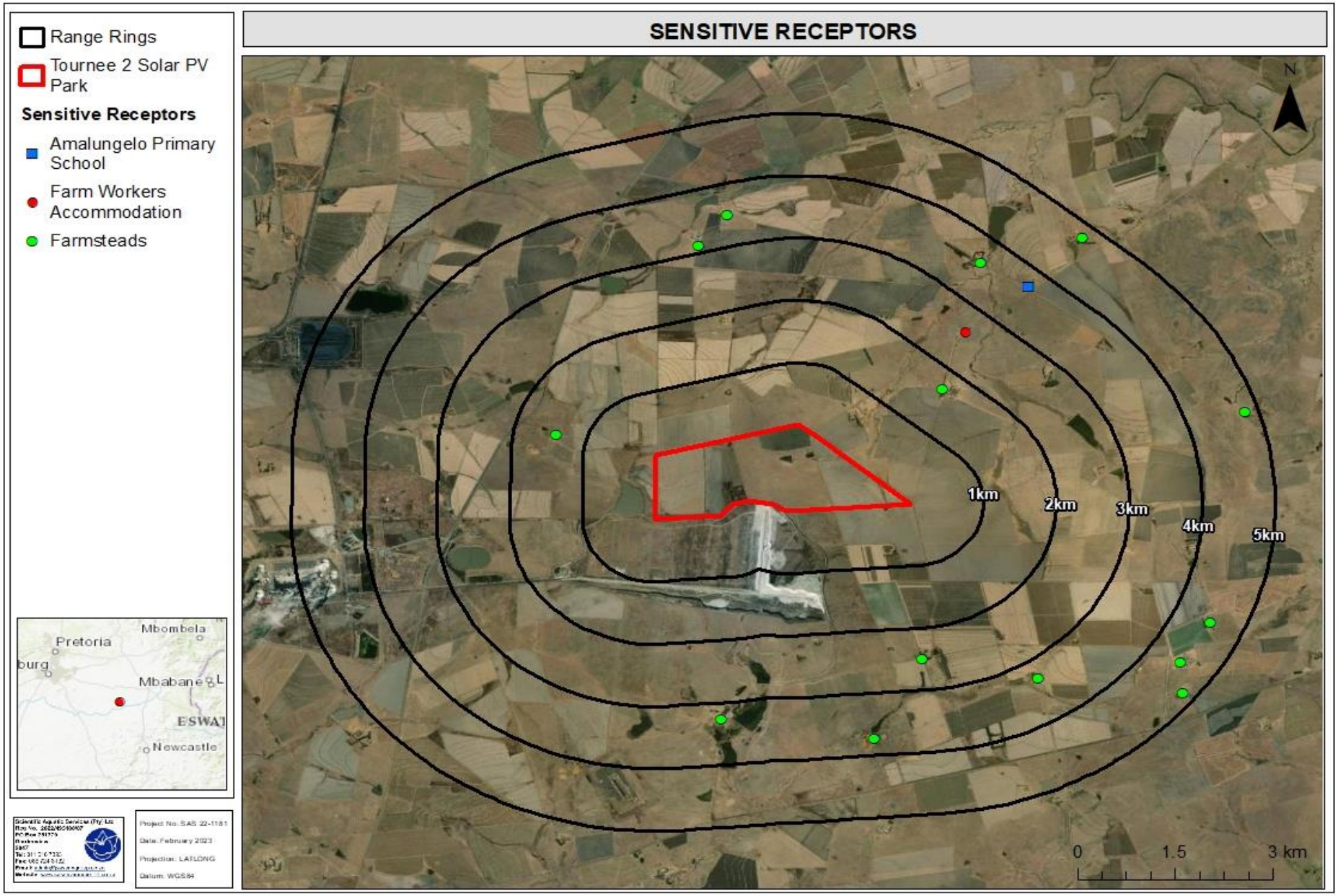


Figure 6: Map indicating the location of potential sensitive receptors within 5km of the Tourneé 2 Solar PV Park.

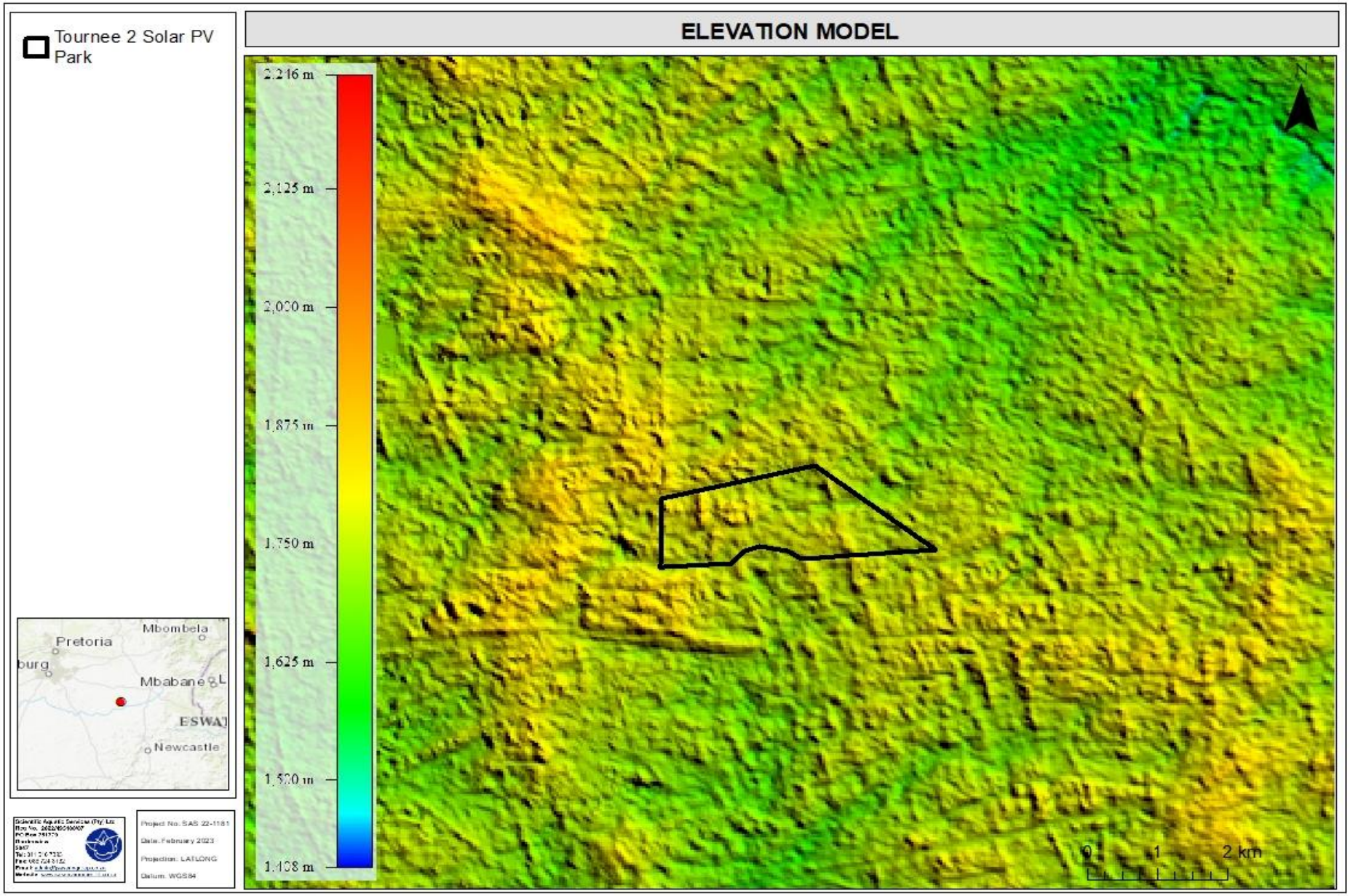


Figure 7: False colour elevation rendering depicting the topographical character of the Tourneé 2 Solar PV Park .

Figure 8: Monochromatic map indicating the general relief associated with the Tourneé 2 Solar PV Park.

The figures below are representative photographs of visual vantage points within the landscape, in the direction of the Tourneé 2 Solar PV Park. From the images below it is evident that the Tourneé 2 Solar PV Park is not significantly visually intrusive.

Figure 9: Photograph taken from the D516, located approximately 4 km west of Tourneé 2 Solar PV Park. As evident in the photograph, the Tutuka ash dump and Tutuka Powerstation is present in the landscape and forms part of the skyline. The Tourneé 2 Solar PV Park is partially screened by the existing dense vegetation in the landscape. Dashed red arrow indicates the proposed PVSEF location.

Figure 10: Image taken from a point along the gravel road traversing the Tourneé 2 Solar PV Park, approximately 2,6 km to the south, indicating that the undulating terrain renders no visibility of the Tourneé 2 Solar PV Park (dashed red arrow).

Figure 11: Image taken along the R38 road located approximately 3,4 km to the west of the Tourneé 2 Solar PV Park. Due to the distance and undulating terrain the PVSEF will not be visible form this portion of the R38 roadway (dashed red arrow).

5. IMPACT ASSESSMENT

Potential impacts on the visual environment in the region as a result of the proposed Tourneé 2 Solar PV Park facilities and based on available information, are discussed in the sections below, and according to the method outlined in Appendix C. This section presents an assessment of the significance of the impacts prior to mitigation and management measures being put in place and taking into consideration the available mitigatory measures, assuming that they are fully implemented.

The project life cycle for a new Solar PV Plant includes the following primary activities:

Feasibility phase: This phase includes confirming the feasibility of the Project by evaluating and addressing the following ➢ Solar resource assessment; ➢ Site selection; ➢ Project land allocation; ➢ Project yield assessment; ➢ Permitting and licensing; ➢ Legal agreements; ➢ Socio-economic development; ➢ Industrialisation and localisation; ➢ Project cost determination; ➢ Project financing; and ➢ Risk analysis.	**Design phase** ➢ Confirming key design features such as the type of PV module to be used, tilting angle, mounting and tracking systems, inverters, and module arrangement; ➢ Confirming specifications for the components of the Solar PV facilities ; ➢ Preparing detailed designs (layout, civil, electrical); ➢ Preparing construction plans; ➢ Preparing the Project schedule; and ➢ Preparing the commissioning plans.
Construction phase	**Operational phase**

➢ Establishing access roads; ➢ Preparing the site (fencing, clearing, levelling and grading, etc.); ➢ Establishing the site office; ➢ Establishing laydown areas and storage facilities; ➢ Transporting equipment to site; ➢ Undertaking civil, mechanical and electrical work; and ➢ Reinstating and rehabilitating working areas outside of permanent development footprint.	Once the PV facilities are up and running the facility will be largely self-sufficient. Operational activities associated with the maintenance and control of the Solar PV facility will include the following ➢ Testing and commissioning the facility's components; ➢ Cleaning of PV modules; ➢ Controlling vegetation; ➢ Managing stormwater and waste; ➢ Conducting preventative and corrective maintenance; and ➢ Monitoring of the facility's performance.
Decommissioning Solar PV facilities are likely to have an operational lifetime of 20 to 30 years or more. The most likely scenario would be extension of the lifespan of the solar facilities by means of replacing individual components with newer more appropriate technology available at that time. The decommissioning phase will include measures for complying with the prevailing regulatory requirements, rehabilitation and managing environmental impacts in order to render the affected area suitable for future desirable use.	

After consideration of the findings of these assessments, recommendations and mitigation measures have been developed which will assist in minimising the proposed project's visual impact throughout the various development phases of the project. The mitigation measures outlined would serve to minimise the potential visual impacts identified to lower significance levels.

Glint and Glare Considerations

PV panels are designed to generate electricity by absorbing the rays of the sun and are therefore constructed of dark-coloured materials, and are covered by anti-reflective coatings. Indications are that as little as 2% of the incoming sunlight is reflected from the surface of modern PV panels especially where the incidence angle (angle of incoming light) is smaller i.e. the panel is facing the sun directly (LOGIS, 2021). This is particularly true for tracker arrays that are designed to track the sun and keep the incidence angle as low as possible (LOGIS, 2021).

Glint and glare occur when the sun reflects off surfaces with specular (mirror-like) properties, which include glass windows, water bodies and potentially some solar energy generation technologies (e.g. CSP heliostats and parabolic troughs). Glint is generally of shorter duration and can be described as "a momentary flash of bright light", whilst glare is the reflection of bright light for a longer duration. Glint and glare may impair the visibility of observers and cause annoyance, discomfort, or loss in visual performance.

Literature review indicates glint and glare is only likely experienced when the observer is at a higher elevation than the proposed solar PV panels and depends on the degree to which is the panels are tilted. For example the glint and glare from tracking panels with back tracking towards ground-based receptors are most common when the panels are flat in the

morning/evening (LOGIS, 2021). This is when the larger incidence angle (angle of incoming light) yields more reflected light.

The visual impact associated with glint and glare relates to the potential it has to negatively affect sensitive receptors in relative close proximity to the source, or aviation safety risk for pilots (especially where the source interferes with the approach angle to the runway). There are several farmsteads located within a 5 km radius, however only two farmsteads and one farm worker's accommodation are located within a 2 km radius. Based on elevation data, the farmstead located 1,3 km west of the Tourneé 2 Solar PV Park is located at a slightly higher elevation, indicating that the farmers might be at risk of experiencing possible glint and glare. The field assessment and digital satellite imagery further indicates that there are cultivated fields situated between the farmstead and Tourneé 2 Solar PV Park, which acts as visual screens, at least for most of the year, resulting in a lowered quantum of risk for experiencing glint and glare. The elevation data further indicates the farmstead located 1,7 km north north east and the farm workers' accommodation located 2,5 km north north east of the Tourneé 2 Solar PV Park is situated at a slightly lower elevation, as such the farmer and farm workers would not experience a reflection due to the 0° tilt (lying flat) of the panels in the mornings. The observers would theoretically be looking at the base (underside) or edge of the panels.

Based on elevation data, the gravel road traversing the Tourneé 2 Solar PV Park is at a slightly higher elevation than the proposed PV arrays located to the east and at a lower elevation than the proposed PV arrays located to the west, as such the farmers traveling along the gravel road is likely to experience less reflection of the PV arrays located west than those located east of the gravel road.

The Federal Aviation Administration (FAA) of the United States of America have researched glare as a hazard for aviation pilots on final approach and may prescribe specific glint and glare studies for solar energy facilities in close proximity to aerodromes (airports, airfields, military airbases, etc.). It is generally possible to mitigate the potential glint and glare impacts through the design and careful placement of the infrastructure. According to the DWS Screening Tool's Civil Aviation Theme, the western portion of Tourneé 2 Solar PV Park is situated within 8 km of a civil aviation aerodrome and the remainder of the site is located between 8 and 15 km of another civil aviation aerodrome. The airstrip of the Tutuka Power Station Airfield – FATT is located approximately 6,3 km west of the Tourneé 2 Solar PV Park. Airstrips with the runway situated on an east to west axis, and located at an angle of less than 30 degrees to the north and 20 degrees to the south in the southern hemisphere from a proposed PVSEF are invariably at a higher risk of experiencing glint and glare, due to the airstrip being orientated at an angle that would lead to reflection toward the runway. The abovementioned airstrip axis is orientated at a north north east to south south west direction,

which puts the airstrip at a significantly lower risk to glint and glare impacts when landing and on take-off from features in the landscape. The Tourneé 2 Solar PV Park is located at an angle between 60˚ and 65˚ to the runway axis, depending on the position within the Tourneé 2 Solar PV Park. Figure 12 below provides an illustration of the bearings from the airstrip to the Tourneé 2 Solar PV Park. Line 1 is the direction of the airstrip which is at a bearing of 18.28˚, the angle of incidence of line 2 is at a bearing of 81.08˚, indicating that the airstrip is at a 62.8˚ from the Tourneé 2 Solar PV Park. Line 3 is at bearing of 80.02˚, indicating that the airstrip is at an angle of 61.74˚ from the Tourneé 2 Solar PV Park. From the above, the risk of glint and glare on the Tutuka Power Station Airfield – FATT is reduced considerably. Should there be risk of glint and glare, it will be most significant in the mornings and in winter months when the sun rises further to the north. Should glint and glare be experienced, this could be mitigated with a simple go-around of the aircraft and landing in the opposite direction which should be possible in the early morning when winds are generally at a lower speed and direction of landing is not a significant factor. Solar PV systems can safely coexist in area where aerodromes are located, provided that mitigation measures are undertaken, such as utilising anti-reflection coating on the PV modules, texturing the PV module surface and/ or varying the alignment of the PV array (Sreenath *et al.*, 2020). Should additional mitigatory measures be deemed necessary solar panels with this technology can be utilised.

The intensity of the light reflected from the solar panels decrease with increasing distance, and is directly proportional to the size of the PV array, which in this case is a relatively big 150 MW installation.

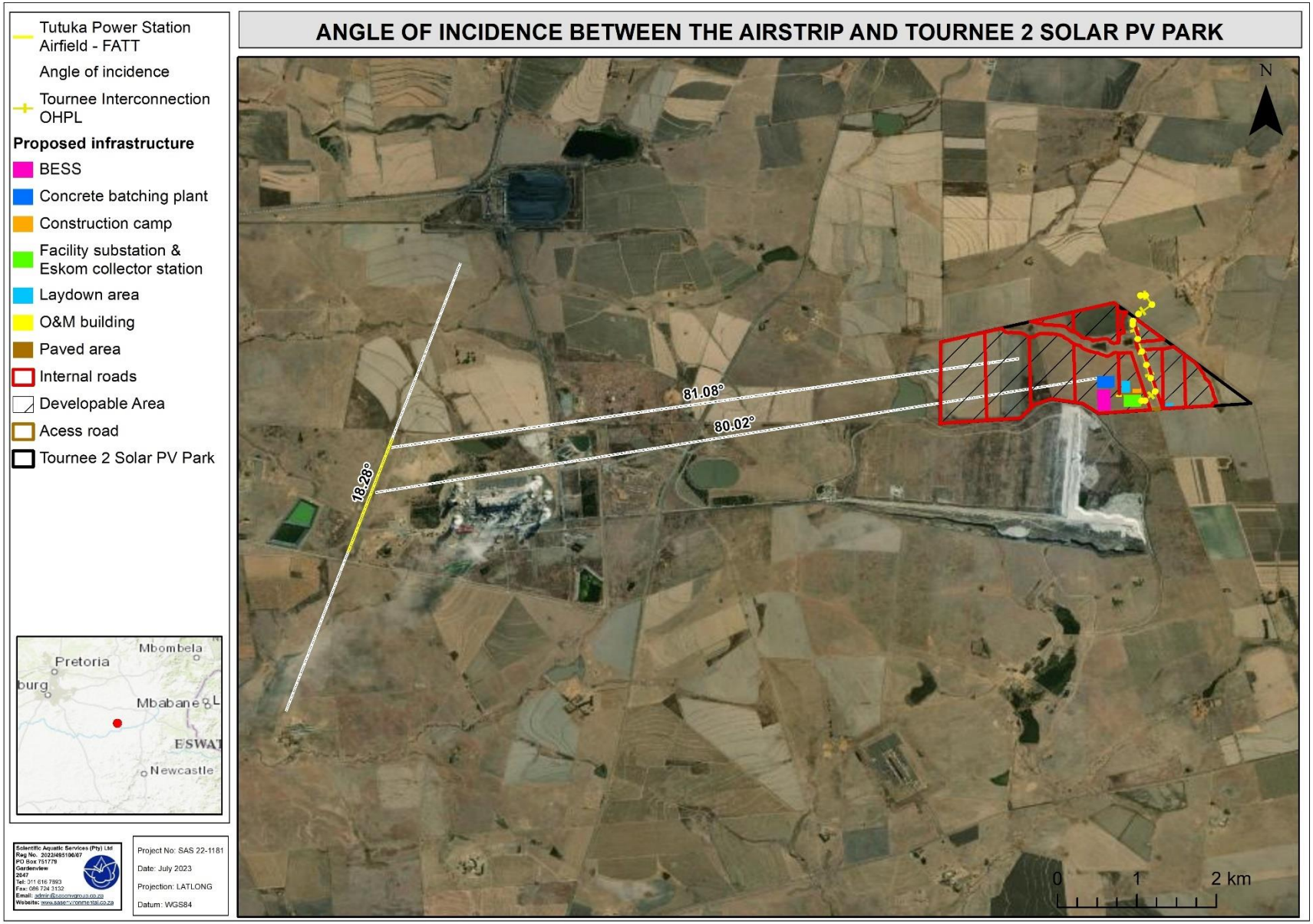


Figure 12: Map illustrating the angle of incidence between the Tutuka Power Station Airfield – FATT and Tourneé 2 Solar PV Park, for illustrative purposes.

5.1 Impact Discussion

The table below identifies potential activities that might take place during the various phases of the proposed project, which could possibly have a visual impact on the surrounding landscape. It should be noted that the activities listed in the table below were utilised during the impact assessment as pre-mitigated impacts to ascertain the significance of the perceived impacts prior to mitigation measures. The sections below present the results of the findings for each potential impact identified.

Pre-Construction	Construction	Operational	Decommissioning
Planning and placement of PV Panels in such a way that it may cause glint and glare impacts at the farmsteads in the vicinity	Site clearing, including the removal of topsoil and vegetation within the footprint.	Presence of the PVSEF within a 20 km radius where no renewable energy structures have been introduced. It should however be noted that Tourneé 2 Solar PV Park is part of the Tourneé Solar Cluster and one other applications within a 50 km radius	Demolition and removal of infrastructure leading to dust generation, erosion and changes in the visual character of the project area
Placement of PVSEF in such a way that it leads to loss of natural visual resources such as freshwater ecosystems	Excavation of foundations for substation infrastructure	Potential increased proliferation of alien floral species and further transformation of habitat leading to a change in landscape character	Potential ineffective rehabilitation leading to poor vegetation cover and the bare areas remaining present
Placement of PVSEF directly adjacent to the road traversing the Tourneé 2 Solar PV Park increasing the likelihood of motorists experiencing glint and glare	Temporary soil stockpiles potentially leading to visual intrusion	Permanent loss of vegetation underneath the bi-facial single axis trackers, due to the ground lined with crushed stone at least to a degree, leading to visual contrast	Ongoing proliferation of alien vegetation
Potential failure to initiate a concurrent rehabilitation plan and alien floral species control plan may lead to further impacts on the landscape character during later development phases	Construction and placement of PV Panels	Potential of sunlight reflecting off the PV arrays potentially creating glint and glare impacts, in particular the Tutuka Power Station Airfield and gravel road traversing the Tourneé 2 Solar PV Park	Stationary and vehicle mounted lighting during the decommissioning phase
	Construction of general surface infrastructure including internal access roads	A small and periodic increase in human activity and operational vehicles	
	An increase in dust and vehicular movement due to construction activities	Exterior lighting around the perimeter of the Tourneé 2 Solar PV Park	
	Increased amount of human activity, traffic, construction vehicles, and other equipment such as excavators and cranes	Potential lighting at night from operational vehicles	
	Use of security lighting during the construction phase	Security and other lighting around and on support structures (BESS, substation and O&M Building) could also contribute to light pollution	
Planning of light placement and overall lighting strategy at the ancillary infrastructure		Potential emergency maintenance activities conducted at night	

5.1.1 Impact on overall landscape, visual intrusion and exposure for Farmsteads

The majority of the time farmsteads have trees surrounding or partially surrounding the houses to act as windbreaks, which is also beneficial from a visual impact perspective in so that it assists in screening (or partial) the proposed infrastructure. As such the impacts below are grouped in the following manner: the farmsteads within 2 km radius, the gravel road traversing the Tourneé 2 Solar PV Park and the Tutuka Power Station Airfield.

Table 4: Impact Assessment Table for the potential visual impacts of the proposed PVSEF on the visual environment.

IMPACT NATURE	Potential impact on the overall landscape, visual intrusion and exposure of the landscape		STATUS	NEGATIVE
Impact Description	* Removal of vegetation leading to potential visual contrast, loss of visual intrusion on sensitive receptors. * Alteration of natural features, resulting in potential loss or alterations of natural vegetation (grassland), leading to loss of visual quality and visual exposure. * Operation of the PVSEF in an area where no previous renewable energy facilities are present.			
Impact Source(s)	* Construction equipment and construction workforce * Operation of PVSEF and increased vehicular and human movement.			
Receptor(s)	Farmsteads within 2 km radius			
PARAMETER	WITHOUT MITIGATION		WITH MITIGATION	
Impact Magnitude (M)	Construction Phase	4	Construction Phase	3
	Operational Phase	3	Operational Phase	3
	Decommissioning Phase	3	Decommissioning Phase	3
Impact Extent (E)	Construction Phase	2	Construction Phase	2
	Operational Phase	2	Operational Phase	2
	Decommissioning Phase	2	Decommissioning Phase	1
Impact Reversibility (R)	Construction Phase	3	Construction Phase	3
	Operational Phase	3	Operational Phase	3
	Decommissioning Phase	3	Decommissioning Phase	3
Impact Duration (D)	Construction Phase	2	Construction Phase	2
	Operational Phase	4	Operational Phase	3
	Decommissioning Phase	2	Decommissioning Phase	2
Probability of Occurrence (P)	Construction Phase	5	Construction Phase	5
	Operational Phase	5	Operational Phase	5
	Decommissioning Phase	4	Decommissioning Phase	4
Significance (S)	Construction Phase	(-) 55	Construction Phase	(-) 50
	Operational Phase	(-) 60	Operational Phase	(-) 55
	Decommissioning Phase	(-) 40	Decommissioning Phase	(-) 36
Environmental Significance Rating	Construction Phase	**Moderate**	Construction Phase	**Moderate**
	Operational Phase	**Moderate**	Operational Phase	**Moderate**
	Decommissioning Phase	**Moderate**	Decommissioning Phase	**Moderate**

CUMULATIVE IMPACTS	Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative visual impacts may be: ➢ Combined - where the PV arrays of several PVSEFs are within the observer's arc view concurrently; ➢ Successive - where the observer has to turn his / her head to see the various PVSEF's arrays; and ➢ Sequential - when the observer has to move to another viewpoint to see the various solar projects or different views of the same project development (such as when travelling along a route). The cumulative impact of PVSEFs on the landscape and visual amenity is a product of: ➢ The distance between individual PVSEFs; ➢ The distance over which the PV arrays are visible; ➢ The overall character of the landscape and its sensitivity to the infrastructures; ➢ The siting and design of the PVSEFs themselves; and ➢ The way in which the landscape is experienced. Cumulative visual impacts resulting from landscape modifications as a result of the proposed project in conjunction Tourneé 1 Solar PV Park and the other two approved applications for renewable energy within a 50 km radius, as well as any future renewable energy facilities (wind and solar facilities) in the area, must be considered. Renewable energy facilities have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. With the Tourneé Cluster PVs situated adjacent to each other and only one other approved PVSEF within a 50 km radius, the cumulative impact is considered sequential overall, however for motorists traveling along the gravel road the cumulative impact may be considered combined. Furthermore, with the moderately low viewer incidence, the cumulative visual impacted is expected to be of moderately low significance. The cumulative impact of additional traffic in the area on the local and regional roads as well as combined impacts from night-time lighting of the substations will affect the sense of place of the larger region. No cumulative impacts are anticipated from the proposed project and other future projects in the area which are of unacceptably high significance.
CONFIDENCE	Medium
MITIGATION MEASURES	➢ All construction areas must be kept in a neat and orderly condition at all times; ➢ The development footprint and disturbed areas associated with the construction phase of the project should be kept as small as possible, with as little indigenous vegetation being cleared as possible; ➢ Construction boundaries should be clearly demarcated to minimise areas of surface disturbance; ➢ Site offices and temporary structures should be limited to single storey and situated at such a location so as to reduce visual intrusion; ➢ Any areas for temporary material storage and other potentially intrusive activities must be screened from view as far as possible, i.e. not situated in a direct line of sight from a receptor (farmsteads); ➢ An efficient removal system of waste and rubble must be ensured during the construction phase; ➢ The duration of the construction phase should be reduced as far as possible through careful planning, to reduce the exposure of bare ground and thus potential of dust generation especially on windy days; ➢ The height of any temporary structures such as soil stockpiles should be kept as low as possible; ➢ Excavation and earthmoving activities are to be kept to a minimum and limited to foundation areas for substations and support structures of the PV panels; ➢ During the construction phase all dirt and access roads, as well as other areas cleared of vegetation for construction purposes will require effective dust suppression such as regular watering;

	➢ Direct loss of or damage to valuable natural visual resources such as the freshwater ecosystems in the area should be actively avoided; ➢ As far as possible, existing roads are to be utilised for construction and maintenance purpose, to limit cumulative impacts from roads, as well as to limit the extent of the vegetation cleared for the purpose of the project; ➢ A transparent fence, should be muted in colour and located as close as possible around the PVSEF, to avoid impeding visibility and ensure that it is visually pleasing to observers; ➢ The use of highly reflective material for storage, BESS and security facilities should be avoided. Lighter tones attract an observer while darker shades recede from the viewer, therefore pure whites and bright colours should be avoided, unless such colours are present in the landscape; ➢ It must be ensured that all buildings / containers and other structures fit its surroundings through the appropriate use of colour and material selection in order to lower the visibility of the proposed infrastructure. It is recommended that neutral colours be utilised, where possible; ➢ The use of permanent signage and project construction signs should be minimised and visually unobtrusive; ➢ Erosion, which may lead to high levels of visual contrast and further detract from the visual environment, must be prevented throughout the lifetime of the project by means of putting soil stabilisation measures in place where required and through concurrent rehabilitation; ➢ Internal access roads must be suitably maintained to limit erosion and dust pollution. To reduce the dust accumulation on the solar PV panels, and hence the more regular cleaning thereof, it is recommended that the internal roads be surfaced; ➢ Vehicle speed on unpaved roads must be reduced to limit dust creation. The following speed is recommended: 40km/h for normal vehicles and 30km/h for heavy vehicles; ➢ Concurrent/ progressive rehabilitation of temporary cleared areas, including reshaping and revegetation, must be implemented as soon as possible; ➢ Upon completion of construction, the project area should be left in a condition that protects the soil surface against erosion and instability; ➢ Indigenous and locally occurring plant species selected for use in re-vegetation should be selected taking quick growth rates into consideration in order to cover bare areas and prevent soil erosion; and ➢ Upon decommissioning, it is important that vegetation be reinstated to blend with the natural environment.

5.1.2 Impact on overall landscape, visual intrusion and exposure for the gravel road

The farmers traveling along the gravel road will experience the highest visual impact, however momentarily. Even though motorists have momentary views of their surroundings, it is imperative to reduce infrastructure in such surroundings, which could potentially distract the driver which could potentially lead to an accident. As such during the Scoping Phase of this project a 50 m buffer around the gravel road was recommended where no PV panels should be placed, to reduce the quantum of risk of glint and glare experienced by the farmers. Further to this, as the road is mostly utilised by farmers, the buffer was reduced to 30m. It should be noted that even though no solar panels are to be placed within the 30 m buffer, all other ancillary infrastructure such as (but not limited to) the substation, O&M building and overhead powerline may be placed within the 30 m buffer provided that mitigation measures such as planting a row of trees between the infrastructure and road is implemented. Based on the

layout assessed during the EIA Phase, the 30 m buffer was adhered to, hence reducing the glint and glare risk, however the PVSEF will still remain visible to the motorists.

Table 5: Impact Assessment Table for the potential visual impacts of the proposed PVSEF on the visual environment.

IMPACT NATURE	**Potential impact on the overall landscape, visual intrusion and exposure of the landscape**		**STATUS**	**NEGATIVE**
Impact Description	* Removal of vegetation leading to potential visual contrast, loss of visual intrusion on sensitive receptors. * Alteration of natural features, resulting in potential loss or alterations of natural vegetation (grassland), leading to loss of visual quality and visual exposure. * Operation of the PVSEF in an area where no previous renewable energy facilities are present.			
Impact Source(s)	* Construction equipment and construction workforce * Operation of PVSEF and increased vehicular and human movement.			
Receptor(s)	Gravel road			
PARAMETER	**WITHOUT MITIGATION**		**WITH MITIGATION**	
Impact Magnitude (M)	Construction Phase	4	Construction Phase	3
	Operational Phase	4	Operational Phase	3
	Decommissioning Phase	3	Decommissioning Phase	3
Impact Extent (E)	Construction Phase	3	Construction Phase	3
	Operational Phase	2	Operational Phase	2
	Decommissioning Phase	2	Decommissioning Phase	1
Impact Reversibility (R)	Construction Phase	3	Construction Phase	3
	Operational Phase	3	Operational Phase	3
	Decommissioning Phase	3	Decommissioning Phase	3
Impact Duration (D)	Construction Phase	2	Construction Phase	2
	Operational Phase	3	Operational Phase	3
	Decommissioning Phase	2	Decommissioning Phase	2
Probability of Occurrence (P)	Construction Phase	5	Construction Phase	5
	Operational Phase	5	Operational Phase	5
	Decommissioning Phase	4	Decommissioning Phase	4
Significance (S)	Construction Phase	(-) 55	Construction Phase	(-) 50
	Operational Phase	(-) 60	Operational Phase	(-) 55
	Decommissioning Phase	(-) 40	Decommissioning Phase	(-) 36
Environmental Significance Rating	Construction Phase	**Moderate**	Construction Phase	**Moderate**
	Operational Phase	**Moderate**	Operational Phase	**Moderate**
	Decommissioning Phase	**Moderate**	Decommissioning Phase	**Moderate**
CUMULATIVE IMPACTS	Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative visual impacts may be: ➢ Combined - where the PV arrays of several PVSEFs are within the observer's arc view concurrently;			

	➢ Successive - where the observer has to turn his / her head to see the various PVSEF's arrays; and ➢ Sequential - when the observer has to move to another viewpoint to see the various solar projects or different views of the same project development (such as when travelling along a route). The cumulative impact of PVSEFs on the landscape and visual amenity is a product of: ➢ The distance between individual PVSEFs; ➢ The distance over which the PV arrays are visible; ➢ The overall character of the landscape and its sensitivity to the infrastructures; ➢ The siting and design of the PVSEFs themselves; and ➢ The way in which the landscape is experienced. Cumulative visual impacts resulting from landscape modifications as a result of the proposed project in conjunction Tourneé 1 Solar PV Park and the other two approved applications for renewable energy within a 50 km radius, as well as any future renewable energy facilities (wind and solar facilities) in the area, must be considered. Renewable energy facilities have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. With the Tourneé Cluster PVs situated adjacent to each other the cumulative impact experienced by motorists may be considered combined. Furthermore, with the gravel road mostly utilised by farmers living in the area, they are accustomed to the ash dump of the Tutuka Power Station and Tutuka Power Station itself, thus the cumulative visual impacted is expected to be of moderately low significance. The cumulative impact of additional traffic in the area on the local and regional roads as well as combined impacts from night-time lighting of the substations will affect the sense of place of the larger region. No cumulative impacts are anticipated from the proposed project and other future projects in the area which are of unacceptably high significance.
CONFIDENCE	Medium
MITIGATION MEASURES	➢ Please refer to the mitigation measures described in Table 4. Additional mitigatory measures applicable to the gravel road are listed below: ➢ Recent studies indicated that an extra layer of anti-reflective material on the outer surface of the glass can further limit sunlight reflection (Sreenath *et. al.,* 2019). This should be helpful to reduce the potential glint and glare experienced especially where the gravel road is slightly elevated above the PVSEF; ➢ Another design feature to limit glint and glare is to roughen the protective glass surface, reducing specular reflection (Sreenath *et. al.,* 2019); ➢ A possible mitigatory technique that can be employed is possible adjustment in the tilt and orientation angle of PV modules. These changes can alter the direction of solar reflection and hence the degree of glare impact. The Solar Glare Hazard Analysis Tool (SGHAT) can be used to check the glare potential for the proposed PV system design values. SGHAT has the capability to identify PV configurations that produce no glare and the design with maximum energy production can be selected (Sreenath *et. al.,* 2019); and ➢ It is further recommended that a row of trees be planted on both sides of the gravel road, for the length of the PVSEF, to assist in screening, at least to a degree, the proposed PVSEF.

5.1.3 Impact on overall landscape, visual intrusion and exposure for the Tutuka Power Station Airfield

As discussed above, the airstrip of the Tutuka Power Station axis is orientated at a north north east to south south west direction, which puts the airstrip at a significantly lower risk to glint and glare impacts when landing and on take-off from features in the landscape. The Tourneé

2 Solar PV Park is located at an angle between 60˚ and 65˚ to the runway axis, depending on the position within the Tourneé 2 Solar PV Park. From the above, the risk of glint and glare on the Tutuka Power Station Airfield – FATT is reduced considerably. With the Airfield located approximately 6,3 km west of the Tourneé 2 Solar PV Park, the potential visual impacts experienced during the construction and decommissioning phases of the project are considered negligible for the Airfield, since potential glint and glare will not be experienced during these phases, as such only the construction phase was assessed in the table below.

Table 6: Impact Assessment Table for the potential visual impacts of the proposed PVSEF on the visual environment during the operational phase.

IMPACT NATURE	**Potential visual intrusion and exposure of the landscape**	**STATUS**	**NEGATIVE**
Impact Description	* Potential glint and glare experienced		
Impact Source(s)	* Operation of PVSEF		
Receptor(s)	Tutuka Power Station Airfield		
PARAMETER	**WITHOUT MITIGATION**	**WITH MITIGATION**	
Impact Magnitude (M)	2	1	
Impact Extent (E)	3	2	
Impact Reversibility (R)	3	1	
Impact Duration (D)	3	3	
Probability of Occurrence (P)	2	2	
Significance (S)	(-) 20	(-) 14	
Environmental Significance Rating	**Low**	**Low**	
CUMULATIVE IMPACTS	The cumulative visual impacts of PVSEFs on airfields can vary depending on several factors: **1. Scale and size:** Large PVSEFs can cover significant land areas and may be visible from the airfield or surrounding areas. The size and scale of the solar panels can create a noticeable change in the landscape. The sized of the Tourneé 2 Solar PV Park is relative, therefore there will be a noticeable change in the surrounding cultivated landscape. **2. Glare and reflection:** Glare from solar panels can potentially create visibility issues for pilots during critical phases of flight, such as take-off and landing. Proper panel orientation and glare-reducing measures can help mitigate this impact. Due to the axis of the airstrip and the angle of Tourneé 2 Solar PV Park, the likelihood of pilots experiencing glint and glare is considered low. **3. Contrast and aesthetics:** The contrast between a PVSEF and the surrounding landscape can affect the visual perception of the area. Some people may find the visual contrast appealing, while others may consider it visually intrusive or detracting from the natural or built environment. With Tourneé 2 Solar PV Park situated in close proximity to the Tutuka Power Station, the landscape is accustomed to energy generation infrastructure. **4. Screen age:** In some cases, visual screening or vegetation buffers may be installed around solar farms to minimize their visual impact. These buffers can consist of trees, shrubs, or other natural elements that help blend the solar farm into the surrounding environment. It's important to note that authorities responsible for airfield operations and land use planning typically have specific guidelines and procedures in place to assess and		

	manage the potential visual impacts of PVSEFs in proximity to airfields. With the Tourneé Solar PV Cluster and one other approved solar facility within a 50 km radius, the cumulative visual impact on civil aviation may be considered low, mainly due to the axis of the airstrip.
CONFIDENCE	Medium
MITIGATION MEASURES	➢ A mitigatory measure that could be implemented is that the PV Panels are no longer managed as flat by the time the sun rises, and should ideally be facing east already, to lower the risk of reflection toward the airstrip. ➢ Recent studies indicated that an extra layer of anti-reflective material on the outer surface of the glass can further limit sunlight reflection (Sreenath *et. al.,* 2019). This should be helpful to reduce the potential glint and glare experienced especially where the gravel road is slightly elevated above the PVSEF; ➢ Another design feature to limit glint and glare is to roughen the protective glass surface, reducing specular reflection (Sreenath *et. al.,* 2019); and ➢ A possible mitigatory technique that can be employed is possible adjustment in the tilt and orientation angle of PV modules. These changes can alter the direction of solar reflection and hence the degree of glare impact. The Solar Glare Hazard Analysis Tool (SGHAT) can be used to check the glare potential for the proposed PV system design values. SGHAT has the capability to identify PV configurations that produce no glare and the design with maximum energy production can be selected (Sreenath *et. al.,* 2019).

5.1.4 Impacts due to Night time Lighting

With the Tourneé 2 Solar PV Park located in a rural area the only sources of lighting are the surrounding farmsteads and Tutuka Power Station, as such the lighting environment is considered rural. Development of the Tourneé 2 Solar PV Park may potentially be a source of light pollution during the construction and operational phases, to a degree, due to security lighting on the perimeter fence and especially at the buildings (substation, BESS and O&M Buildings). Due to the nature of Tourneé 2 Solar PV Park which would primarily be operational during sunlit (daylight) hours, lighting at night is not a major operational component of such facilities. Possible maintenance activities conducted at night, such as mirror or panel washing or replacement might require vehicle-mounted lights, which could contribute to light pollution. Overall, the impact significance of potential night time lighting is expected to be low, and will be limited to a local area. Security lights associated with the BESS, Substation and O&M Buildings may potentially contribute somewhat to the effects of skyglow and artificial lighting in the region. This can, however be easily mitigated by installing security lighting no higher than 5 meters above the ground and through appropriate planning of illumination direction.

Table 7: Impact Assessment Table for the potential visual impacts of the proposed PVSEF on the visual environment.

IMPACT NATURE	Potential impact of night-time lighting on the visual environment		STATUS	NEGATIVE
Impact Description	* Night time security lighting at the temporary construction camps, office area, workshop/store and plant area impacting the sensitive receptors in the area; * Night-time security lighting at the BESS, O&M Buildings and substation; and *Additional lighting that may be required during decommissioning phase.			
Impact Source(s)	Light sources either temporarily or permanently installed.			
Receptor(s)	All receptors within 5 km radius			
PARAMETER	WITHOUT MITIGATION		WITH MITIGATION	
Impact Magnitude (M)	Construction Phase	3	Construction Phase	3
	Operational Phase	3	Operational Phase	2
	Decommissioning Phase	2	Decommissioning Phase	2
Impact Extent (E)	Construction Phase	3	Construction Phase	3
	Operational Phase	2	Operational Phase	2
	Decommissioning Phase	2	Decommissioning Phase	1
Impact Reversibility (R)	Construction Phase	1	Construction Phase	1
	Operational Phase	1	Operational Phase	1
	Decommissioning Phase	1	Decommissioning Phase	1
Impact Duration (D)	Construction Phase	2	Construction Phase	2
	Operational Phase	4	Operational Phase	3
	Decommissioning Phase	2	Decommissioning Phase	2
Probability of Occurrence (P)	Construction Phase	4	Construction Phase	4
	Operational Phase	3	Operational Phase	3
	Decommissioning Phase	3	Decommissioning Phase	3
Significance (S)	Construction Phase	(-) 36	Construction Phase	(-) 36
	Operational Phase	(-) 30	Operational Phase	(-) 24
	Decommissioning Phase	(-) 21	Decommissioning Phase	(-) 18
Environmental Significance Rating	Construction Phase	**Moderate**	Construction Phase	**Moderate**
	Operational Phase	**Low**	Operational Phase	**Low**
	Decommissioning Phase	**Low**	Decommissioning Phase	**Low**
CUMULATIVE IMPACTS	Cumulative visual impacts resulting from landscape modifications as a result of the proposed project in conjunction Tourneé 2 Solar PV Park and the one other approved application of renewable energy within a 50 km radius, as well as any future renewable energy facilities (wind and solar facilities) in the area, must be considered. Renewable energy facilities have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. The landscape is accustomed to the Tutuka Power Station, which is a significant light source, thus the cumulative visual impacted is expected to be of low significance.			
CONFIDENCE	Medium			
MITIGATION MEASURES	➢ As far as possible, construction activities should be restricted to daylight hours, in order to limit the need of bright floodlighting and the potential for skyglow and to avoid the use of additional night-time lighting for security purposes; ➢ Night lighting of construction sites and camps, the BESS, substation and O&M Building should be minimised as far as possible, taking into consideration that due to safety requirements a certain level of lighting may be necessary; ➢ It must be ensured that routine maintenance and cleaning of PV modules, especially after a rainfall event, should occur during the daylight hours, to reduce the potential of night lighting and potential temporary contribution to skyglow; ➢ Where security lighting is used during the construction phase and operational phase, the following management measures should be implemented:			

	• Making use of motion detectors on security lighting, at the substation, BESS and O&M Building, ensures that the site will remain in relative darkness, until lighting is required for security and maintenance purposes; • Placement of lights should consider the location of surrounding receptors and as far as possible be screened from view; • The use of high light masts and high pole top security lighting should be avoided; • Up-lighting of structures must be avoided, with lighting installed at downward angles that provide precisely directed illumination beyond the immediate surroundings of the infrastructure, thereby minimising the light spill and trespass; • Care should be taken when selecting luminaries to ensure that appropriate units are chosen and that their location will reduce spill light and glare to a minimum; • Minimum wattage light fixtures should be used, with the minimum intensity necessary to accomplish the light's purpose; • The use of low-pressure sodium lamps, yellow LED lighting, or an equivalent should be considered to reduce skyglow (BLM, 2013). ➢ Upon decommissioning, it is recommended that no activities occur at night, to reduce the use of bright floodlighting.

With improved technology and design techniques, most PV facilities are no longer associated with glare, however PV Panels can create increased visibility and contrast through the creation of geometric patterns of reflected light caused by simultaneous reflection of sunlight from regularly-spaced metal surfaces in the collector array. The reflected light may not necessarily cause discomfort to the viewer, during the daytime, and may change dramatically as the observer moves (Royal Haskoning DHV, 2015). It should be noted that the PV panels will not contribute to night time light pollution in the area, since no reflection of the moon occurs at night.

6. CONCLUSION

The proposed Tourneé 2 Solar PV Park is situated in a rural area with a relatively low number of sensitive receptor; comprising mostly of farmsteads. Based on the field assessment, the undulating topography and dense vegetation associated with the farmsteads partially obscures the view towards the Tourneé 2 Solar PV Park, therefore the visual impact for the Tourneé 2 Solar PV Park is considered moderately low as the visual intrusion on the receiving environment will be low to moderate depending on the location of the vantage point.

According to the Strategic Environmental Assessment (SEA) Project (2019) the Tourneé 2 Solar PV Park does not fall within any Renewable Energy Development Zones (REDZ) nor within any corridor for ElectricaL Grid Infrastructure (EGI). According to South African Renewable Energy EIA Application Database (REEA) there is one approved application for a renewable energy facility (solar) within a 30 km radius of the Tourneé 2 Solar PV Park. This indicates that the larger region may be earmarked for renewable energy facilities in the foreseeable future, which may alter the landscape character on a broader scale.

With the Tourneé 2 Solar PV Park and surroundings being dominated by grasses interspersed with freshwater ecosystems and cultivated fields, the vegetative component will not be able to substantially assist in screening the Tourneé 2 Solar PV Park. The farmsteads do however have existing dense tree lines which may partially or completely obscure the view towards Tourneé 2 Solar PV Park. The local topography of the Tourneé 2 Solar PV Park is relatively flat to gently sloping with the surrounding landscape displaying undulating terrain. With the local topography of the Tourneé 2 Solar Park being relatively flat, it is unlikely to assist in absorbing and/ or screening the Tourneé 2 Solar PV Park. The field assessment did however indicate the undulating terrain of the surrounding area affecting the degree of visibility from various vantage points. The Tutuka ash dump will assist in screening and/ or absorbing the Tourneé 2 Solar PV Park, especially to receptors located to the south and north.

The sense of place associated with the Tourneé 2 Solar PV Park can be described as calm, tranquil and peaceful, with limited development and movement, with the exception of the shepherds moving with the livestock and the cultivated fields being tilled or harvested. The sense of place is however not unique to the Tourneé 2 Solar PV Park as it extends to the larger region. During the construction phase of the Tourneé 2 Solar PV Park, the sense of place will however be affected, shifting the mood to busy and disturbed with construction vehicles and potential need for some earth moving equipment, however, once the panels are operational there will be limited additional vehicular movement in and out of the area, thus returning the area to a calm and tranquil landscape.

The Tourneé 2 Solar PV Park being located in a rural area, results in limited sources of night-time lighting, as such the lighting environment is considered rural with low district brightness. Development of the Tourneé 2 Solar PV Park may potentially be a source of light pollution during the construction and operational phases, due to security lighting on the perimeter fence and at the buildings (substation, BESS and O&M Buildings). Overall, the impact significance of potential night-time lighting is expected to be moderately low and will be limited to a local area, as the Tourneé 2 Solar PV Park is not a development that requires a significant amount of lighting. This corresponds with Bortle's Scale – indicating that Tourneé 2 Solar PV Park falls within a Class 4 area (rural/suburban transition) where the light pollution is low and distant large objects are distinct. As such the introduction of lighting sources in a rural area results in the Tourneé 2 Solar PV Park likely to somewhat contribute to the effects of sky glow and artificial lighting in the region.

From a visual impact perspective, there are no fatal flaws associated with the Tourneé 2 Solar PV Park should the recommended buffer zone for the gravel road be considered. T Hence, it

is the professional opinion of the visual specialist that he development of the Tourneé 2 Solar PV Park can be considered for authorisation.

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APPENDIX A – IFC STANDARDS

International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability

The IFC Sustainability Framework articulates the Corporation's strategic commitment to sustainable development, and is an integral part of IFC's approach to risk management. The sustainability framework comprises IFC's Policy and Performance standards on Environmental and Social Sustainability, and IFC's Access to Information Policy. The Performance Standards (PS) are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate and manage risks and impacts as a wat of doing business in a sustainable manner.

There are eight (8) Performance Standards which has to be implemented throughout the life of an investment by IFC. These Performance Standards include:

1 Assessment and Management of Environmental and Social Risk and Impacts;
2 Labor and Working Conditions;
3 Resource Efficiency and Pollution Prevention;
4 Community Health, Safety, and Security;
5 Land Acquisition and Involuntary Resettlement;
6 Biodiversity Conservation and Sustainable Management of Living Natural Resources;
7 Indigenous Peoples; and
8 Cultural Heritage.

The applicant deemed it necessary that the environmental assessment process must fully consider Equator Principles and IFC Performance Standards (PS) as follows:

- **PS 1:** the product must meet the requirements of a bankable IFC environmental and social impact assessment as they relate to the terms of reference;
- **PS3**: must be considered where relevant in terms of water consumption, pollution prevention, wastes, hazardous material management and pesticide use and management;
- **PS4:** must be considered, if applicable, in terms of ecosystem services;
- **PS6:** must be included in terms of protection and conservation of biodiversity and habitat (modified, natural and critical), legally protected and internationally recognised areas, invasive alien species, and management of ecosystem services; and
- **PS 8:** must be included, for the protection of cultural heritage as it relates to the terms of reference.

PS 1 establishes the importance of:

I. Integrated assessment to identify the environmental and social impacts, risks, and opportunities of the project;
II. Effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and
III. The client's management of environmental and social performance throughout the life of the project.

The objectives of PS1 are to identify and evaluate environmental and social risks and impact of the project as well as to adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible ,minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, affected communities, and the environment.

PS 3 recognizes that increased economic activity and urbanisation often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. The objectives of PS 3 is to:

IV. Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities;
V. To promote more sustainable use of resources, including energy and water; and
VI. To reduce project-related greenhouse gases (GHG) emissions.

PS 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. The objectives of PS 4 are to anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances. As well as to ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.

PS 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The objectives of PS 6 are to protect and conserve biodiversity, maintain the benefits from ecosystem services, and to promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

In circumstances where a proposed project is located within a legally protected area or an internationally recognised area, the client will meet the requirement of paragraphs 16 through 19 of the PS, as applicable. In addition the client will:

- Demonstrate that the proposed development in such areas is legally permitted;
- Act in a manner consistent with any government recognised management plan for such areas;
- Consult protected area sponsors and managers, Affected Communities, Indigenous Peoples and other stakeholders on the proposed project, as appropriate; and
- Implement additional programs, as appropriate, to promote and enhance the conservation aims and effective management of the area.

According to the South African Protected Areas Database (SAPAD, 2022) and the National Protected Areas Expansion Strategy (NPAES, 2009) Dataset, there are no protected areas located within a 10 km radius of the Tourneé 2 Solar PV Park , therefore the PS 6 is currently not relevant to the proposed project.

PS 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity. The objectives of this PS is to protect cultural heritage from adverse impacts of project activities and support its preservation and to promote the equitable sharing of benefits from the use of cultural heritage.

The IFC habitat categories are defined as follows:

Modified Habitat
Modified habitats are areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition. Modified habitats may include areas managed for agriculture, forest plantations, reclaimed coastal zones, and reclaimed wetlands.

This Performance Standard applies to those areas of modified habitat that include significant biodiversity value, as determined by the risks and impacts identification process required in PS 1. The client should minimize impacts on such biodiversity and implement mitigation measures as appropriate.

Natural Habitat
Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition.
The client will not significantly convert or degrade natural habitats, unless all of the following are demonstrated:

- No other viable alternatives within the region exist for development of the project on modified habitat;
- Consultation has established the views of stakeholders, including Affected Communities, with respect to the extent of conversion and degradation; and
- Any conversion or degradation is mitigated according to the mitigation hierarchy.

In areas of natural habitat, mitigation measures will be designed to achieve no net loss of biodiversity where feasible. Appropriate actions include:

- Avoiding impacts on biodiversity through the identification and protection of set-asides;
- Implementing measures to minimize habitat fragmentation, such as biological corridors;
- Restoring habitats during operations and/or after operations; and
- Implementing biodiversity offsets.

Critical Habitat

Critical habitats are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.

In areas of critical habitat, the client will not implement any project activities unless all of the following are demonstrated:

- No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;
- The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and
- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.

In such cases where a client is able to meet the requirements defined in paragraph 17, the project's mitigation strategy will be described in a Biodiversity Action Plan and will be designed to achieve net gains of those biodiversity values for which the critical habitat was designated.

In instances where biodiversity offsets are proposed as part of the mitigation strategy, the client must demonstrate through an assessment that the project's significant residual impacts on biodiversity will be adequately mitigated to meet the requirements of paragraph 17.

GN9. The requirements for the baseline study will vary depending on the nature and scale of the project. For sites with potentially significant impacts on natural and critical habitats and ecosystem services, the baseline should include field surveys over multiple seasons, to be undertaken by competent professionals and with the involvement of external experts, as necessary. Field surveys and assessments should be recent, and data should be acquired for the direct project footprint, including related and associated facilities, the project's area of influence, and potentially beyond

GN22. For projects located in critical habitats (including legally protected and internationally recognized areas), clients must ensure that external experts with regional experience are involved in the biodiversity and/or critical habitat assessment. If habitat is critical due to the presence of critically endangered or endangered species, recognized species specialists must be involved (for example, including individuals from IUCN Species Survival Commission Specialist Groups). In areas of critical habitat, clients will benefit from establishing a mechanism for external review of the project's risks and impacts identification process and proposed mitigation strategy. This is especially relevant where uncertainty is high, where potential impacts are complex and/or controversial, and/or where no precedent exists for proposed mitigations (such as some types of offsets). Such a mechanism would also promote the sharing of good international practice between projects and improve transparency in decision making

GN28. Both natural and modified habitats may contain high biodiversity values, thereby qualifying as critical habitat. Performance Standard 6 does not limit its definition of critical habitat to *critical natural* habitat. An area may just as well be *critical modified* habitat. The extent of human-induced modification of the habitat is therefore not necessarily an indicator of its biodiversity value or the presence of critical habitat.

GN36. Clients should endeavour to site the project in modified habitat rather than on natural or critical habitat and demonstrate this effort through a project alternatives analysis conducted during the risks and impacts identification process.

GN37. Performance Standard 6 requires that projects with significant biodiversity values in modified habitats minimize their impacts and implement mitigation and management measures as needed to conserve those values. Significant biodiversity values that might occur in modified habitat include species of conservation concern (for example, species that are threatened or otherwise identified as important by stakeholders) and remnant ecological features that persist in the modified landscape, especially those that perform important ecological functions. In some cases, significant biodiversity values may cause natural or critical habitat requirements to be applied, in which case they should be treated using the guidelines for those habitat designations.

GN58. *Relatively broad landscape and seascape units might qualify as critical habitat.* The scale of the critical habitat assessment depends on the biodiversity attributes particular to the habitat in question and the ecological patterns and processes required to maintain them. Even within a single site designated as critical habitat there might be areas or features of higher or lower biodiversity value. There also will be cases where a project is sited within a greater area recognized as critical habitat, but the project site itself has been highly modified. *A critical habitat assessment therefore must not focus solely on the project site.* The client should be prepared to conduct desktop assessments, consult with experts and other relevant stakeholders to obtain an understanding of the relative importance or uniqueness of the site with respect to the regional and even the global scale, and/or conduct field surveys beyond the boundaries of the project site. These considerations would form part of the landscape/seascape analyses as referred to in paragraph 6 of Performance Standard 6 and in paragraph GN17 of this note.

GN104. In many cases, invasive species will have already been established in the region in which the project is located. In these cases, the client has the responsibility to take measures to prevent the species from further spread into areas in which it has not already been established. For example, in the case of linear infrastructure, invasive weeds might be spread into forested habitats, especially if the forest canopy is not able to re-establish itself (due to maintenance of the right-of-way for operational purposes). This is exacerbated if opportunistic agricultural or logging activities further widen the right-of-way, thereby facilitating spread. In these cases, the client is expected to determine the severity of the threat and the mode of spread of that species. The situation should be monitored as part of the overall ESMS, and the client should seek effective mitigation measures in coordination with local and national authorities.

GN106. Performance Standard 6 defines ecosystem services as “the benefits that people, including businesses, obtain from ecosystems” (paragraph 2), which is in line with the definition provided by the Millennium Ecosystem Assessment (GN23). As described in paragraph 2 and footnote 1 of Performance Standard 6, ecosystem services are organized into four major categories:

- Provisioning ecosystem services, include, among others, (i) agricultural products, seafood and game, wild foods, and ethnobotanical plants; (ii) water for drinking, irrigation, and industrial purposes; and (iii) forest areas, which provide the basis for many biopharmaceuticals, construction materials, and biomass for renewable energy;
- Regulating ecosystem services, include, among others, (i) climate regulation and carbon;
- storage and sequestration; (ii) waste decomposition and detoxification; (iii) purification of water and air; (iv) control of pests, disease, and pollination; and (v) natural hazard mitigation;
- Cultural services, include, among others, (i) spiritual and sacred sites; (ii) recreational purposes such as sport, hunting, fishing, and ecotourism; and(iii) scientific exploration and education; and
- Supporting services, are the natural processes that maintain the other services, such as (i) nutrient capture and recycling, (ii) primary production, and (iii) pathways for genetic exchange.

APPENDIX B – METHOD OF ASSESSMENT

Level of Assessment

The following method of assessment for determining the level of detail of the assessment was utilised in this report (Oberholzer, 2005):

Table B1: Categories of development and impact severity.

Type of environment	Category 1 development	Category 2 development	Category 3 development	Category 4 development	Category 5 development
Protected/wild areas of international, national or regional significance	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected	Very high visual impact expected
Areas or routes of high scenic, cultural, historical significance	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected
Areas or routes of medium scenic, cultural, historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected
Areas or routes of low scenic, cultural, historical significance/disturbed	Little or no visual impact expected, possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected
Disturbed or degraded sites/run down areas/ wasteland	Little or no visual impact expected, possible benefits	Little or no visual impact expected, possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

The following key provides an explanation to the categories of development:

Category 1 development:
e.g., nature reserves, nature-related recreation, camping, picnicking, trails and minimal visitor facilities.

Category 2 development:
e.g., low-key recreation / resort / residential type development, small-scale agriculture / nurseries, narrow roads and small-scale infrastructure.

Category 3 development:
e.g., low-density resort / residential type development, golf or polo estates, low to medium-scale infrastructure.

Category 4 development:
e.g., medium density residential development, sports facilities, small-scale commercial facilities / office parks, one-stop petrol stations, light industry, medium-scale infrastructure.

Category 5 development:
e.g., high density township / residential development, retail and office complexes, industrial facilities, refineries, treatment plants, power stations, wind energy farms, power lines, freeways, toll roads, large scale infrastructure generally. Large-scale development of agricultural land and commercial tree plantations. Quarrying and mining activities with related processing plants.

The following box explains the nature of the impacts:

Very high visual impact expected:
Potentially significant effect on wilderness quality or scenic resources;
Fundamental change in the visual character of the area;
Establishes a major precedent for development in the area.

High visual impact expected:
Potential intrusion on protected landscapes or scenic resources;
Noticeable change in visual character of the area;
Establishes a new precedent for development in the area.

Moderate visual impact expected:
Potentially some effect on protected landscapes or scenic resources;
Some change in the visual character of the area;
Introduces new development or adds to existing development in the area.

Minimal visual impact expected:
Potentially low level of intrusion on landscapes or scenic resources;
Limited change in the visual character of the area;
Low-key development, similar in nature to existing development.

Little or no visual impact expected:
Potentially little influence on scenic resources or visual character of the area;
Generally compatible with existing development in the area;
Possible scope for enhancement of the area.

From the above, the severity of the impact determines the level of the assessment:

Table B2: Impact assessment level of input determination.

Approach	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	Very high visual impact expected
Level of visual input recommended	Level 1	Level 2	Level 3	Level 4	

The following box explains the inputs required at each level of assessment (Oberholzer, 2005).

Level 1 input:
Identification of issues, and site visit;
Brief comment on visual influence of the project and an indication of the expected impacts / benefits.

Level 2 input:
Identification of issues raised in scoping phase, and site visit;
Description of the receiving environment and the proposed project;
Establishment of Receptor Site area and receptors;
Brief indication of potential visual impacts, and possible mitigation measures.

Level 3 assessment:
Identification of issues raised in scoping phase, and site visit;
Description of the receiving environment and the proposed project;
Establishment of Receptor Site area, view corridors, viewpoints and receptors;
Indication of potential visual impacts using established criteria;
Inclusion of potential lighting impacts at night;
Description of alternatives, mitigation measures and monitoring programmes.
Review by independent, experienced visual specialist (if required).

Level 4 assessment:
As per Level 3 assessment, plus complete 3D modelling and simulations, with and without mitigation.
Review by independent, experienced visual specialist (if required).

SITE SENSITIVITY VERIFICATION REQUIREMENTS WHERE A SPECIALIST ASSESSMENT IS REQUIRED BUT NO SPECIFIC ASSESSMENT PROTOCOL HAS BEEN PRESCRIBED

Published in Government Notice No. 320 GOVERNMENT GAZETTE 43110 on 20 MARCH 2020.

1. Site Sensitivity Verification And Minimum Report Content Requirements

Prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration identified by the national web-based environmental screening tool (screening tool), where determined, must be confirmed by undertaking a site sensitivity verification.

The screening tool can be accessed at: https://screening.environment.gov.za/screeningtool

1.1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.

1.2. The site sensitivity verification must be undertaken through the use of:

(a) a desktop analysis, using satellite imagery;

(b) a preliminary on-site inspection; and

(c) any other available and relevant information.

1.3. The outcome of the site sensitivity verification must be recorded in the form of a report that--

(a) confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.;

(b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and

(c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

2. Specialist Assessment And Minimum Report Content Requirements

Where a specialist assessment is required and no specific environmental theme protocol has been prescribed, the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations.

The gazette is available online at www.gpwonline.co.za

APPENDIX C – IMPACT ASSESSMENT METHODOLOGY

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[1], indirect[2], secondary[3] as well as cumulative[4] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e., residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[5] presented below.

Table C1: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				

[1] Impacts that arise directly from activities that form an integral part of the Project.

[2] Impacts that arise indirectly from activities not explicitly forming part of the Project.

[3] Secondary or induced impacts caused by a change in the Project environment.

[4] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.

[5] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

Table C2: impact significance rating

TOTAL SCORE	4 TO 15	16 TO 30	31 TO 60	61 TO 80	81 TO 100
Environmental Significance Rating (Negative (-))	Very low	Low	Moderate	High	Very High
Environmental Significance Rating (Positive (+))	Very low	Low	Moderate	High	Very High

Impact Mitigation

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in Figure C1 below.

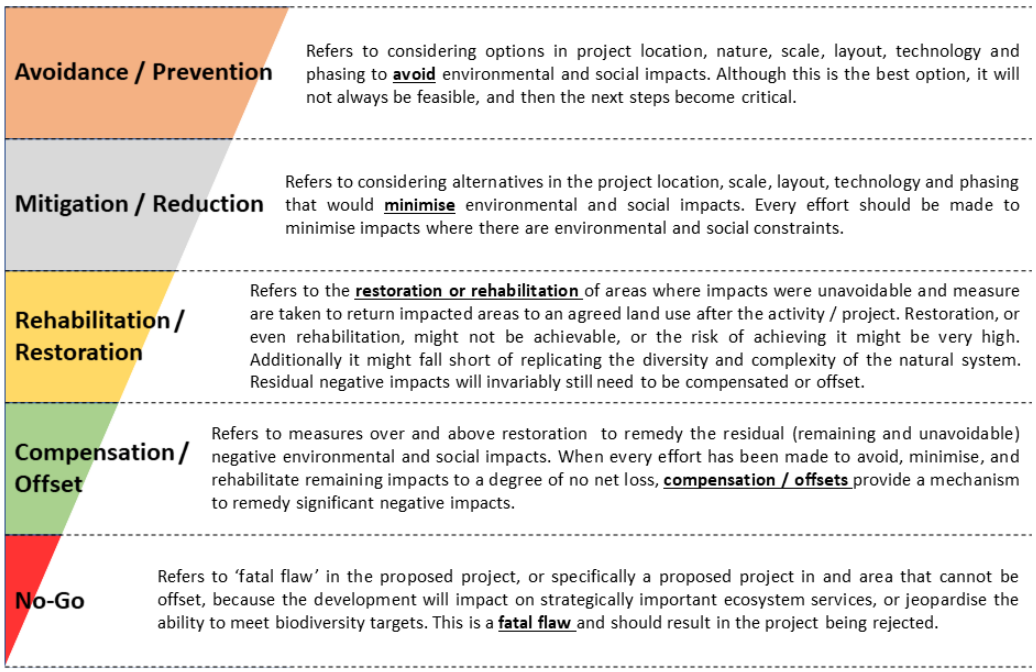

Figure C1:Mitigation Sequence/Hierarchy

APPENDIX D – VEGETATION TYPE

Table D1: Characteristics of the vegetation type associated with the Tourneé 2 Solar PV Park

DESCRIPTION OF THE SOWETO HIGHVELD GRASSLAND WITHIN THE TOURNEÉ 2 SOLAR PV PARK (MUCINA & RUTHERFORD, 2006)					
Distribution	Mpumalanga, Gauteng (and to a very small extent also in neighbouring Free State and North-West) Provinces: In a broad band roughly delimited by the N17 road between Ermelo and Johannesburg in the north, Perdekop in the southeast and the Vaal River (border with the Free State) in the south. It extends further westwards along the southern edge of the Johannesburg Dome (including part of Soweto) as far as the vicinity of Randfontein. In southern Gauteng it includes the surrounds of Vanderbijlpark and Vereeniging as well as Sasolburg in the northern Free State.				
Climate	Summer-rainfall region (MAP 662 mm). Cool-temperate climate with thermic continentality (high extremes between maximum summer and minimum winter temperatures, frequent occurrence of frost, large thermic diurnal differences, especially in autumn and spring).				
	MAP (mm)	**MAT (°C)**	**MFD (days)**	**MAPE (mm)**	**MASMS (%)**
	662	14.8	41	2060	75
Altitude (m)	1 420–1 760 m				
Conservation	**Endangered (EN).** Target 24%. Only a handful of patches statutorily conserved (Waldrift, Krugersdorp, Leeuwkuil, Suikerbosrand, Rolfe's Pan Nature Reserves) or privately conserved (Johanna Jacobs, Tweefontein, Gert Jacobs, Nikolaas and Avalon Nature Reserves, Heidelberg Natural Heritage Site). Almost half of the area already transformed by cultivation, urban sprawl, mining and building of road infrastructure. Some areas have been flooded by dams (Grootdraai, Leeukuil, Trichardtsfontein, Vaal, Willem Brummer). Erosion is generally very low (93%).				
Geology & Soils	Shale, sandstone or mudstone of the Madzaringwe Formation (Karoo Supergroup) or the intrusive Karoo Suite dolerites which feature prominently in the area. In the south, the Volksrust Formation (Karoo Supergroup) is found and in the west, the rocks of the older Transvaal, Ventersdorp and Witwatersrand Supergroups are most significant. Soils are deep, reddish on flat plains and are typically Ea, Ba and Bb land types.				
Vegetation & landscape features	Gently to moderately undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of other grasses such as *Elionurus muticus*, *Eragrostis racemosa*, *Heteropogon contortus* and *Tristachya leucothrix*. In places not disturbed, only scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover.				

Soweto Highveld Grassland (GM8)

Figure D1: Gm 8 Soweto Highveld Grassland: Typical mesic highveld grassland with *Themeda triandra* and several *Eragrostis* species still found in some parts of the southern Gauteng in natural condition (page 397 Mucina & Rutherford 2006).

Table D1: Floristic species of the Soweto Highveld Grassland (Mucina & Rutherford, 2006).

Plant Community	Species
Dominant and typical floristic species	
Woody Layer	
Low Shrubs	*Anthospermum hispidulum, A. rigidum subsp. pumilum, Berkheya annectens, Felicia muricata, Ziziphus zeyheriana.*
Forb layer	
Herbaceous climber	*Rhynchosia totta.*
Herbs	*Hermannia depressa (d), Acalypha angustata, Berkheya setifera, Dicoma anomala, Euryops gilfillanii, Geigeria aspera var. aspera, Graderia subintegra, Haplocarpha scaposa, Helichrysum miconiifolium, H. nudifolium var. nudifolium, H. rugulosum, Hibiscus pusillus, Justicia anagalloides, Lippia scaberrima, Rhynchosia effusa, Schistostephium crataegifolium, Selago densiflora, Senecio coronatus, Hilliardiella elaeagnoides, Wahlenbergia undulata.*
Geophytic Herbs	*Haemanthus humilis* subsp. *hirsutus, H. montanus.*
Graminoid layer	
Graminoids	*Andropogon appendiculatus (d), Brachiaria serrata (d), Cymbopogon pospischilii (d), Cynodon dactylon (d), Elionurus muticus (d), Eragrostis capensis (d), E. chloromelas (d), E. curvula (d), E. plana (d), E. planiculmis (d), E. racemosa (d), Heteropogon contortus (d), Hyparrhenia hirta (d), Setaria nigrirostris (d), S. sphacelata (d), Themeda triandra (d), Tristachya leucothrix (d), Andropogon schirensis, Aristida adscensionis, A. bipartita, A. congesta, A. junciformis subsp. galpinii, Cymbopogon caesius, Digitaria diagonalis, Diheteropogon amplectens, Eragrostis micrantha, E. superba, Harpochloa falx, Microchloa caffra, Paspalum dilatatum.*

APPENDIX E – VISUAL RECEPTORS

The number of observers and their perception of the proposed project will have an impact on the VIA and also on the perceived sensitivity of the landscape. The perception of viewers is difficult to determine as there are many variables to consider, such as cultural background, state of mind, the reason for the sighting and how often the project is viewed within a set period. It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the project. It is also necessary to generalise the viewer sensitivity to the proposed project to some degree (Oberholzer, 2005).

The IEMA (2002) identifies a number of potential sensitive receptors that may be affected by a proposed development, namely:

- Users of recreational landscapes/ public footpaths and bridleways, including tourists and visitors;
- Residents;
- Users of public sports grounds and amenity open space;
- Users of public roads and railways;
- Workers; and
- Views of or from within valued landscapes.

The sensitivity of visual receptors and views will depend on:

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

The most sensitive receptors may include:

- Users of outdoor recreational facilities, including public rights of way, whose attention or interest may be focused on the landscape;
- Communities where the development results in changes in the landscape setting or valued views enjoyed by the community; and
- Occupiers of residential properties with views affected by the development.

Other receptors include:

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

APPENDIX F – NIGHT TIME LIGHTING

In order to understand the potential visual impacts from night lighting, it is important to understand the existing lighting levels. The Institute of Lighting Engineers (ILP) (2011) identifies five environmental zones for exterior lighting control and with which to describe the existing lighting conditions within the landscape (Table I1). These environmental zones are supported by design guidance for the reduction of light pollution, which can then inform proposed mitigation measures and techniques. Where an area to be lit lies on the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone.

Table F1: Environmental zones for night-time lighting.

Environmental Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically Dark	National Parks, Areas of Outstanding Natural Beauty etc.
E2	Rural	Low District Brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium District Brightness	Small town centres or suburban locations
E4	Urban	High District Brightness	Town/city centres with high levels of night-time activity

Stationary lights facing upward are significant contributors to light pollution and causes sky glow and glare, while light facing in a horizontal direction can be visible for long distances, lead to light trespass (light falling outside the desired area of illumination) and be disturbing to viewers and vehicles. Sky glow refers to the night-time brightening of skies, caused by the scattering and redirecting of light in the atmosphere, by water droplets and dust in the air, back towards the ground. Such stray light mostly comes from poorly designed and improperly aimed light, and from light reflected from over-lit areas (ASSA, 2012). Lighting from vehicles within rural areas will generally be more intrusive than in urban settings and, therefore, will have a potentially greater impact due the general lack of existing ambient light within areas further away from the surface infrastructure area.

Sky glow refers to the night-time brightening of skies, caused by the scattering and redirecting of light in the atmosphere, by water droplets and dust in the air, back towards the ground. Such stray light mostly comes from poorly designed and improperly aimed light, and from light reflected from over-lit areas (ASSA, 2012). In addition, the impacts of vehicle mounted lighting sources in the area will generally be confined to the local and sub-regional setting (up to 10km) due to the effects of distance, intervening undulating topography and vegetation which restrict the potential impact on views from more distant regional points.

The ILP (2011) recommends that, in order to maintain the night-time setting, lighting within the identified zone should have minimal illumination into the sky as well as to adjacent viewpoints.

Bortle Dark Sky Scale

The Bortle Dark Sky Scale was developed by John Bortle "based on nearly 50 years of observing experience," to describe the amount of light pollution in a night sky. It was first published in a 2001 Sky & Telescope article. The reality behind the use of the scale is the enormous amount of artificial light pushed into the sky by human habitation, as documented on this map below. To facilitate learning and using the scale, Bortle's indicators of sky brightness have been adapted as a table (below), including the color codes used in available light pollution map.

For the amateur astronomer, the most robust and convenient relative measure of sky brightness is the naked eye or telescopic limiting magnitude. This is also a criterion that can be directly reported without recourse to the Bortle classification categories.

To calculate the sky darkness using these charts, simply canvas the entire area of the chart and mark as many stars as you can recognize that are near your averted vision threshold. Do not mark stars that you can identify with direct vision or that are easy with averted vision; try to select stars near your threshold. Identify in this way at least 10 faint stars. Later, tally the number of stars that fall within each magnitude bin shown in the key at bottom left, which identifies the half magnitude steps corresponding to the Bortle categories. The prevailing sky brightness is the average magnitude of the two faintest bins marked:

SB = (t1*m1 + t2*m2) / (t1+t2)

#t is a tally
*m is the fainter bracket magnitude that defines the magnitude interval bin.

For example, 7 stars of magnitude 5.0–5.49 and 9 stars of magnitude 5.5–5.99, so:

SB = (7*5.5+9*6.0)/(7+9) = (38.5+54)/16 = 5.78 = Bortle 5 (suburban)

The limit magnitude may differ from another observer's, but this difference in visual acuity will transfer to all other visual tasks. The Bortle scale inevitably combines differences in sky brightness and differences in individual detection capabilities.

Number Code	*Map Color Code*	*Label*	*Sky Mag.*	*Naked Eye Limit Mag.*	*320mm Limit Mag.*	*Triangulum Galaxy visible?*	*Andromeda Galaxy visible?*	*Central Galaxy visible?*	*Zodiacal light visible?*	*Light Pollution*	*Clouds*	*Ground Objects*
1		excellent dark sky	22.00–21.99	≥ 7.5	> 17	obvious	.	casts shadows	striking	airglow apparent	.	visible only as silhouettes
2		average dark sky	21.99–21.89	7.0–7.49	16.5	easy with direct vision	.	appears highly structured	bright, faint yellow color	airglow faint	dark everywhere	large near objects vague
3		rural sky	21.89–21.69	6.5–6.99	16.0	easy with averted vision	.	complex structure	obvious	LP on horizon	dark overhead	large distant objects vague
4		rural/suburban transition	21.69–20.49	6.0–6.49	15.5	difficult with averted vision	obvious	only large structures	halfway to zenith	low LP	lit in distance	distant large objects distinct
5		suburban	20.49–19.50	5.5–5.99	14.5–15.0	.	easy with direct vision	washed out	faint	encircling LP	brighter than sky	
6		bright suburban	19.50–18.94	5.0–5.49	14.0–14.5	.	easy with averted vision	visible only near zenith	.	LP to 35°	fairly bright	small close objects distinct
7		suburban/urban transition	18.94–18.38	4.5–4.99	14.0	.	difficult with averted vision	invisible	.	LP to zenith	brilliantly lit	.
8		city sky	< 18.38	4.0–4.49	13	.	.	.	.	bright to 35°	.	headlines legible
9		inner city sky	.	≤ 4.0		.	.	.	.	bright at zenith	.	.

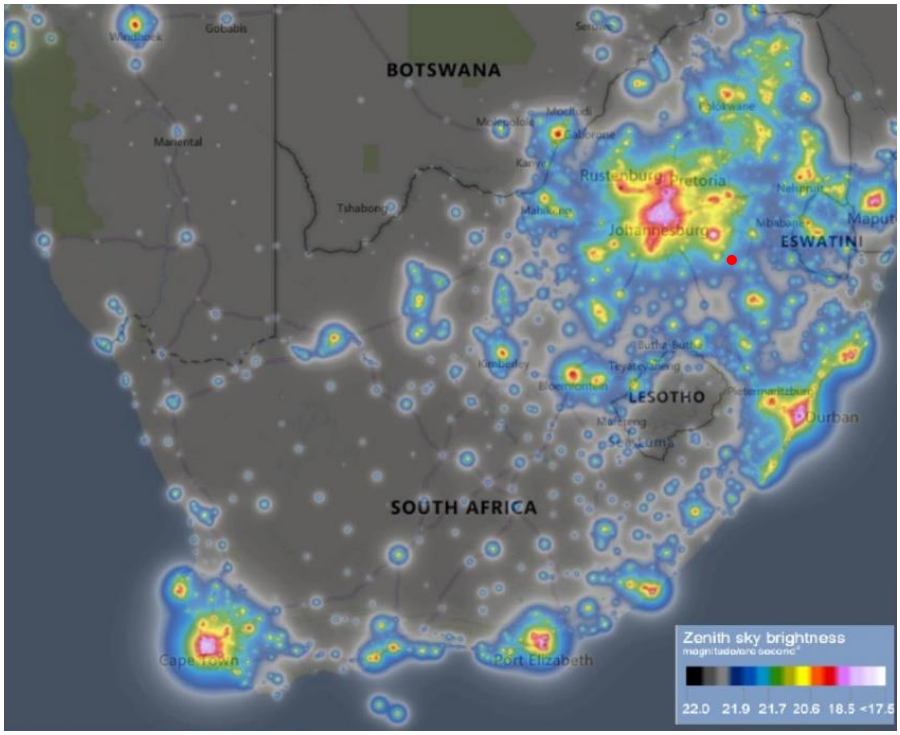

Figure F1: Light pollution map of South Africa (The World Atlas of the Artificial Night Sky Brightness). The red dot indicates where the Tourneé 2 Solar PV Park is situated.

APPENDIX G – INDEMNITY AND TERMS OF USE OF THIS REPORT

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and SAS (Pty) Ltd and its staff reserve the right, at their sole discretion, to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field or pertaining to this investigation.

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APPENDIX H – SPECIALIST INFORMATION

Details of the specialist who prepared the report

Stephen van Staden	MSc Environmental Management (University of Johannesburg)
Sanja Erwee	BSc Zoology (University of Pretoria)

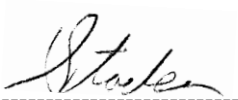
The expertise of that specialist to compile a specialist report including a curriculum vitae

Company of Specialist:	Scientific Aquatic Services		
Name / Contact person:	Stephen van Staden		
Postal address:	29 Arterial Road West, Oriel, Bedfordview		
Postal code:	2007	Cell:	082 442 7637
Telephone:	011 616 7893	Fax:	011 615 6240/ 086 724 3132
E-mail:	stephen@sasenvgroup.co.za		
Qualifications	MSc (Environmental Management) (University of Johannesburg) BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg) BSc (Zoology, Geography and Environmental Management) (University of Johannesburg)		
Registration / Associations	Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP) Accredited River Health practitioner by the South African River Health Program (RHP) Member of the South African Soil Surveyors Association (SASSO) Member of the Gauteng Wetland Forum		

Specialist Declaration

I, Stephen van Staden, declare that -

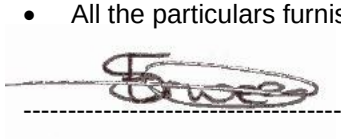
- I act as an **independent specialist (reviewer)** in this assessment;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



Signature of the Specialist

I, Sanja Erwee, declare that -

- I act as an **independent specialist** in this assessment;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



Signature of the Specialist

SAS ENVIRONMENTAL GROUP OF COMPANIES –

SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF STEPHEN VAN STADEN

PERSONAL DETAILS

Position in Company	Group CEO, Water Resource discipline lead, Managing member, Ecologist, Aquatic Ecologist
Joined SAS Environmental Group of Companies	2003 (year of establishment)

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP)
Accredited River Health practitioner by the South African River Health Program (RHP)
Member of the South African Soil Surveyors Association (SASSO) Member of the Gauteng Wetland Forum
Member of the Gauteng Wetland Forum;
Member of International Association of Impact Assessors (IAIA) South Africa;
Member of the Land Rehabilitation Society of South Africa (LaRSSA)

EDUCATION

Qualifications

MSc Environmental Management (University of Johannesburg)	2003
BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg)	2001
BSc (Zoology, Geography and Environmental Management) (University of Johannesburg)	2000
Tools for wetland assessment short course Rhodes University	2016
Legal liability training course (Legricon Pty Ltd)	2018
Hazard identification and risk assessment training course (Legricon Pty Ltd)	2013

Short Courses

Certificate – Department of Environmental Science in Legal context of Environmental Management, Compliance and Enforcement (UNISA)	2009
Introduction to Project Management - Online course by the University of Adelaide	2016
Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017

AREAS OF WORK EXPERIENCE

South Africa – All Provinces
Southern Africa – Lesotho, Botswana, Mozambique, Zimbabwe Zambia
Eastern Africa – Tanzania Mauritius
West Africa – Ghana, Liberia, Angola, Guinea Bissau, Nigeria, Sierra Leona
Central Africa – Democratic Republic of the Congo

SELECTED PROJECT EXAMPLES OUT OF OVER 2000 PROJECTS WORKED ON

1 Mining: Coal, Chrome, PGM's, Mineral Sands, Gold, Phosphate, river sand, clay, fluorspar
2 Linear developments
3 Energy Transmission, telecommunication, pipelines, roads
4 Minerals beneficiation
5 Renewable energy (wind and solar)
6 Commercial development
7 Residential development
8 Agriculture
9 Industrial/chemical

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Floral Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Terrestrial Monitoring
- Protected Tree and Floral Marking and Reporting
- Biodiversity Offset Plan

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Maintenance and Management Plans
- Plant species and Landscape Plan
- Freshwater Offset Plan
- Hydropedological Assessment
- Pit Closure Analysis

Aquatic Ecological Assessment and Water Quality Studies

- Habitat Assessment Indices (IHAS, HRC, IHIA & RHAM)
- Aquatic Macro-Invertebrates (SASS5 & MIRAI)
- Fish Assemblage Integrity Index (FRAI)
- Fish Health Assessments
- Riparian Vegetation Integrity (VEGRAI)
- Toxicological Analysis
- Water quality Monitoring
- Screening Test
- Riverine Rehabilitation Plans

Soil and Land Capability Assessment

- Soil and Land Capability Assessment
- Soil Monitoring
- Soil Mapping

Visual Impact Assessment

- Visual Baseline and Impact Assessments
- Visual Impact Peer Review Assessments
- View Shed Analyses
- Visual Modelling

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Environmental and Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions.

SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION CURRICULUM VITAE OF SANJA ERWEE

PERSONAL DETAILS

Position in Company	GIS Technician and Visual Specialist
Joined SAS Environmental Group of Companies	2014

EDUCATION

Qualifications

BSC Zoology (University of Pretoria)	2013

Short Courses

Global Mapper	2015
SANBI BGIS Course	2017
Global Mapper Lidar Course	2017
ESRI MOOC ARCGIS Cartography	2018

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Northern Cape, Western Cape Free State

KEY SPECIALIST DISCIPLINES

Freshwater Assessments

- Desktop Freshwater Delineation
- Plant species and Landscape Plan

Visual Impact Assessment

- Visual Baseline and Impact Assessments
- Visual Impact Peer Review Assessments
- View Shed Analyses
- Visual Modelling

GIS

- Mapping and GIS for various sectors and various disciplines (biodiversity, freshwater, aquatic, soil and land capability).

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APPENDIX I – SITE VERIFICATION

VISUAL (LANDSCAPE [SOLAR]) SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPSOSED TOURNEÉ SOLAR 1 PHOTOVOLTAIC (PV) FACILITY PARK, NEAR TUTUKANI, MPUMALANGA PROVINCE.

Introduction

According to the "Protocols for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes ("the Protocols") published in Government Gazette No. 43110 on 20 March 2020 and Government Gazette No. 43855 on 30 October 2020, the Environmental Assessment Practitioner (EAP) must verify the current use of the site in question and its environmental sensitivity as identified by the Screening Tool to determine the need for specialist inputs in relation to the themes included in the Protocols. The Protocols are allowed for in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"). The Protocols must be complied with for every new application for Environmental Authorisation that is submitted after 9 May 2020.

This document serves as the Visual (Landscape [Solar]) Site Sensitivity Verification Report for the proposed Tourneé 2 Solar PV Park, near Tutukani, Mpumalanga Province. The proposed Tourneé 2 Solar PV Park requires environmental authorisation in terms of the NEMA EIA Regulations (2014), as amended and a Water Use Licence (WUL).

Study Area

The Tourneé 2 Solar PV Park is located within the Lekwa Local Municipality, an administration of the Gert Sibande District Municipality. Tourneé 2 Solar PV Park is located on the remainder of portion 3 of the Farm Dwars-In-De-Weg 350 IS and on portion 9 of the Farm Dwars-In-De-Weg 350 IS. The Tourneé 2 Solar PV Park is situated within a landscape that is associated with open grassland, often utilised for grazing, cultivated fields and freshwater ecosystems.

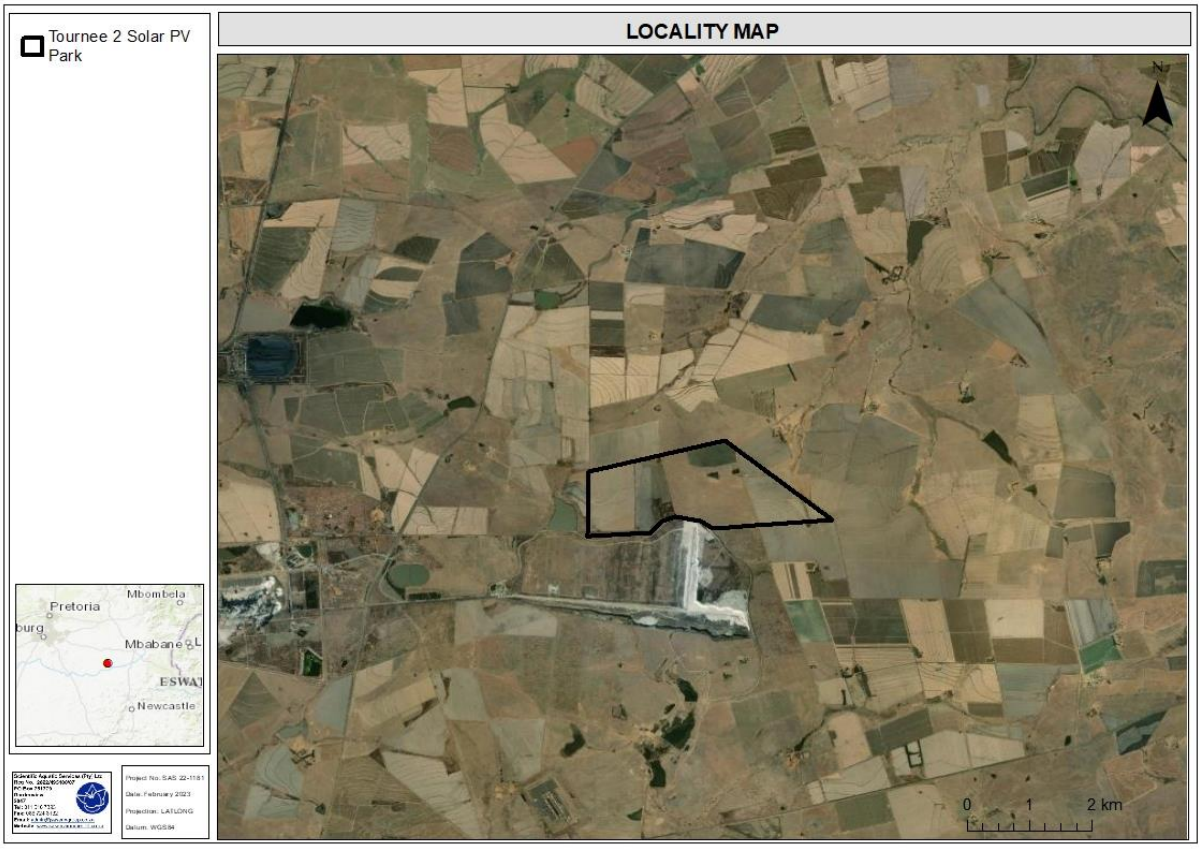

Figure N1: Digital satellite image depicting the location of the proposed Tourneé 2 Solar PV Park in relation to the surrounding area.

This Visual (Landscape [Solar]) site sensitivity verification report relates to a Screening Tool Report (STR) completed for the site in February 2023.

Site Verification Methodology

A site visit was conducted by the specialist to inform the specialist reports required for the proposed project.

Visual (Landscape) Site Verification

The table below provides information regarding the outcome of the Screening tool in terms of the landscape (Solar) theme sensitivity associated with the proposed project as well as a brief summary of the outcome of the Visual Impact Assessment report in response.

Table N1: Visual (Landscape [Solar]) Theme Sensitivity analysis for the proposed project.

Environmental Theme	Applicable Protocol	Response
Visual (Landscape [Solar]) Sensitivity Rating: The western and eastern portions of the Tourneé 2 Solar PV Park has a **very high sensitivity** in terms of the landscape (solar) theme sensitivity as the area is believed to have mountain tops and high ridges. The remaining portions of the Tourneé 2 Solar PV Park is considered to have no sensitivity. Requirement: Visual Impact Assessment Ground-truthed Sensitivity: The very high sensitivity was not supported for Tourneé 2 Solar PV Park as no mountain tops or high ridges are present in the site.	No specific protocol - consider general requirements (GG 45421 of 10/05/2019)_DRAFT)	A Visual Impact Assessment was conducted by Scientific Aquatic Services (SAS, 2023). During the site visit it was determined that the landscape associated with the Tourneé 2 Solar PV Park is similar to its surroundings and the larger region. No prominent outcrops or ridges were associated with the Tourneé 2 Solar PV Park and it was dominated by grazing and crop cultivation practices. The EIA report provided a detailed description of the quality of the landscape prior to development taking place. The EIA report assessed the possible visual impacts after development associated with the proposed project will be defined and suitable mitigation measures to best minimise the potential visual impact on the receiving environment was provided.