BASIC ASSESSMENT PROCESS
DRAFT BASIC REPORT

PROPOSED SOLAR ENERGY FACILITY ON WIGT AND ALBERT FARM, HERTZOGVILLE PV 1 (19MW), FREE STATE PROVINCE
DEA Ref. No: 14/12/16/3/3/1/425

DRAFT FOR PUBLIC REVIEW
17 April 2012 – 21 May 2012

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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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File Reference Number:	
Application Number:	
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2010, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.

2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.

3. Where applicable **tick** the boxes that are applicable in the report.

4. An incomplete report may be returned to the applicant for revision.

5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.

6. This report must be handed in at offices of the relevant competent authority as determined by each authority.

7. No faxed or e-mailed reports will be accepted.

8. The report must be compiled by an independent environmental assessment practitioner.

9. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.

10. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.

PROJECT DETAILS

DEA Reference No.	:	14/12/16/3/3/1/425
Title	:	Environmental Basic Assessment Process Draft Basic Assessment Report: Proposed Solar Energy Facility on Wigt and Albert Farm, Hertzogville PV 1 (19MW), Free State Province
Authors	:	Savannah Environmental Umeshree Naicker Jo-Anne Thomas
Sub-consultants	:	Ecology – David Hoare (David Hoare Consulting cc) Soil and Agricultural Potential – Johan van Der Waals (Terrasoil Science) Heritage resources – Jaco van der Walt (Heritage Contracts and Archaeological Consulting) Social - Ingrid Snyman (Batho Earth) Visual – Lourens du Plessis (MetroGIS (Pty) Ltd)
Client	:	SunCorp/Solar Reserve JV
Report Status	:	Draft Basic Assessment Report for public review

When used as a reference this report should be cited as: Savannah Environmental Savannah Environmental (2012) Draft Environmental Management Programme: Proposed Solar Energy Facility on Wigt and Albert Farm, Hertzogville PV 1 (19MW), Free State Province.

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SUMMARY AND OVERVIEW OF THE PROPOSED PROJECT

SunCorp/Solar Reserve JV is proposing the establishment of a 19 MW commercial photovoltaic (PV) solar energy facility and associated infrastructure on Portion 0 of Farm Wigt 1036 and the Remainder of Farm Albert 986, which is located approximately 12km south of Hertzogville in the Free State Province (refer to Figure 1). The solar energy facility is proposed to accommodate several arrays of photovoltaic (PV) panels and associated infrastructure.

The facility would include:

» An array of PV panels;
» Upgrade of the Hertzogville 132/22kV Rural Substation which is located on the Farm Albert 986.
» Cabling between the project components, to be lain underground where practical;
» Mounting structure to be either rammed steel piles or piles with pre-manufactured concrete footings to support the PV panels;
» A power line that is likely to connect to the Hertzogville 132/22kV Rural Substation;
» Internal access roads;
» Fencing;
» Workshop area for maintenance and storage; and
» Office, toilets and small water treatment unit.

There are two Options for the location for Hertzogville PV 1 Solar Energy Facility on Portion 0 of Farm Wigt 1036 (Option 1) and the Remainder of Farm Albert 986 (Option 2).

The proposed project will be referred to as **Hertzogville PV 1** and will have a maximum generating capacity of up to 19 MW. The PV facility could possibly connect into the existing Hertzogville 132/22kV Rural Substation which is located on the Farm Albert 986, if it is upgraded to accommodate the additional power generation supply.

SunCorp/Solar Reserve Joint Venture is also proposing the development of a 150MW commercial photovoltaic (PV) solar energy facility and associated infrastructure on the Remainder of Farm Albert 986. This project will be referred to as Hertzogville PV 2 and will follow the Scoping/EIA process. A separate application has been submitted for Hertzogville PV 2 and will not be dealt with in this Basic Assessment Process[1].

[1] This project has been registered with the Department of Environmental Affairs under EIA Reference number 14/12/16/3/3/1/425.

Project Location

The Hertzogville PV 1 Solar Energy Facility is proposed to be established on Portion 0 of Farm Wigt 1036 and the Remainder of Farm Albert 986, which falls within the Tokologo Local Municipality the Free State Province. The identified sites have existing road access via secondary roads; both are relatively short and link up to existing access roads. The location of Option 1 and Option 2 are indicated on Figure 1 overleaf.

A short turn-in overhead 132kV power line feeding into the Hertzogville substation is proposed to connect the facility to the electricity grid. Farm buildings are located in the southern part of the study area, and roads and various power lines crossing the site.

The topography of the study site is relatively flat. There is a large pan in the southern part of the site (Wolwepan). Other than this feature, there are no other topographic features of note on site. The elevation on site varies from 1306m to 1357 m above sea level over a distance of approximately 5 km, which is considered to be a gentle slope. The landscape rises slightly in a northerly direction away from Wolwepan.

The climate is arid to semi-arid. Rainfall occurs from November to March, but peaks in mid- to late summer (February / March). Mean annual rainfall is 420 mm per year. All areas with less than 400 mm rainfall are considered to be arid. The study area can therefore be considered to be dry, but not arid.

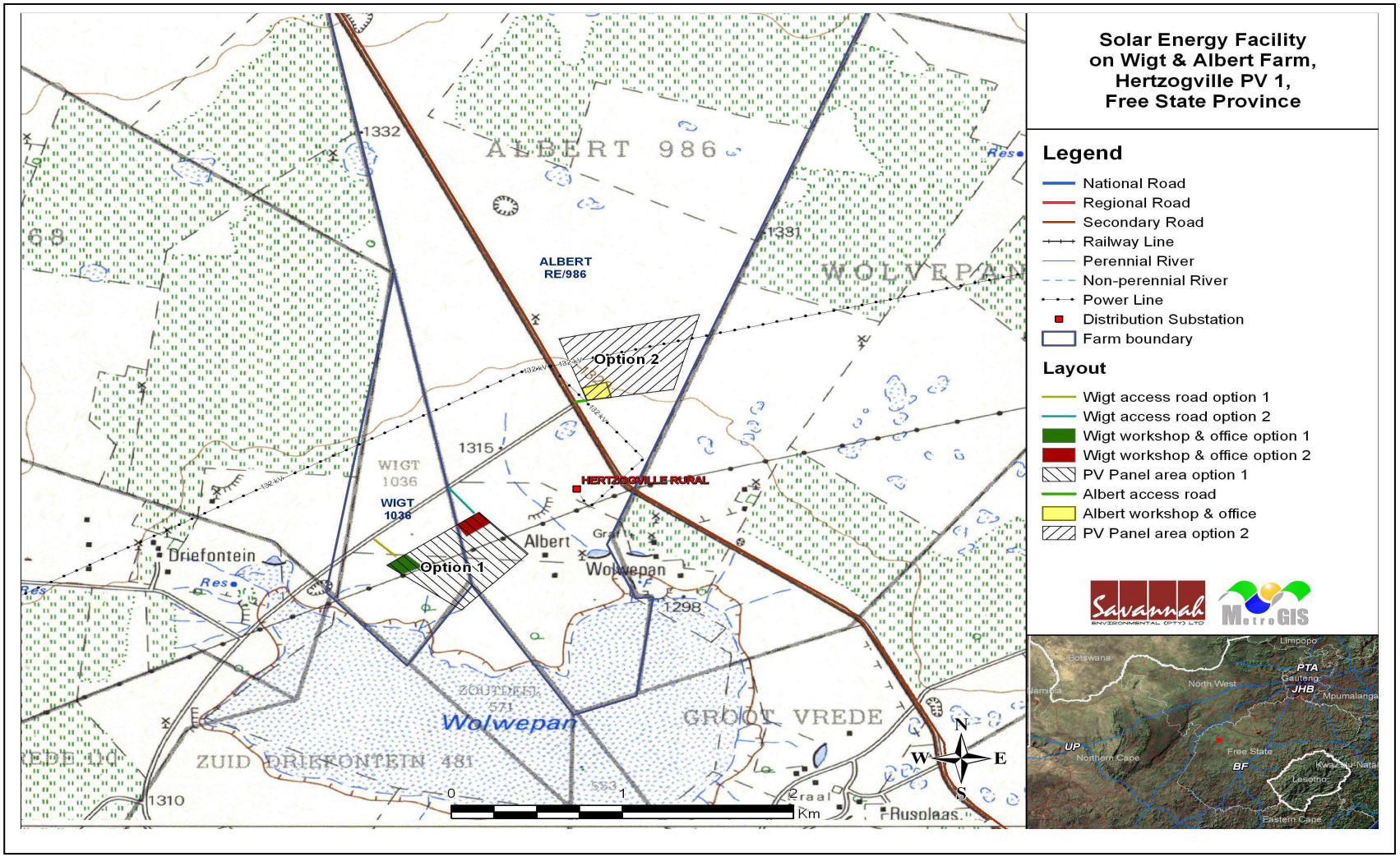

Figure 1: Locality map showing Option 1 and Option 2 on Portion 0 of Farm Wigt 1036 and the Remainder of Farm Albert 986 respectively

In terms of the Environmental Impact Assessment (EIA) Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998), authorisation is required from the competent authority, i.e. the National Department of Environmental Affairs (DEA) (in consultation with the Free State Department of Economic Development Environment and Tourism), for the establishment of the proposed installation. In terms of sections 24 and 24D of NEMA, as read with the EIA Regulations of GNR543; GNR544; GNR545; and GNR546, a Basic Assessment process is required to be undertaken for the construction of the proposed facility. This project has been registered with National DEA under reference number **14/12/16/3/3/1/425**. The following listed activities are applicable:

Notice Number	Activity	Description	Relevance of Regulation to Project
544, 18 June 2010	*1(i)*	*The construction of facilities or infrastructure for the generation of electricity where:* *i. the electricity output is more than 10 megawatts but less than 20 megawatts;*	*Construction of a Photovoltaic Solar Energy Facility with a maximum generating capacity of 19MW in an area covering approximately 20 ha. Inverters, Step-Up transformers, reticulation cables, medium voltage connection and protection equipment and mounting structures are ancillary infrastructure for this facility.*
544, 18 June 2010	*10(i)*	*The construction of facilities or infrastructure for the transmission and distribution of electricity:* *i. Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;*	*The construction of a 132kV overhead power line from the solar facility to the Eskom electricity grid*
544, 18 June 2010	*11(xi)*	*The construction of:* *xi. Infrastructure or structures covering 50 square metres or more.* *Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.*	*The construction of the proposed solar facility and associated infrastructure may impede on drainage lines on the site.*
GN 544, 18 June 2010	*13*	*The construction of facilities or infrastructure for the storage, or for the storage and handling of dangerous good, where such storage occurs in containers with a combined*	*The facility may require the storage in containers with a combined capacity of 80 but not exceeding 500 cubic metres.*

Notice Number	Activity	Description	Relevance of Regulation to Project
		capacity of 80 but not exceeding 500 cubic meter.	
GN 544, 18 June 2010	*18*	*The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from:* *(i) a watercourse;* *(ii) the sea;* *(iii) the seashore;* *(iv) the littoral active zone, an estuary or a distance of 100 metres inland of the highwater* *mark of the sea or an estuary, whichever distance is the greater but excluding where such infilling, depositing , dredging, excavation, removal or moving;* *(a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or* *(b) occurs behind the development setback line.*	*Potential infilling or depositing may occur as a result of the construction of the proposed facility and associated infrastructure.*
GN 544, 18 June 2010	*22*	*The construction of a road, outside urban areas,* *(i) with a reserve wider than 13.5 metres or,* *(ii) where no road reserve exists where the road is wider than 8 metres, or* *(iii) for which an environmental authorisation was obtained for the route determination in terms of activity 5 of Government Notice 387 of 2006 or activity 18 of Notice 545 of 2010.* *This will be confirmed through the EIA process.*	*The solar energy facility may require new access roads to be constructed.*
544, 18 June 2010	*23*	*The transformation of undeveloped, vacant or derelict land to:* *i. Residential, retails, commercial, recreational, industrial, or institutional use, outside an*	*The solar energy facility will involve transforming agricultural land-use to industrial land-use of an area outside an urban area and where the total area to be transformed is*

Notice Number	Activity	Description	Relevance of Regulation to Project
		urban area, and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares.	*bigger than 1 hectare but less than 20 hectares.*
GN544	*26*	*Any process or activity identified in terms of section 53 (1) of the National Environmental Management: Biodersity Act, 2004 (Act No. 10 0f 2004)*	*Impacts on orange or red data plant species may be a process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). There are no listed plants on site. This activity is therefore not applicable.*
GN546, 18 June 2010	*2*	*The construction of a road wider than 4 metres with a reserve less than 13,5 metres, that may occur in:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *(dd) Sites or areas identified in terms of an International Convention;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(ff) Core areas in biosphere reserves;* *(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve;* *(hh) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined.* *The applicability of this activity for*	*The specialist ecology study revealed that no Critical Biodiversity Areas have been identified for municipal areas of the North-West Province (bgis.sanbi.org). This activity is therefore not applicable.*

Notice Number	Activity	Description	Relevance of Regulation to Project
		the development site will be confirmed through the EIA process	

Savannah Environmental has been appointed as the independent environmental consultant to undertake an Environmental Basic Assessment to identify and assess the potential environmental impacts associated with the proposed project. As part of these environmental studies, potential impacts have been identified and assessed through detailed specialist studies, and interested and affected parties (I&APs) have been actively involved through a public involvement process.

1.1 The Environmental Assessment Practitioners

Savannah Environmental was contracted by SunCorp/Solar Reserve JV as the independent environmental consultant to undertake the Environmental Basic Assessment process for the proposed project. Neither Savannah Environmental nor any of its specialist sub-consultants on this project are subsidiaries of or are affiliated to SunCorp/Solar Reserve JV. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments and planning to ensure compliance and evaluate the risk of development; and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team have considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with electricity generation.
The EAP's from Savannah Environmental who are responsible for this project are:

» Jo-Anne Thomas - a registered Professional Natural Scientist and holds a Master of Science degree. She has 14 years of experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently

responsible for the project management of EIAs for several renewable energy projects across the country.

» Umeshree Naicker - the principle author of this report, holds an Honours Bachelor of Science degree in Environmental Science and has 4 years' experience in environmental management.

Curricula vitae for the Savannah Environmental project team consultants are included in Appendix G.

In order to adequately identify and assess potential environmental impacts associated with the proposed project, Savannah Environmental has appointed the following specialist sub-consultants to conduct specialist impact assessments:

» Ecology – David Hoare of David Hoare Consulting cc
» Soil and Agricultural Potential – Johan van der Waals of Terrasoil Science
» Heritage resources – Jaco van der Walt of Heritage Contracts & Archaeological Consulting cc
» Social - Ingrid Snyman of Batho Earth Social & Environmental Consultant
» Visual – Lourens du Plessis of MetroGIS

Curricula vitae for the specialist project team consultants are included in Appendix G.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section? NO

If YES, please complete the form entitled "Details of specialist and declaration of interest" for appointment of a specialist for each specialist thus appointed:
Any specialist reports must be contained in Appendix D.

1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail[2]:

SunCorp/Solar Reserve JV is proposing the establishment of a Solar Energy Facility (SEF) on a site located about 12km south of Hertzogville, within the Tokologo Local Municipality in the Free State Province. This proposed project is to be known as Hertzogville PV 1and is proposed on Portion 0 of Farm Wigt 1036 and the Remainder of Farm Albert 986;

Two alternatives sites, Option 1 and Option 2, have been identified for investigation as follows:

» Option 1 (on Wigt Farm) has an existing road, workshops, office laydown area, water storage and treatment. Site option 1 is located to the south of the KDS-Giraffe 132kV power line, just north of the *Wolwepan* and just west of the Hertzogville 132/22kV Rural Substation

» Option 2 (on Albert Farm) has an existing road, workshops, office laydown area, water storage and treatment. Site option 2 is located to the north of the KDS-Giraffe 132kV power line and the Hertzogville 132/22kV Rural Substation

The PV solar energy facility is proposed to accommodate an array of **photovoltaic (PV) panels** with a generating capacity of up to 19MW. Other **infrastructure** associated with the PV facility will include:

» An array of PV panels;
» Upgrade of the Hertzogville 132/22kV Rural Substation which is located on the Farm Albert 986.
» Cabling between the project components, to be lain underground where practical;
» Mounting structure to be either rammed steel piles or piles with pre-manufactured concrete footings to support the PV panels;
» A power line that is likely to connect to the Hertzogville 132/22kV Rural Substation;
» Internal access roads;
» Fencing;
» Workshop area for maintenance and storage;
» Office, toilets and small water treatment unit.

It is estimated that the workshop area will be 50 m x 50 m, the water tanks will have a

capacity of 20-30,000 litres (approx. 4 tanks), the office/workshop size would be 20 m x 30 m, and the water treatment deionising plant be 25 m x 30 m. All of this proposed infrastructure would fall within the area indicated as Option 1 or Options 2 on Figure 1.

An estimated 300,000 litres of water per annum would be required for cleaning of the panels, 250,000 litres for offices and workshops and an estimated 1.9 million litres of water would be required for the construction of the plant.

The overall aim of the design and layout of the facility is to maximise electricity production through **exposure to the solar radiation**, while minimising infrastructure, operation and maintenance costs, and **social and environmental impacts**. The use of solar energy for power generation can be described as a non-consumptive use of natural resources which emits zero greenhouse gas emissions. The generation of renewable energy contributes to South Africa's electricity generating market which has been dominated by coal-based power generation.

The PV facility will be comprised of the following:

PV Panels

Solar energy facilities, such as those using PV panels, use the energy from the sun to generate electricity through a process known as the Photovoltaic Effect. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity.

A photovoltaic (PV) cell is made of silicone which acts as a semiconductor used to produce the photovoltaic effect. Individual PV cells are linked and placed behind a protective glass sheet to form a photovoltaic panel. The PV cell is positively charged on one side and negatively charged on the other side and electrical conductors are attached to either side to form a circuit. This circuit then captures the released electrons in the form of an electric current (direct current). An inverter must be used to change the direct current (DC) it to alternating current (AC). The electricity is then transmitted through a power line for distribution and use.

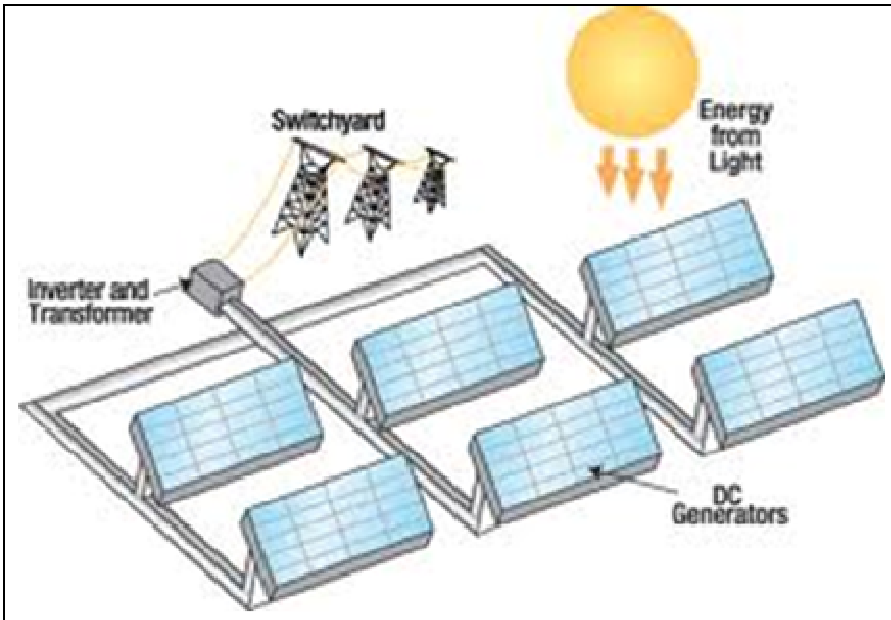

Figure 2: Schematic diagram of a PV plant (Sourced from: http://www.solar-green-wind.com/archives/tag/solar-cells)

The PV panels will be fixed to a support structure (as illustrated in Figure 3) set at an angle so to receive the maximum amount of solar radiation.

Figure 3: PV panels installed

The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar radiation characteristics. The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance.

Photovoltaic Cells

An individual photovoltaic cell is made of silicone which acts as a semiconductor). The cell absorbs solar radiation which energises the electrons inside the cells and produces electricity. Individual PV cells are linked and placed behind a protective glass sheet to form a photovoltaic panel. A single cell is sufficient to power a small device such as an emergency telephone. However, to produce 19 MW of power, the proposed facility will require numerous cells arranged in multiples/arrays which will be fixed to a support structure.

The adopted mounting structure proposed for this project is a mono axial tracking frame with:

» Direction of rotation axis North – South
» Sun path direction tracking East – West
» Maximum allowed tracking angle, from +45° to -45°
» Maximum modules surface for frame, about 36 m2

The height of the PV arrays is expected to be up to 2 m. This technology ensures, in term of energy production, an advantage of about 25% compared to the horizontal fixed one.

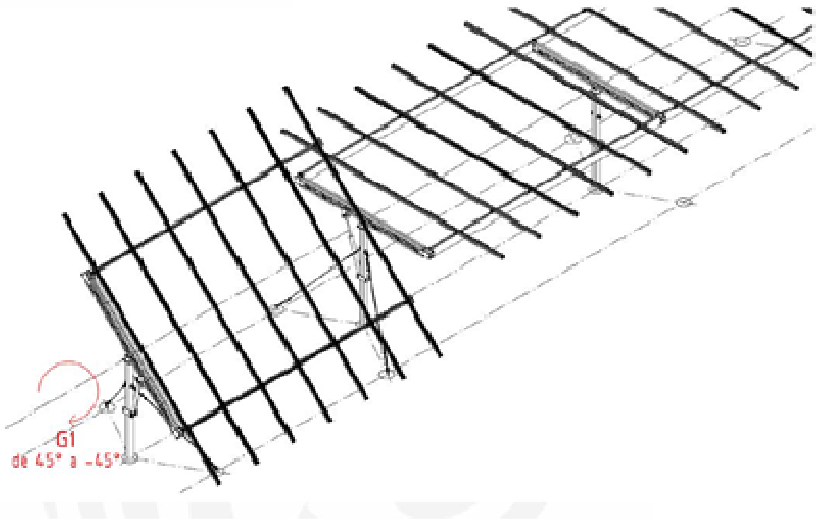

Figure 4: Frame, structural details of a tracking PV technology

Site preparation activities will include clearance of vegetation at the footprint of certain components (i.e. inverters and transformer position) and the establishment of the internal access roads. The PV panels will be sited a certain distance away from each other (to avoid shading). The vegetation between the panels will not be cleared and will be mechanically maintained. Clearing activities, where required, will involve the stripping of topsoil which will need to be stockpiled and/or spread on site.

Overview of the Construction Phase

A facility consisting of several PV arrays with a generating capacity of 19 MW could take

approximately 3-4 months to construct and commission, and would require the expertise of skilled, semi-skilled and low skilled staff. In order to construct the proposed PV solar energy facility and associated infrastructure, a series of activities will need to be undertaken. These are described below.

1. Conduct Surveys

Prior to initiating construction, a number of surveys will be required including, but not limited to, a geotechnical survey, a site survey and, survey of substation site and road servitudes.

2. Establishment of Access Roads

Access to both sites is from existing secondary roads, i.e. The main roads linking Hertzogville with Bultfontein (R708) and Dealesville (R59), as well as the secondary roads crossing both the site and the study area. Internal access roads may however need to be established for use during construction and operation.

3. Undertake Site Preparation

Site preparation activities will include clearance of vegetation at the footprint of each support structure. These activities will require the stripping of topsoil which will need to be stockpiled, backfilled and/or spread on site.

4. Transport of Components and Equipment to Site

The components and equipment required for the construction of the proposed facility will be brought to site in sections by means of national and provincial roads and then proposed internal access road. Some of the components (i.e. transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989) by virtue of the dimensional limitations (i.e. weight).

Typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the upgrade of the substation and site preparation.

5. Establishment of Laydown Areas on Site

Laydown and storage areas will be required for the typical construction equipment which will be required on site.

6. Erect PV Cells and Construct Substation & Inverters

The PV cells will be arranged in arrays. The frames will be fixed onto the ground with the use of concrete, depending on the soil conditions at the site. This will make the installation of the plant less invasive for the territory and facilitate the decommissioning at the end of its production cycle. The height of the PV panel structure will be up to 2 m.

Inverters will be installed to facilitate the connection between the solar energy facility and the Eskom electricity grid via the Hertzogville 132/22kV Rural Substation. The position of the inverters within the footprint of the broader site will be informed by the final positioning of the PV components.

The upgrade of the Hertzogville 132/22kV Rural Substation which is located on the Farm Albert 986 would require a survey of the site, site clearing and levelling and construction of access road/s (where required), construction of a level terrace and foundations, assembly, erection, installation and connection of equipment, and rehabilitation of any disturbed areas and protection of erosion sensitive areas.

7. Establishment of Ancillary Infrastructure

Ancillary infrastructure may include a short turn-in overhead 132kV power line feeding into the Eskom electricity network via an existing power line located on the site, workshop, storage areas as well as a temporary contractor's equipment camp.

The establishment of these facilities/buildings will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction. A laydown area for building materials and equipment associated with these buildings will also be required. Water storage tanks will also be placed on-site to collect water for cleaning of the PV panels.

8. Undertake Site Rehabilitation

Once construction is completed and once all construction equipment is removed, the site must be rehabilitated where practical and reasonable. On full commissioning of the facility, any access points to the site which are not required during the operational phase must be closed and rehabilitated.

Overview of the Operation Phase

The electricity that is generated from the PV panels will be stepped up through the on-site inverters and transformers at the substation. Thereafter the power will be evacuated from the on-site substation to the Eskom existing overhead power line to feed into the grid Hertzogville 132/22kV Rural Substation.

It is anticipated that a full-time security, maintenance and control room staff will be required on site. Each component within the solar energy facility will be operational except under circumstances of mechanical breakdown, unfavourable weather conditions or maintenance activities.

1. Cleaning of the PV Panels Using Water

Water storage tanks will be used to store water for the cleaning of the PV Panels. Approximately 550 000 litres of water per annum will be required for cleaning and for domestic use on the plant. Water is planned to be store using several storage tanks (one

tank will be approximately 40,000 litres in size). Water supply with trucked in from nearest authorised water user and subsequent water purchase agreement - pending water authority engagement/water availability / limits in the area. Depending on dust levels, the PV panels will be required to be cleaned with water twice a year usually after a dust storm event.

Overview of the Decommissioning Phase

The solar energy facility is expected to have a lifespan of more than 20 years (with maintenance) and the power plant infrastructure would only be decommissioned once it has reached the end of its economic life. If economically feasible/desirable the decommissioning activities would comprise the disassembly and replacement of the individual components with more appropriate technology/ infrastructure available at that time. However, if not deemed so, then the facility would be completely decommissioned which would include the following decommissioning activities.

1. Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment (e.g. lay down areas) and the mobilisation of decommissioning equipment.

2. Disassemble Components

The components would be disassembled, and reused and recycled (where possible), or disposed of in accordance with regulatory requirements.

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives

that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Paragraphs 3 – 13 below should be completed for each alternative.

The following describes the potential alternatives identified, and provides a motivation as to why some were not assessed (as required in terms of Regulation 31(3) of the EIA Regulations).

a) The property on which or location where it is proposed to undertake the activity:
There are two site alternatives for the proposed activity; Option 1 and Option 2 which are located on Portion 0 of Farm Wigt 1036 and the Remainder of Farm Albert 986 respectively. The placement of a solar facility is strongly dependent on several factors such as local irradiation, site extent, site access, and climatic conditions and gradient of the site. Portion 0 of Farm Wigt 1036 and the Remainder of Farm Albert 986 has **been identified** SunCorp/Solar Reserve Joint Venture as being highly desirable from a technical perspective for the establishment of a photovoltaic plant as per the following technical, logistical and environmental reasons:

Site Extent
The site was selected based on the local topography, solar irradiation and access to the electricity grid.

Site access
Option 1 and Option 2 can be accessed easily via existing access roads.

Climatic Conditions
The economic viability of a photovoltaic plant is directly dependent on the annual direct solar irradiation values. A study of available irradiation data shows that the proposed site is uniformly irradiated by the sun. In addition, compared to other areas in the country with similar irradiation, the site experiences moderate temperatures which are suitable for PV technology.

Gradient
A level surface area (i.e. with a minimal gradient in the region of 1%) is preferred for the installation of PV panels and specifically for PV technologies (Fluri, 2009). This reduces the need for extensive earthworks associated with the levelling of a site, thereby minimising environmental impacts. The proposed alternative areas for the proposed PV plant are located on flat terrain.

Grid Connection
A 132 kV Eskom power line traverses the site, and Hertzogville 132/22kV Rural Substation is located on the Farm Albert 986. It is intended that the PV solar energy facility will be connected into the grid via an upgrade of the existing substation. There are no alternatives for the gird connection, unless there is an alternative/s recommended and provided by Eskom.

Based on the above considerations, SunCorp/Solar Reserve Joint Venture considers the proposed site as a highly preferred site from a technical perspective for the development of a PV Solar Energy Facility. The two site alternatives identified within the broader property are considered technically feasible locations for the establishment of a solar PV facility and are comparatively assessed within this report.

b) The type of activity to be undertaken
The establishment of a photovoltaic plant is the only technology under consideration. No other development or renewable technologies such as wind or concentrated solar power are considered within this study. The site is not considered to be suitable for wind energy (due to the local climatic conditions), and the project is too limited in size to make consideration of CSP technology a viable option. In addition, the water availability constraints would result in CSP technology being unviable at this location.

c) The technology to be used in the activity
Very few technological options exist in as far as PV technologies are concerned; those that are available are usually differentiated by weather and temperature conditions that prevail – so that optimality is obtained by the final choice. The impacts of any of the PV technology choices on the environment are the same as they all require similar areas for establishment and have similar construction and operational requirements. Therefore, the choice of technology does not affect the type or significance of the environmental impact of the proposed development. The construction, operation and decommissioning of the facility will also be the same irrespective of the technology chosen. Therefore, no alternatives were assessed in this regard.

d) The operational aspects of the activity
No operational alternatives were assessed as no feasible and reasonable operational alternatives were identified for the proposed development.

e) The option of not implementing the activity
The 'do-nothing' alternative is the option of not constructing the proposed PV Solar Energy Facility. Should this alternative be selected then there will be impacts at a local and a broader scale. From a local perspective, the identified site, which is zoned for agricultural purposes but is predominately used for cattle grazing, would not be impacted on from an environmental perspective, and could continue to be utilised for future cattle grazing. However, at a broader scale, the benefits of additional capacity to the electricity grid and those associated with the introduction of renewable energy would not be realised. This alternative is further assessed within this report.

3. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

List alternative sites, if applicable.

	Latitude (S):	**Longitude (E):**
Alternative:		

Alternative S1[3] (Option1)	**28°**	**14 02 30'**	**25°**	**34 38. 39'**
Alternative S2 (Option 2)	**28°**	**12 55.01‘**	**25°**	**35 11.04‘**
Alternative S3 (if any)	°	‘	°	‘

In the case of linear activities: Power Lines

Alternative:	**Latitude (S):**		**Longitude (E):**	
Alternative S1 (Option 1)				
• Starting point of the activity	**28**	**13 59 40**	**25**	**34 40 95**
• Middle/Additional point of the activity				
• End point of the activity (i.e substation)	**28**	**13 45 41**	**25**	**35 00 43**
Alternative S2 (Option 2)				
• Starting point of the activity	**28**	**13 26 69**	**25**	**35 03 14**
• Middle/Additional point of the activity				
• End point of the activity (i.e. substation)	**28**	**13 45 41**	**25**	**35 00 43**
Alternative S3 (if any)				
• Starting point of the activity				
• Middle/Additional point of the activity				
• End point of the activity				

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250m along the route for each alternative alignment.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	**Size of the activity:**
Alternative A1[4] (preferred activity alternative)	**200 000m^2**
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2

Or, for linear activities:

Alternative:	
Alternative A1 (preferred)	**m**
Alternative A2 (if any)	m
Alternative A3 (if any)	m

[3] "Alternative S." refers to site alternatives.
[4] "Alternative A." refers to activity, process, technology or other alternatives.

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	**Size of the site/servitude:**
Alternative A1	m^2
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2

5. SITE ACCESS

Does ready access to the site exist?	YES [redacted]
If NO, what is the distance over which a new access road will be built	m

Describe the type of access road planned:

Option 1 and Option 2 have existing road access.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

6. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

6.1 the scale of the plan which must be at least a scale of 1:500;
6.2 the property boundaries and numbers of all the properties within 50 metres of the site;
6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
6.4 the exact position of each element of the application as well as any other structures on the site;
6.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
6.6 all trees and shrubs taller than 1.8 metres;
6.7 walls and fencing including details of the height and construction material;
6.8 servitudes indicating the purpose of the servitude;
6.9 sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):

- rivers;
- the 1:100 year flood line (where available or where it is required by DWA);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or invested with alien species);

6.10 for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and

6.11 the positions from where photographs of the site were taken.

A detailed site plan has been included and attached as **Appendix A**.

7. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this form**.** It must be supplemented with additional photographs of relevant features on the site, if applicable.

Colour photographs taken on site together with a description of each photograph are attached within **Appendix B**.

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

The facility illustration is attached within **Appendix C**.

9. ACTIVITY MOTIVATION

9(a) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	Approximately R500 million
What is the expected yearly income that will be generated by or as a result of the activity?	Depends on bid tariff project and variables of DOE
Will the activity contribute to service infrastructure?	YES

Is the activity a public amenity?	NO
How many new employment opportunities will be created in the development phase of the activity?	40 to 60
What is the expected value of the employment opportunities during the development phase?	Local procurement guidelines of DOE
What percentage of this will accrue to previously disadvantaged individuals?	5 % Highly Skilled 20% skilled
How many permanent new employment opportunities will be created during the operational phase of the activity?	10 to 20
What is the expected current value of the employment opportunities during the first 10 years?	Not Known
What percentage of this will accrue to previously disadvantaged individuals?	20 % to be employed from PDI as a minimum standard as part of department of energy program

9(b) Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

NEED:			
1.	Was the relevant provincial planning department involved in the application?	**YES** ✓	
2.	Does the proposed land use fall within the relevant provincial planning framework?		NO ✓
3.	If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:		
	The site will need to be rezoned or become 'special use', as required by the municipality		

DESIRABILITY:			
1.	Does the proposed land use / development fit the surrounding area?	**YES** ✓	
2.	Does the proposed land use / development conform to the relevant structure plans, SDF, and planning visions for the area?	**YES** ✓	
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	**YES** ✓	
4.	If the answer to any of the questions 1 - 3 was NO, please provide further motivation / explanation:		
5.	Will the proposed land use / development impact on the sense of place?	**YES** ✓	

6.	Will the proposed land use / development set a precedent?		**NO** ✓
7.	Will any person's rights be affected by the proposed land use / development?		**NO** ✓
8.	Will the proposed land use / development compromise the "urban edge"?		**NO** ✓
9.	If the answer to any of the question 5 - 8 was YES, please provide further motivation / explanation.		
	The PV facility could be seen as an intrusion on the rural visual environment which is currently associated with farming and agricultural activities. However, it should also be considered that the farms Wigt and Albert are already disturbed by infrastructure such as gravel roads, a substation and power lines. It is thus anticipated that the proposed facility would have some negative impact on the sense of place which is unlikely to be effectively mitigated.		

BENEFITS:			
1.	Will the land use / development have any benefits for society in general?	**YES** ✓	
2.	Explain:		
	The evacuation of additional electricity into the Eskom National grid will serve to both strengthen the grid itself and assist in the small scale alleviation of pressure of electricity generation from coal fired power stations, and will contribute to the National Government target for renewable energy. Due to the small scale nature of the project, the significance of this positive impact is low. However, with the cumulative effect of numerous proposed renewable energy facilities in the area and across the country the long term impact may prove significant.		
3.	Will the land use / development have any benefits for the local communities where it will be located?	**YES** ✓	
4.	Explain:		
	Local communities surrounding the development site may benefit from limited job opportunities, primarily low to semi- skilled positions, during the construction phase. Operational phase jobs include security, cleaning panels, general maintenance. Skilled jobs available if relevant qualification available under internships programs		

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline:	**Administering authority**:	**Date**:
National Environmental Management Act (Act No 107 of 1998)	National and Provincial Department of Environmental Affairs	1998
Environment Conservation Act (Act No. 73 of 1989)	» Free State - Department of Economic Development, Tourism and Environmental Affairs (FS DEDTEA) » Local Authorities	1989
National Water Act (Act No 36 of 1998)	Department of Water Affairs	1998
Conservation of Agricultural Resources Act (Act No 43 of 1983)	Department of Agriculture	1983
National Environmental Management: Waste Act (Act No 59 of 2008)	Department of Environmental Affairs	2008
National Heritage Resources Act (Act No 25 of 1999)	South African Heritage Resources Agency	1999
National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	National Department of Environmental Affairs	2004
National Forests Act (Act No. 84 of 1998)	National Department of Forestry	1998
Promotion of Access to Information Act (Act No 2 of 2000)	National Department of Environmental Affairs	2000

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

YES	
✓	

If yes, what estimated quantity will be produced per month?	± 8m^3 of solid construction waste consisting mainly of vegetation, spoil material from clearing activities and metal and cabling off cuts.

How will the construction solid waste be disposed of (describe)?

It is anticipated that construction waste will be disposed of at trucked to the landfill site.

Where will the construction solid waste be disposed of (describe)?

In order to comply with legal requirements should there be excess solid construction waste after recycling options have been exhausted, the waste will be trucked to Landfill (to be confirmed in consultation with the municipality).

Will the activity produce solid waste during its operational phase?		**NO** ✓
If yes, what estimated quantity will be produced per month?		m^3

How will the solid waste be disposed of (describe)?

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?		**NO** ✓

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?		**NO** ✓

If yes, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

11(b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	[redacted] **NO** ✓
If yes, what estimated quantity will be produced per month?	m^3
Will the activity produce any effluent that will be treated and/or disposed of on site?	[redacted] **NO** ✓

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?	[redacted] **NO** ✓

If yes, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

In addition to standard water use for an office and toilets, the PV panels may need to be cleaned on a regular basis during operation, as dust accumulation reduces their efficiency. Larger volumes of water will be needed based on dust storm type events. Approximately 550 000 litres of water per annum is proposed to be trucked in from the nearest water source as per a water purchase agreement by local authorised user. Depending on water quality it is not expected that this water would need to be treated and thus this water will not accumulate any chemicals or hazardous materials and therefore is not regarded as waste water. If the water quality of purchased water is poor and or needs deionising for panel cleaning then a small salt rich residue will remain and disposed of at the appropriate municipal depot. It is envisaged that the volume of salt residue would not exceed 4 cubes per month and deposited at nearest authorised facility.

11(c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere?	[redacted] NO ✓

If yes, is it controlled by any legislation of any sphere of government?

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

PV installations convert solar energy into electricity, and consume no fuel during operation. PV installations produce an insignificant quantity of greenhouse gases over their lifecycle when compared to conventional coal-fired power stations. The operational phase of a solar facility produces little to zero carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of air pollution.

11(d) Generation of noise

Will the activity generate noise? NO ✓

If yes, is it controlled by any legislation of any sphere of government?

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

A limited amount of noise will be generated during the construction phase of the facility due to movement of heavy machinery on site. The operation phase will not generate any noise.

12. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(s)

Municipal ✓	Water board	Groundwater	River, stream, dam or lake	**Other** ✓	The activity will not use water
The applicant will be trucking in water with purchase agreement from agreement from localised user or the municipality, as advised by Department of Water Affairs.					

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month: NA

Does the activity require a water use permit from the Department of Water Affairs? **NO** ✓

If yes, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this application if it has been submitted.

As required by DWA, and dependent on water assessment on site a water use license application may be submitted to DWA once the project becomes operational

13. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The activity will use very little of the energy it produces and is in itself an activity that is proposed to generate electricity from a cleaner alternative energy source (i.e. solar radiation).

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

The purpose of a PV installation is to utilise an alternative energy source (i.e. solar radiation) for the production of electricity. Therefore it is not required to consider any additional alternative energy sources.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g. A):

2. Paragraphs 1 - 6 below must be completed for each alternative.

As the two options under consideration are located on adjacent farm portions and are relatively close to one another, the site description for both options is the same. This section is therefore relevant to both Option 1 and Option 2.

3. Has a specialist been consulted to assist with the completion of this section? NO ✓

If YES, please complete the form entitled "Details of specialist and declaration of interest"

for each specialist thus appointed:

All specialist reports must be contained in Appendix D.

Property description/physical address:	Portion 0 of Farm Wigt 1036 and the Remainder of Farm Albert 986

(Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.

N/A

In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.

Current land-use zoning:	Agriculture – used for cattle and sheep grazing

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to , to this application.

Is a change of land-use or a consent use application required?	YES ✓	
Must a building plan be submitted to the local authority?	YES ✓	

Locality map: An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:

- an indication of the project site position as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection)

Attached as **Appendix A.**

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1: Option 1

Flat ✓	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S2 (if any): Option 2

Flat ✓	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

Option 1 and Option 2:

2.1 Ridgeline
2.2 Plateau
2.3 Side slope of hill/mountain
2.4 Closed valley
2.5 Open valley
2.6 Plain
2.7 Undulating plain / low hills
2.8 Dune
2.9 Seafront

No significant slopes are present within the study area.

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1 (Option 1):		**Alternative S2 (Option 2):**		**Alternative S3 (if any):**	
Shallow water table (less than 1.5m deep)		NO√		NO√	YES	NO
Dolomite, sinkhole or doline areas		NO√		NO√	YES	NO
Seasonally wet soils (often close to water bodies)	YES√			NO√	YES	NO
Unstable rocky slopes or steep slopes with loose soil		NO√		NO√	YES	NO
Dispersive soils (soils that dissolve in water)		NO√		NO√	YES	NO
Soils with high clay content (clay fraction more than 40%)		NO√		NO√	YES	NO
Any other unstable soil or geological feature		NO√		NO√	YES	NO

An area sensitive to erosion		NO√		NO√		YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

Both Option 1 and 2 lie in the **Da1** land type (Land Type Survey Staff, 1972 - 2006).

Da land types denote areas where duplex soils with red B horizons comprise more than half of the area covered by the duplex soils. The soils are dominantly shallow rocky to structured duplex with inclusions of red structured horizons. Low-lying areas are dominated by structured swelling (vertic) and non-swelling (melanic) soils with poorly drained conditions in the form of G-horizons in some areas.

During the soil survey of the two alternative sites it was found that the specific survey area did not have any duplex soils as expected from the land type data. The land type data is therefore considered to be non-accurate for the specific area. The soils found on the site of **Option 1** were all apedal (structureless) with varying degrees of lime accumulation in the subsoil. A clear distinction was found between soils with shallow lime containing horizons and soils with thicker red apedal horizons overlying lime rich subsoil horizons. The dominant soil forms in the shallow lime areas were therefore of the Brandvlei (Br) (Orthic A-horizon / Soft Carbonate B-horizon) form and in the deeper lime areas of the Augrabies (Ag) (Orthic A-horizon / Neocarbonate B-horizon / unspecified) form. The area of the Augrabies soil form could also contain subdominant soils of the Addo (Ad) (Orthic A-horizon / Neocarbonate B-horizon / Soft Carbonate B-horizon) and Prieska (Pr) (Orthic A-horizon / Neocarbonate B-horizon / Hardpan Carbonate) forms – depending on the depth and degree of cementation of the lime rich horizons.

The soils on the site of **Option 2** of the project are predominantly apedal and with a dominant Neocarbonate B-horizon (therefore of the Augrabies or Addo forms). In between the deeper soils frequent lime outcrops occur at the surface or in an undulating manner below the surface. Due to the variation in lime content and depth soils of the Brandvlei form are also found on the site.

The agricultural potential of for both is considered to be low in terms of dryland crop production due to the relatively low rainfall (in the region of 400 mm per year) as well

as the variable depth of the soils. The variable depth nature of the soils implies that there is not enough of a soil profile to store water after rainfall events to be able to carry a crop, such as maize, through a season of variable rainfall.

Refer to Appendix D3: Soil and Agricultural Potential Study.

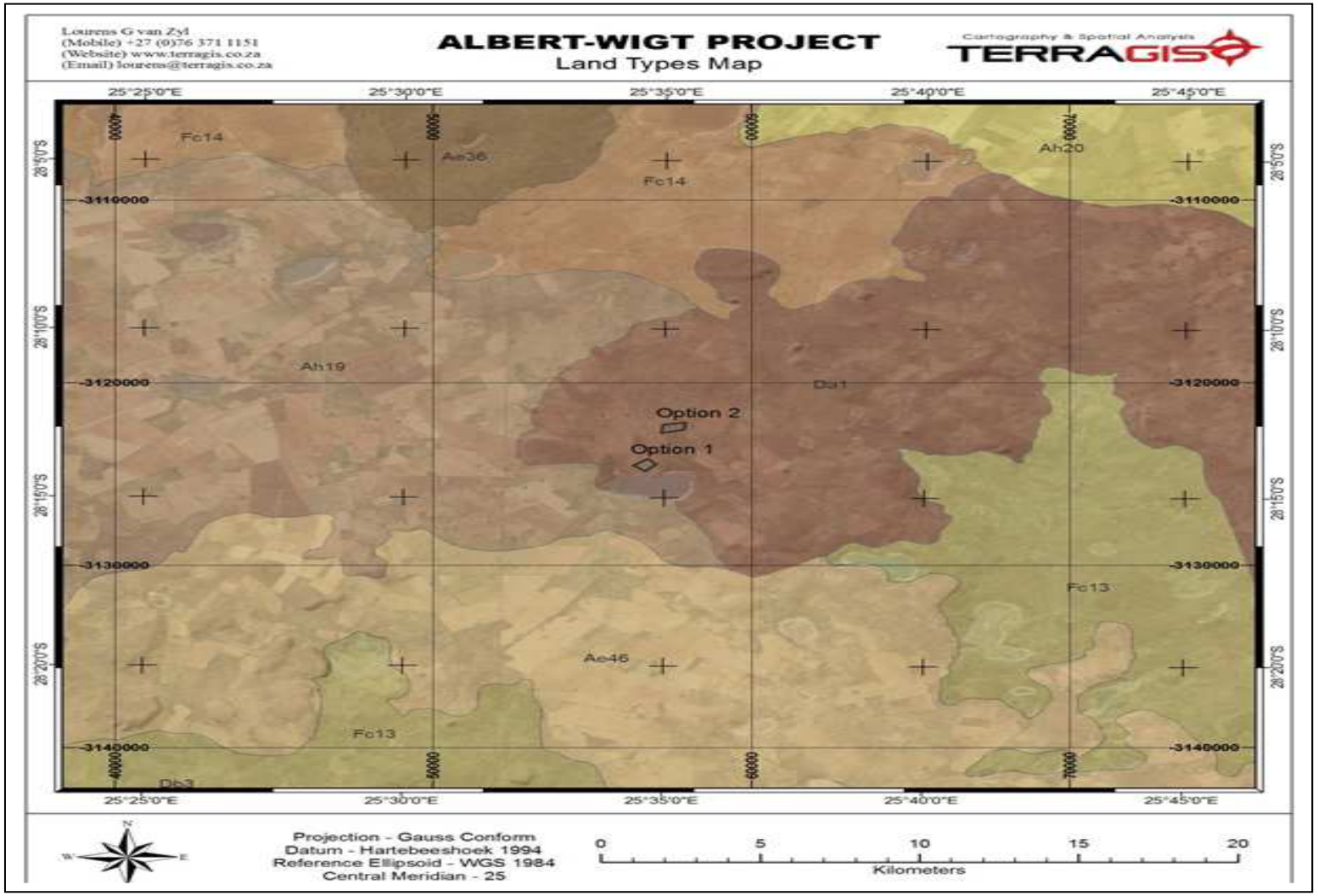

Figure 5: Soil map of the two alternative sites

4. GROUNDCOVER

Indicate the types of groundcover present on the site:

Option 1 and Option 2:

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E] ✓	Natural veld with scattered aliens[E]	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	**Cultivated land** ✓	Paved surface	Building or other structure	Bare soil

A landcover map of the study area (Fairbanks *et al*. 2000) indicates that the entire farm portions consist of natural vegetation, except for small patches of cultivation along the eastern boundary. The landcover on site is classified as "unimproved grassland" and "thicket and bushland". This is contrary to the 1:50 000 topo-cadastral maps, which show that large parts of the northern parts of the site have been previously cultivated.

The study area falls within the Grassland Biome (Rutherford & Westfall 1986, Mucina & Rutherford 2006). The most recent and detailed description of the vegetation of this region is part of a national map (Mucina, Rutherford & Powrie, 2005; *Mucina et al*. 2006). This map shows two vegetation types occurring within the study site, namely Western Free State Clay Grassland and Highveld Salt Pans. Further away is Schmidtsdrif Thornveld, but this does not occur on site. No other vegetation type occurs anywhere near to the site. The vegetation types are described in more detail below.

Western Free State Clay Grassland

This vegetation type occurs on the flat bottomlands of parts of the Free State Province. It has a dry, species-poor grassland dominated by the grasses *Aristida adscensionis*, *Aristida bipartita*, *Cynodon dactylon*, *Eragrostis chloromelas*, *Eragrostis lehmanniana*, *Panicum coloratum* and *Themeda triandra*. The area in which this vegetation type occurs is on duplex soils in which there are many salt pans and very few rivers or streams that drain the landscape, all the water draining into the pans.

Highveld Salt Pans

These pans are scattered along the broad Grassland/Karoo and Grassland/Savanna interface. They are found in depressions in the plateau landscape and contain temporary (and less frequently permanent) water bodies. The central parts of pans often contain seasonally inundated areas and sometimes floating macrophyte vegetation or the vegetation develops on the drained bottoms of pans and forms typical concentric zonation patterns. On the pan edges open to sparse grassy dwarf shrubland may develop, especially when the pan is under heavy grazing pressure (*Mucina et al*. 2006).

These vegetation types are not listed in the Draft National List of Threatened Ecosystems (GN1477 of 2009). According to Driver *et al*. 2005 and *Mucina et al*. 2005, the conservation status is least threatened. No Critical Biodiversity Areas have been identified for municipal areas of the Free State Province (bgis.sanbi.org). It is therefore not possible to identify areas of concern at a regional level in the current study area.

Refer to Appendix D 5: Ecology Study.

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

5.1 Natural area

5.2 Low density residential
5.3 Medium density residential
5.4 High density residential
5.5 Informal residential[A]
5.6 Retail commercial & warehousing
5.7 Light industrial
5.8 Medium industrial [AN]
5.9 Heavy industrial [AN]
5.10 Power station
5.11 Office/consulting room
5.12 Military or police base/station/compound
5.13 Spoil heap or slimes dam[A]
5.14 Quarry, sand or borrow pit
5.15 Dam or reservoir
5.16 Hospital/medical centre
5.17 School
5.18 Tertiary education facility
5.19 Church
5.20 Old age home
5.21 Sewage treatment plant[A]
5.22 Train station or shunting yard [N]
5.23 Railway line [N]
5.24 Major road (4 lanes or more) [N]
5.25 Airport [N]
5.26 Harbour

5.27 Sport facilities
5.28 Golf course
5.29 Polo fields
5.30 Filling station [H]
5.31 Landfill or waste treatment site
5.32 Plantation
5.33 Agriculture
5.34 River, stream or wetland
5.35 Nature conservation area
5.36 Mountain, koppie or ridge
5.37 Museum
5.38 Historical building
5.39 Protected Area
5.40 Graveyard
5.41 Archaeological site (within 85 metres)
5.42 Other land uses (describe)

If any of the boxes marked with an "[N] "are ticked, how this impact will / be impacted upon by the proposed activity?

N/A

If any of the boxes marked with an "[An]" are ticked, how will this impact / be impacted upon by the proposed activity?
If YES, specify and explain:
If YES, specify:

N/A

If any of the boxes marked with an "[H]" are ticked, how will this impact / be impacted upon by the proposed activity.
If YES, specify and explain:
If YES, specify:

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or palaeontological sites, on or close (within 20m) to the site?	[redacted]	NO ✓
If YES, explain:	A Heritage Impact Assessment was conducted for both site options; the report is attached in Appendix D 2: Heritage Impact Assessment Study.	

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist:	» Three sites of heritage significance were identified during the survey. These sites however are located outside the study area approximately 85 m to the east of PV plant option 1 » (Refer to Heritage Impact Assessment report attached in **Appendix D2**).

Will any building or structure older than 60 years be affected in any way?		NO ✓
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?		NO ✓

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT

» A2 site notices were placed on the entrance of Wigt Farm.
» A4 notices were placed at the Boshof Public Library and Hertzogville Public Library.
» Stakeholder letters were distributed to the database of registered parties. This included relevant officials from the National and Provincial Authorities, the local and district municipalities, key stakeholders and organs of state relevant to the proposed project. The public meeting was held at **Hertzogville Community Hall** on **30 January 2012** at **17:30 – 18:00hrs**. A notice was placed in Volksblad, DFA and Noordwester to advertise the Basic Assessment process on 18 and 20 January 2012 respectively.

2. Content of advertisements and notices

A notice board, advertisement or notices must:

(a) indicate the details of the application which is subjected to public participation; and
(b) state—
  (i) that the application has been submitted to the competent authority in terms of these Regulations, as the case may be;
  (ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;
  (iii) the nature and location of the activity to which the application relates;
  (iv) where further information on the application or activity can be obtained; and
  (iv) the manner in which and the person to whom representations in respect of the application may be made.

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

The proposed PV project will not result in any impacts that extend beyond the municipal area where it is located. The project details and public meeting were advertised in the following newspapers:

» Volksblad (Afrikaans advert placed on 18 January 2012)
» Snuffelblad (English advert to be placed on 30 January 2012)

The advertisement, site notices, and stakeholder letters detailed the Basic Assessment process, the nature, and location of the proposed project, where further information on the proposed activity could be obtained and the manner in which representations on the application could be made.

Proof of the advertisement placed is included within **Appendix E1**.

4. DETERMINATION OF APPROPRIATE MEASURES

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

A public meeting was held on 30 January 2012 at the Hertzogville Community hall from 17:30. The aim of this meeting was to inform attendees of the findings of the Basic Assessment process. However, no attendees arrived for the meeting.

Meetings were held with the local municipality. Consultation with I&APs and stakeholders was on-going throughout the EIA process.

Further to this the use of a stakeholder database, an advertisement, and site notices is deemed adequate for the public involvement process.

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before the application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to this application. The comments and response report must be attached under Appendix E.

All issues, comments, and/or concerns that have been raised to date have been captured and recorded within the Comments and Response Report (refer to **Appendix E 8**).

6. AUTHORITY PARTICIPATION

Please note that a complete list of all organs of state and or any other applicable authority with their contact details must be appended to the basic assessment report or scoping report, whichever is applicable.

Authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input.

List of authorities informed:

- Free State - Department of Economic Development, Tourism and Environmental Affairs (FS DEDTEA)
- Free State - Agriculture and Rural Development
- Free State - Public Works
- Free State – Roads And Transport
- Free State - Water Affairs
- South African Heritage Resources Agency
- SANRAL - Eastern Region
- Tokologo Local Municipality
- Lejweleputswa District Municipality
- Eskom
- Department of Energy
- National Department of Agriculture, Forestry and Fisheries

List of authorities from whom comments have been received:

A Focus Group meeting was held on Monday, 30 January 2012, Tokologo Municipality – Hertzogville Free State Province and the Mayor of Tokologo Municipality – Boshof Free State Province. These are attached in Appendix E 7.

7. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for linear activities, or where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that subregulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable.

Has any comment been received from stakeholders?	YES	[redacted]

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

Potentially affected stakeholders have been identified and consulted regarding the proposed project, including, inter alia:

» Affected and Neighbouring landowners;
» Parastatals and conservation authorities;
» Members of the public

The public meeting was held on Tuesday, 30 January 2012, Hertzogville Community Hall Free State Province

Focus Group Meetings were held on Monday, 30 January 2012, Tokologo Municipality – Hertzogville Free State Province and the Mayor of Tokologo Municipality – Boshof Free State Province.

A stakeholder database is attached in **Appendix E 4** and with proof of consultation with stakeholders attached in **Appendix E 5.**

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

Issues from Public Meeting:

No members of the public attended the Hertzogville Public meeting. Two other public meetings were apparently scheduled for the evening in the community. It was agreed with the Ward Councilors, Koba Ditira and George Nyamani that a mass public meeting be scheduled for the environmental impact assessment phase. They indicated that they would assist in ensuring the community was aware of this meeting in advance. Shawn Johnston provided the councilors with background information documents for distribution to the community, and undertook to send additional background information documents for the Hertzogville library and municipal office. It was agreed by all present to do a mass mobilization of the community with the assistance of the ward councilors for the next meeting.

Issues from Focus group meetings with the Local Municipality and Mayor:

1. Why do you use the name Hertzogville for your project? We are in a process of changing place names in the municipality. Why not call it Tokologo?
2. Our biggest problem is unemployment and poverty. Agriculture does not support the entire community. We need to investigate new job creation opportunities. I believe a project of this nature could assist the Tokologo Municipality in achieving some of its goals.
3. Your project is an excellent idea. We would like to see job creation, direct and indirect investment in our area.
4. Will you use local labour in the construction and operational phase of the project?
5. We understand that you cannot use a 100% local labour; however we would like to see a huge local labour content.
6. We would support a project of this nature as we have large-scale poverty, unemployment, major youth problems and a shortage of water in the town of Hertzogville. The socio-economic issues are our biggest concerns.
7. I would like to see how your project could benefit the Hertzogville community directly and assist the Tokologo Municipality with resolving the socio-economic problems.
8. Where will you obtain your water from during the construction and operational phase? Please note we are in a water stress area. Our towns have major water shortages.
9. Let's have a follow-up discussion about the access and availability to water? Let's see how we can clarify the water needs and how the Tokologo Municipality can assist your project.
10. We have a water shortage in town. We only receive water twice a day. The water shortage is due to broken and aged water infrastructure. A new pipeline is being built from the Vaal River.
11. All water related issues need to be discussed with the Department of Water Affairs and the Tokologo Municipality.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached to this report as Annexure E):

Responses to all issues raised are included within the Comments and Response Report attached in Appendix E.

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

2.1 IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

No impacts are expected to result from the planning and design phase. However, recommendations made by the specialist studies for minimising potential impacts during construction and operation should be considered during this phase in order to ensure that these recommendations can be implemented at a later stage in the development process.

2.2 IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

Potential impacts associated with the construction of the proposed project are discussed below.

The following methodology was used in assessing impacts related to the proposed development.

All impacts are assessed according to the following criteria:

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected.
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- The **duration**, wherein it is indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - Medium-term (5–15 years) – assigned a score of 3;

    - Long term (> 15 years) - assigned a score of 4; or;
    - Permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
    - 0 is small and will have no effect on the environment;
    - 2 is minor and will not result in an impact on processes;
    - 4 is low and will cause a slight impact on processes;
    - 6 is moderate and will result in processes continuing but in a modified way;
    - 8 is high (processes are altered to the extent that they temporarily cease); and
    - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
    - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
    - Assigned a score of 2 is improbable (some possibility, but low likelihood);
    - Assigned a score of 3 is probable (distinct possibility);
    - Assigned a score of 4 is highly probable (most likely); and
    - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The **status**, which is described as positive, negative, or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

S=(E+D+M)P; where

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance** weightings for each potential impact are as follows:

- < **30 points**: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- **30-60 points**: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- **> 60 points**: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Impacts for Both Options under consideration are similar/identical, unless otherwise stated

The potential impacts associated with the construction of the proposed PV facility are discussed below. Detailed specialist studies are included within **Appendix D** which detail the potential environmental impacts on heritage resources, soil erosion and agricultural potential, ecological impacts, and visual impacts.

1. Potential impacts on Ecology

Construction of infrastructure may lead to direct loss of vegetation. This may lead to localised or more extensive reduction in the overall extent of vegetation. Consequences of the potential impact of loss of indigenous natural vegetation occurring may include:

» Negative change in conservation status of habitat (Driver *et al*. 2005);
» Increased vulnerability of remaining portions to future disturbance;
» General loss of habitat for sensitive species;
» Loss in variation within sensitive habitats due to loss of portions of it;
» General reduction in biodiversity;
» Increased fragmentation (depending on location of impact);
» Disturbance to processes maintaining biodiversity and ecosystem goods and services;
» Loss of ecosystem goods and services.

The vegetation types on site are Western Free State Clay Grassland and Highveld Salt Pans, which are both classified as Least Threatened. Both development options are located within areas containing indigenous natural vegetation.

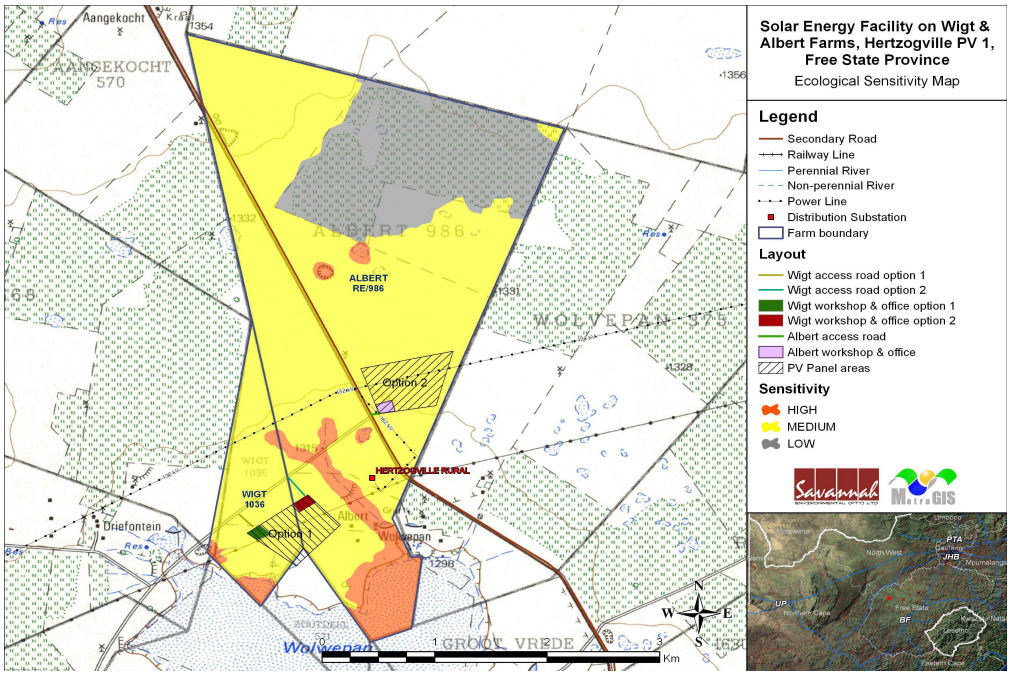

Figure 6 : Habitat sensitivity map

Option 1 and Option 2 do not fall within the High Sensitivity area.

There are three species on this list that have been identified as having a probability of occurring on the proposed development site, two listed as Near Threatened (*Lithops lesliei subsp. Lesliei* and *Sporobolus oxyphyllus*) and one listed as Declining (*Acacia erioloba).* The conservation categories of "declining" and "rare" are of much lower importance than species classified as threatened (critically endangered, endangered or vulnerable) or near threatened.

The following species were considered to have probability of occurring on sites:

» *Acacia erioloba* (declining) occurs on site and is also a protected tree. It usually occurs in deep sandy soils, along drainage lines and sometimes on rocky outcrops, but may also occur more widely in other habitats. The conservation categories of "declining" and "rare" are of much lower importance than species classified as threatened (critically endangered, endangered or vulnerable) or near threatened
» *Lithops lesliei* subsp. *lesliei*, is listed as Near Threatened. Information from the SANBI website indicates that this species has not been previously listed in the grid in which the site is located, but occurs in neighbouring grids. There is no suitable habitat on site for this species. *Lithops lesliei* subsp. *lesliei* therefore has a low probability of occurring on site.
» The grass, *Sporobolus oxyphyllus*, is also listed as Near Threatened. Information from the SANBI website indicates that this species has been previously listed in the grid in which the site is located. It grows in areas of high 'sodic' soils especially at the edges of salt pans and in saline vleis. Due to the fact that such habitats occur on site and that the species has been previously recorded in this grid, there is a high risk of it occurring on site. No individuals were found on site, but suitable habitat occurs there along the margins of the pans.

Two species have a geographic distribution that includes the study area, *Harpagophytum procumbens* and *Hoodia gordonii*. A field assessment of the site indicated that these species are not on site

There are three mammal species of conservation concern that could occur in available habitats in the study area (White-tailed Rat, Brown Hyaena and South African Hedgehog) and two protected mammal species that could occur there (Black-footed Cat, Cape Fox). The Brown Hyaena and South African Hedgehog are also protected.

There are five threatened bird species (Blue Crane, Grass Owl, Kori Bustard, Lesser Kestrel, Martial Eagle, all VU) and five Near Threatened bird species (Blue Korhaan, Caspian Tern, Lanner Falcon, Secretary bird, White Pelican) that have a medium to high probability of utilising available habitats in the study area, either for foraging or breeding.

There are no threatened, near threatened or protected reptile species that could occur in available habitats in the proposed study area.

The protected Giant Bullfrog (not listed as threatened) could occur on site.

Impact tables summarising the significance of ecological impacts:

There are two options for siting of PV panels, Option 1 and Option 2. The assessment is identical for both options, except where indicated.

Nature: **Potential impacts of disturbance or loss of indigenous natural vegetation**

There are two major vegetation types that occurs in the study area, namely Western Free State Clay Grassland and Highveld Salt Pans, both classified as Least Threatened. The natural vegetation across most of the site is therefore not considered, from this perspective, to have high conservation status. The site does not occur within any Centre of Floristic Endemism.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Small to low (3)
Probability	Definite (5)	Definite (5)
Significance	**Medium (50)**	**Medium (45)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	To some extent	

Mitigation:

» Avoid unnecessary impacts on natural vegetation surrounding infrastructure. Impacts should be contained, as much as possible, within the footprint of the infrastructure.

Cumulative impacts:

» Soil erosion, alien invasions may lead to additional loss of habitat that will exacerbate this impact.

Residual impacts:

» Some loss of this vegetation type will occur, but this is insignificant relative to the total extent of the vegetation type.

Nature: **Destruction/permanent loss of individuals of threatened plant species due to the construction of the solar arrays and buildings (for Option 1 only)**

The destruction of Red Data species or areas suitable for said species represents a significant impact on the biodiversity of a region. The Draft National List of Threatened Ecosystems (GN1477 of 2009), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types that are afforded protection on the basis of rates of transformation.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Short-term (2)
Magnitude	minor (2)	none (0)
Probability	Probable (3)	Highly improbable (1)
Significance	**Low (21)**	**Low (3)**

Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Partially	

Mitigation:

» If possible, avoid disturbing individuals of *Acacia erioloba* that occur near to the proposed infrastructure.
» Ensure that no disturbance occurs within 200 m of the edge of the pan (Wolwepan), which constitutes favourable habitat for a near threatened species, *Sporobolus oxyphyllus.*
» Educate personnel on the conservation value of the species and the need to prevent disturbance to any individuals.
» If plants are to be destroyed (in the case that no other options are available) then a permit is required (National Environmental Management: Biodiversity Act).

Cumulative impacts:

» Loss of habitat, soil erosion, alien invasions may all lead to additional impacts that will exacerbate this impact.

Residual impacts:

» Not Likely.

Nature: Impacts on protected tree species **due to the construction of the solar arrays and buildings for** ***Option 1 only.***

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (5)
Magnitude	minor (2)	none (0)
Probability	Probable (3)	Improbable (2)
Significance	**Low (21)**	**Medium (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	No	

Mitigation:

» If possible, avoid disturbing individuals of *Acacia erioloba*. If not, a permit is required for the removal or damage of protected trees.

Cumulative impacts:

» Impacts due to alien invasions and damage to watercourses may possibly cause damage to habitat where protected trees could grow that may exacerbate this impact.

Residual impacts:

» Not Likely.

Nature: **Loss of habitat for threatened animals due to the construction of PV Solar Panels**

None of the protected or threatened animals were found during the investigation
The footprint of the solar array is small relative to the overall availability of habitat in the general area. The potential impact on them due to a loss of a small area of habitat is therefore not considered to be serious.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Option 1: low (4) Option 2: small (2)	Option 1: low (3) Option 2: small (1)
Probability	Option 1 : Probable (3) Option 2: Improbable (2)	Option 1 : Probable (3) Option 2: Improbable (2)
Significance	**Option 1: Medium (30)** **Option 2: Low (16)**	**Option 1: Low (27)** **Option 2: Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible to some degree	Reversible to some degree
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Not required	

Mitigation:

» Unnecessary impacts on surrounding natural vegetation must be avoided.
» The construction impacts must be contained within the footprint of the infrastructure. Disturbed areas beyond the footprint of the infrastructure must be rehabilitated as quickly as possible.
» If Option 1 is selected, construction personnel and equipment must be prevented from causing any disturbance close to the pan (Wolwepan).

Cumulative impacts:
None

Residual impacts:
Not likely

Nature: Potential impacts on Damage to wetlands/watercourses
Other than Wolwepan, there are two shallow unchannelled watercourses in the study area, as well as a number of small pans. According to the National Water Act, these are classified as water resources. Construction may lead to some direct or indirect loss of or damage to these affected areas or changes to the catchment of these areas.

	Without mitigation	**With mitigation**
Extent	local and surroundings (2)	local and surroundings (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Option 1: Moderate (6) Option 2: Low (4)	Option 1: Low (4) Option 2: Low (3)
Probability	Option 1: Highly probable (4) Option 2: Probable (3)	Probable (3)
Significance	**Option 1: medium (48)**	**Option 1:**

	Option 2: medium (30)	**medium (30) Option 2: low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible with effective rehabilitation	Reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	To some degree	
Mitigation: » Ground surfaces within the solar array must be properly maintained to avoid erosion impacts. » A comprehensive storm-water management plan must be compiled for the solar array. This must indicate how water velocities will be reduced before storm water is allowed to enter natural channels and how natural processes for water infiltration of the affected landscape will be accommodated. Current project design already foresees the use of gutter-like rainwater collection channels below the panels, in order to drive runoff water from panels to underground water tanks » There is a legal obligation to apply for a Water Use Licence for any wetlands that may be affected, since they are classified in the National Water Act as a water resource. Any activity within 500 m of a wetland or watercourse boundary may require a WUL, depending on the activity.		
Cumulative impacts: » Soil erosion, alien invasions, may all lead to additional impacts on watercourse habitats that will exacerbate this impact.		
Residual impacts: » Not likely		

Impacts from construction of the ancillary infrastructure may impacts on the loss of habitats for threatened animals:

Access Road:

There are two possible access roads to site (see Figure 1). Both are relatively short and link up to existing access roads.

Power line:

There are two solar array alternatives and it is assumed that power lines will run directly from these to the existing substation in the study area. The main impact of the power line will be due to impacts on birds, although there could be some loss of habitat for terrestrial fauna in the footprint of tower structures

The significance of these impacts is expected to be identical for both Option 1 and Option 2.

Nature: Loss of habitat for threatened animals due to the construction of the access roads and power line		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)

Duration	Permanent (5)	Permanent (5)
Magnitude	small (2)	small (1)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (16)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible to some degree	Reversible to some degree
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Not required	

Mitigation:

» Unnecessary impacts on surrounding natural vegetation must be avoided. The construction impacts must be contained within the footprint of the infrastructure. Disturbed areas beyond the footprint of the infrastructure must be rehabilitated as quickly as possible.

Cumulative impacts:

» None

Residual impacts:

» None likely

Nature: **Establishment and spread of declared weeds and alien invader plants due to the construction of the access roads and power line**

There are very few concentrations of alien plants on site. The shrub, *Prosopis glandulosa* (honey mesquite), is found in the general area Construction of the solar array will require the total clearing of vegetation within the footprint during the construction phase. However this will be allowed to grow back and will be kept low to avoid fire risks. It is possible that there will be some invasion by aliens along the margins of disturbed areas

	Without mitigation	**With mitigation**
Extent	Site & surroundings (2)	Site & surroundings (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	medium (6)	minor (2)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (36)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

» Keep disturbance of vegetation surrounding array to a minimum
» Rehabilitate disturbed areas as quickly as possible following completion of construction activities in an area
» Do not translocate soil stockpiles from areas with alien plants
» Control any alien plants immediately to avoid establishment of a soil seed bank that would take decades to remove
» Establish an on-going monitoring programme to detect and quantify any aliens that

may become established
Cumulative impacts:
» Other disturbance to parts of the site could lead to similar impacts.
Residual impacts:
» Will probably be very low if control measures are effectively applied

Nature: Loss of individuals of protected trees		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (5)
Magnitude	minor (2)	none (0)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (14)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	No	
Mitigation:		
» If possible, avoid disturbing individuals of *Acacia erioloba*. If not, a permit is required for the removal or damage of protected trees.		
Cumulative impacts:		
» Impacts due to alien invasions and damage to watercourses may possibly cause damage to habitat where protected trees could grow that may exacerbate this impact.		
Residual impacts:		
» None likely		

Nature: Loss of habitat within indigenous natural vegetation				
	Road Access		**Power Line**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)	Medium-Term (3)	Medium-Term (3)
Magnitude	Minor (2)	Minor (1)	Low (4)	Small (2)
Probability	Definite (5)	Definite (5)	Definite (5)	Highly Probable (4)
Significance	**Medium (40)**	**Medium (35)**	**Medium (40)**	**Low (24)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Not Reversible	Not Reversible	Not Reversible	Not Reversible
Irreplaceable loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	To some extent			
Mitigation:				

» Avoid unnecessary impacts on natural vegetation surrounding infrastructure. Impacts should be contained, as much as possible, within the footprint of the infrastructure. » Disturbed areas beyond the footprint of the infrastructure must be rehabilitated as quickly as possible.
Cumulative impacts: » Soil erosion, alien invasions may lead to additional loss of habitat that will exacerbate this impact.
Residual impacts: » Some loss of this vegetation type will occur, but this is insignificant relative to the total extent of the vegetation type.

Nature: ***Destruction/permanent loss of individuals of threatened plant species (Option 1 only)***				
	Road Access (Option 1 only)		**Power Line (Option1 only)**	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-Term (4)	Long-Term (4)	Long-Term (4)	Short-Term (2)
Magnitude	Minor (2)	Minor (2)	Minor (2)	None (0)
Probability	Improbable (2)	Improbable (2)	Improbable (2)	Highly Improbable (1)
Significance	**Low (14)**	**Low (14)**	**Low (14)**	**Low (3)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Not Reversible	Not Reversible	Not Reversible	Not Reversible
Irreplaceable loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	To Some Extent			
Mitigation: » If possible, avoid disturbing individuals of *Acacia erioloba* that occur near to the proposed infrastructure. » Educate personnel on the conservation value of the species and the need to prevent disturbance to any individuals. » If plants are to be destroyed (in the case that no other options are available) then a permit is required (National Environmental Management: Biodiversity Act).				
Cumulative impacts: » Soil erosion, alien invasions, may all lead to additional impacts on watercourse habitats that will exacerbate this impact.				
Residual impacts: » None likely				

Nature: ***Damage to wetland / watercourse areas resulting in hydrological impacts***

	Road Access		**Power Line**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local And Surroundings (2)	Local And Surroundings (2)	Local And Surroundings (2)	Local And Surroundings (2)
Duration	Long-Term (4)	Long-Term (4)	Long-Term (4)	Long-Term (4)
Magnitude	Low (4)	Low (4)	Option 1: Moderate (6) Option 2: Low (4)	Option 1: Low (4) Option 2: Low (3)
Probability	Improbable (2)	Improbable (2)	Option 1: Highly Probable (4) Option 2: Probable (3)	Probable (3)
Significance	**Low (20)**	**Low (20)**	**Option 1: Medium (48)** **Option 2: Medium (30)**	**Option 1: Medium (30)** **Option 2: Low (27)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Reversible With Effective Rehabilitation	Reversible	Reversible With Effective Rehabilitation	Reversible
Irreplaceable loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	To Some Extent			

Mitigation:

Road Access:

» There is a legal obligation to apply for a Water Use Licence for any wetlands that may be affected, since they are classified in the National Water Act as a water resource. Any activity within 500 m of a wetland or watercourse boundary may require a WUL, depending on the activity.

Power line:

» Pylons must be positioned a minimum of 50 m outside of watercourse boundaries.

» Existing tracks crossing the watercourse between Solar Array Option 1 and the substation must be used as a service road rather than constructing new roads.

» There is a legal obligation to apply for a Water Use Licence for any wetlands that may be affected, since they are classified in the National Water Act as a water resource. Any activity within 500 m of a wetland or watercourse boundary may require a WUL, depending on the activity.

Cumulative impacts:

» Soil erosion, alien invasions, may all lead to additional impacts on watercourse habitats that will exacerbate this impact.
Residual impacts:
» None

Nature: Potential impacts on Bird collisions with power lines		
There is a low to moderate likelihood of threatened or near threatened bird species occurring along the proposed overhead power line routes. The potential impact on them due to collisions is therefore not considered to be likely to be of high frequency, but could potentially have a serious impact on some species. The construction of the power line will add to an existing impact (there is an existing power line on site).		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-Term (4)	Long-Term (4)
Magnitude	Low (4)	Low (3)
Probability	Probable (3)	Improbable (2)
Significance	**Low (27)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible To Some Degree	Reversible To Some Degree
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Local (1)	
Mitigation:		
» Devices to make lines more visible must be attached to overhead power lines.		
Cumulative impacts:		
» None		
Residual impacts:		
» None likely		

Comparison of Alternatives

PV panels

Development of Option 1 will cause some loss of natural vegetation, may cause loss of some individuals of plant species of concern and protected trees, could affect animal species of conservation concern, especially birds, and introduces risks to watercourses and Wolwepan. Option 2 will cause some loss of natural vegetation, could affect animal species of conservation concern, especially birds, but to a lesser extent than for Option 1, and introduces low risks to a watercourse.

Access roads

Option 1 has a slight risk of affecting protected trees, which is not the case with Option 2. The expected significance of impacts is otherwise the same for both options.

Power lines

Power line Option 1 crosses a small, unchannelled watercourse, which is not the case with

Option 2. Option 1 has a slightly higher risk of affecting plant species of conservation concern than Option 2. For both power line options, there may be some collision impacts with birds.

The specialist study has revealed that **Option 2 is preferred to Option 1**. The preference is based on the proximity of Option 1 to Wolwepan, which introduces a number of risks, including the presence or potential presence of plant species of conservation concern, protected trees, impacts on watercourses and/or pans and a slightly greater risk of affecting animal and bird species of conservation concern. The area adjacent to Wolwepan has habitat not typical of surrounding areas, including the presence of wooded grassland, which attracts birds and animals.

Implications for Project Implementation

- The sensitive areas are classified as having High sensitivity (see Figure 6) and no development should take place in this area. However, the sensitivity map illustrates that the proposed sites for Option 1 and Option 2 are located in Medium sensitivity areas.
- The vegetation on site is listed as Least threatened and does not occur within any Centre of Floristic Endemism.

Obtain permits for removal of protected trees

Potential Impacts on Soil and Agricultural Potential

Potential impacts on Agricultural potential and land capability:

The agricultural potential of the site is considered to be low in terms of dryland crop production due to the relatively low rainfall (in the region of 400 mm per year) as well as the variable depth of the soils.

Nature of impact: Loss of agricultural potential and land capability owing to the development

	Without mitigation	**With mitigation**
Ext*ent*	Low (1) – Site	Low (1) – Site
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Low (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	32 (Low)	32 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	No

Mitigation:

- The loss of agricultural land is a long term loss and there are no mitigation measures that can be put in place to combat this loss.

Cumulative impacts:

- Soil erosion may arise owing to increased surface water runoff. Adequate management and erosion control measures should be implemented.

Residual Impacts:

» The loss of agricultural land is a long term loss. This loss extends to the post-construction phase. The agricultural potential is however very low.

Potential impacts on soil and existing land use

The construction of the solar panels would impact on the soil and existing land use by changing the land used that is generally used for cattle grazing.

Nature of impact: Construction of solar panels, stands, buildings and roads with the associated disturbance of soils and existing land use.

	Without mitigation	**With mitigation**
Extent	Low (1) – Site	Low (1) – Site
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Low (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	**32 (Medium)**	**32 (Medium)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	No	No

Mitigation:

» It is important to note that any soil impact in the form of drastic physical disturbance (as with construction activities) is a permanent one and no mitigation is possible. Impacts are small due to the localised nature thereof.

Cumulative impacts:

» The cumulative impact of the construction the solar panels, stands and buildings will be small as it is constructed on land with low agricultural potential.

» The cumulative impact of the construction of the roads will be small as it is linear and limited in geographical extent.

Residual Impacts:

» None

<u>Comparison of Alternatives</u>

PV panels

Development of Option 1 will cause some loss of natural vegetation, may cause loss of some individuals of plant species of concern and protected trees, could affect animal species of conservation concern, especially birds, and introduces risks to watercourses and Wolwepan. Option 2 will cause some loss of natural vegetation, could affect animal species of conservation concern, especially birds, but to a lesser extent than for Option 1, and introduces low risks to a watercourse.

Access roads

Option 1 has a slight risk of affecting protected trees, which is not the case with Option 2. The expected significance of impacts is otherwise the same for both options.

Power lines

Power line Option 1 crosses a small, unchannelled watercourse, which is not the case with

Option 2. Option 1 has a slightly higher risk of affecting plant species of conservation concern than Option 2. For both power line options, there may be some collision impacts with birds.

Option 2 is preferred to Option 1. The preference is based on the proximity of Option 1 to Wolwepan, which introduces a number of risks, including the presence or potential presence of plant species of conservation concern, protected trees, impacts on watercourses and/or pans and a slightly greater risk of affecting animal and bird species of conservation concern.

Implications for Project Implementation

- The sensitive areas are classified as having High sensitivity (see Figure 6) and no development should take place in this area. However, the sensitivity map illustrates that the proposed sites for Option 1 and Option 2 are located in Medium sensitivity areas.
- The vegetation on site is listed as Least threatened and does not occur within any Centre of Floristic Endemism.
- Obtain permits for removal of protected trees.

2. Potential impacts on heritage resources

Three sites of heritage significance were identified during the survey. The demolished remains of two residential dwellings (Site 2 and 3) are located outside the study area approximately 85 m to the east of PV plant option 1, and no direct impact is foreseen on these sites. Site 1 consists of the foundations of a rectangular cattle kraal and is associated with the residential complex (Site 2 and 3) and is located in the south eastern corner of PV plant option 1. Therefore, this site will be impacted if option 1 is selected for development. No sites of significance were identified in the area earmarked for PV plant option 2. Based on these findings and the impact assessment below, the following recommendations are made:

- Since no heritage sites or features have been recorded in PV plant option 2 this is the preferred option for the PV plant from a heritage point of view.
- If PV plant option 1 is earmarked for the development it is recommended that the footprint is moved to the south west to facilitate the preservation of Site 1 in situ. Site 1, 2 and 3 will have to be fenced off with danger tape during the construction phase of the development to protect them against accidental impacts.
- If, during construction, any archaeological finds are made (e.g. stone tools, skeletal material), the operations must be stopped, and the archaeologist must be contacted for an assessment of the finds.

Nature of impact: During the operation of the project an indirect visual impact is expected for Site 1 situated on Option 1.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Low (2)
Probability	Probable (4)	Probable (3)

Significance	**60 (Medium)**	**24 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:

- If option 2 is chosen the development can continue as it will not impact on the site. However if the development continues as per Option 1 the site can be mitigated by preserving it in situ and fencing it off during construction.
- If PV plant option 1 is earmarked for the development it is recommended that the footprint is moved to the west to facilitate the preservation of Site 1 in situ. Site 1, 2 and 3 will have to be fenced off with danger tape during the construction phase of the development to protect them, against accidental impacts.
- If, during construction, any archaeological finds are made (e.g. stone tools, skeletal material), the operations must be stopped, and the archaeologist must be contacted for an assessment of the finds.

»

Cumulative impacts:

» Archaeological and cultural sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.

Residual Impacts:

» Depletion of archaeological record of the area.

Nature of impact: During the operation of the project an indirect visual impact is expected for the site for Site 2 and 3 situated outside Option 1.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	**45 (Medium)**	**24 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:

» The sites are located outside of the development footprint and no further action is necessary.

Cumulative impacts:

» Archaeological and cultural sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.

Residual Impacts:

» Depletion of archaeological record of the area.

Comparison of Alternatives

Since no heritage sites or features have been recorded in PV plant option 2 this is the preferred option for the PV plant from a heritage point of view.

Implications for Project Implementation

- If PV plant option 1 is earmarked for the development it is recommended that the footprint is moved to the south west to facilitate the preservation of Site 1 in situ.
- Site 1, 2 and 3 will have to be fenced off with danger tape during the construction phase of the development to protect them against accidental impacts.

3. Potential Visual Impacts

During the construction period, there will be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and land owners in the area. Dust from construction work could also result in potential visual impact.

This anticipated visual impact for both site options is likely to be of moderate significance, and may be mitigated to low.

Nature of impact: Potential visual impact of construction on visual receptors in close proximity to the proposed SEF (options 1 and 2).

	Without mitigation	**With mitigation**
Extent	Local **(4)**	Local **(4)**
Duration	Very short term **(1)**	Very short term **(1)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(33)**	Low **(22)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

» Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
» Reduce the construction period through careful logistical planning and productive implementation of resources.
» Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
» Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
» Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
» Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
» Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
» Rehabilitate all disturbed areas, construction areas, roads, slopes etc immediately after the completion of construction works.

Cumulative impacts:

None.

Residual impacts:
None.

Comparison of Alternatives

There is no preferred option in terms of potential impacts during construction.

Implications for Project Implementation

» The recommendations contained in the visual impact assessment should be implemented.

4. Potential Social Impacts

The specialist study was based on the farm portion as opposed to Option 1 and Option 2.

Nature of impact: Employment opportunities

It is estimated that between 40 to 60 direct job opportunities would be created during the construction phase. Approximately 5% of these opportunities would require skilled personnel, which leaves between 38 and 57 unskilled and semi-skilled opportunities available. As training and skills development would form part of the development of the PV facility, and the fact that unemployment figures are quite high, it is thus highly likely that locals could be employed during the 3 to 4 month construction phase.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Highly Probable (4)
Significance	**Low (21)**	**Medium (36)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	

Mitigation:

» Suncorp/Solar Reserve JV and their Employment Procurement and Construction (EPC) contractor should maximise the use of local labour.
» Training and capacity building programmes should be implemented to lessen any possible skills disparity between the local skills available and the requirements of the project.
» The skill requirements should be communicated to the local community leaders and community based organisations.

Cumulative impacts:

» Further positive impacts with regards to job creation for individuals within the Tokologo Local Municipality, and possibly the region, in the event that the Hertzogville PV 2 facility would be implemented.

Residual impacts:

» An increase in individuals with specialised or enhanced skills due to skills training and capacity building

Nature of impact: **Potential impact on Tokologo Local Municipality and local economy**

As the energy generated through the proposed Hertzogville PV 1 project would be incorporated into the national electricity energy grid, the direct benefits of the improved electricity supply would occur on a national scale.

It is also not anticipated that the Tokologo Local Municipality would have to contribute any funding or services to the proposed project. The provision of infrastructure on site would be the responsibility of Suncorp/Solar Reserve JV and off-site they would possibly link with existing infrastructure.

Indirect benefits however could accrue to the Tokologo Local Municipality through efforts by Suncorp/Solar Reserve JV to be involved with social development and social services support (social responsibility).

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Minor (2)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (15)**	**Low (21)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	

Mitigation:

Ensure that locals also receive some benefit from the proposed project by committing Suncorp/Solar Reserve JV to local social development and social support

Cumulative impacts:

Cumulative impacts would depend on whether the Hertzogville PV 2 project would also be implemented and the effectiveness of Suncorp/Solar Reserve JV's inputs with regards to social development and social services support

Residual impacts:

Improvement in quality of life of local individuals

Nature of impact: **Potential impacts of safety and security risks to site and surrounds**

Safety and security related impacts refer to the possible increase in safety risks or perceptions in this regard during the construction phase due to the inflow and movement of a construction workforce. It is unlikely that the presence of the facility would increase the risk of criminal activities as the site would be properly fenced and permanent security personnel would be on site, with limited movement of employees

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	

Mitigation:

» Working hours should be kept to normal working hours (e.g. 6 am until 6 pm) during the construction phase.
» The construction site should be properly secured to prevent any unauthorised access to the site and permanent security personnel should be on-site prior to construction activities commencing.
» Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce.
» Construction workers should be easily identifiable by wearing uniforms and even identity tags.
» Local community organisations and policing forums / neighbourhood watches must be informed of the presence of the workforce.
» Permanent security personnel should be on site during the operational phase.
» Fencing of the site should be implemented and maintained.

Cumulative impacts:

Increasing crime levels due to more people present and moving around in the local area.

Residual impacts:

None anticipated.

Nature of impact: **Impacts on daily living and movement patterns during the construction phase.**

The proposed sites for the PV facility (19MW) on the farms Wigt or Albert could be accessed from the tarred R59 road following local gravel access roads. Localised noise and dust pollution on the farms Wigt and Albert could be expected during the construction phase due to the movement of the construction related vehicles transporting workers and materials to the site. Due to the presence of the construction workers on site and construction related activities subsequent possible negative social impacts refer to impact of veld fires on surrounding property owners, as well as an increase in safety and security risks.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (21)**

Status (positive or negative)	Negative	Negative
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	

Mitigation:

» As far as possible, working hours should be kept to normal working hours (i.e. 6 am until 6 pm). Only workers that are on duty and security personnel should be allowed on site.
» Before construction commences, representatives from the Tokologo Local Municipality, community leaders, community-based organisations and the surrounding property owners, should be informed of the details of the contractors, size of the workforce and construction schedules.
» Construction workers and permanent employees should be easily identifiable by wearing uniforms and even identity tags.
» Construction workers should refrain from unauthorised entry on the remaining sections of the affected farms and should thus remain within the construction site boundaries.
» The construction site should be properly fenced and access should be controlled. The same security measures should be strictly implemented during the operational phase of the project
» Sufficient water and sanitation facilities should be provided for the workers on site during the construction period.
» The construction site should be properly managed to avoid any environmental pollution and littering.
» Informal vending stations on or near the construction site should preferably not be allowed.
» The PV facility should be equipped with fire fighting equipment and an emergency plan in this regard should be finalised and implemented in conjunction with the surrounding property owners.

Cumulative impacts:
None anticipated.

Residual impacts:
Change in landscape character.

Nature of impact: **Potential impacts on Tourism**

As the area is not known for major tourist locations and/or sites, it is unlikely that the proposed PV facility would have any positive or negative impacts on the local tourism industry. It is thus also not foreseen that the proposed PV facility could play a major positive role as tourist destination in the area.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Very Improbable (1)
Significance	**Low (10)**	**Low (5)**
Status (positive or negative)	Neutral	Neutral

Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Unlikely	

Mitigation:

» Construction activities should keep to normal working hours (e.g.6 am to 6 pm) and the construction site should be properly managed to limit any intrusions.

» Suncorp/Solar Reserve JV and representatives of the Tokologo Local Municipality, tourism operators, and property owners involved in the tourism sector should jointly investigate whether the PV facility could play a role concerning the local tourism industry.

Cumulative impacts:

None anticipated

Residual impacts:

Change in landscape character.

The PV facility of 19 MW would be a relatively small operation and it is thus not anticipated to change the demographic profile of the local community. During the construction phase a concentration of additional construction workers (locals and outsiders) would be present on site which would result in a concentrated change in the local population density for only a short period of time. Should locals be employed this impact would furthermore be mitigated

Nature of impact: **Potential impacts on population change**

The PV facility of 19 MW would be a relatively small operation and it is thus not anticipated to change the demographic profile of the local community. During the construction phase a concentration of additional construction workers (locals and outsiders) would be present on site which would result in a concentrated change in the local population density for only a short period of time. Should locals be employed this impact would furthermore be mitigated.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Very Improbable (1)
Significance	**Low (10)**	**Low (5)**
Status (positive or negative)	Neutral	Neutral
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	

Mitigation:

» The use of local labourers during the construction phase, where possible, would assist in limiting any possible indirect negative impacts associated with the limited population change during the construction phase.

Cumulative impacts:

» A larger increase in the population size and density during the construction phase, and

possibly on the infrastructure and provision of services within the Tokologo Local Municipal area due to the possible development of the Hertzogville PV 2 project on the farm Albert

Residual impacts:

» Possibility of outside workers remaining in the area after construction has ceased with additional, although still limited impacts on the local population size

Nature of impact: **Inflow of outside workforce**

This variable refers to the inflow of temporary workers as well as potential conflict between locals and this "outside" workforce during the construction phase, but also to the possibility of outsiders being permanently employed.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (21)**	**Low (15)**
Status (positive or negative)	Possibly Negative	Negative to Neutral
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	

Mitigation:

» Local labourers should be employed where applicable and the employment of outsiders during the construction process should be kept to the minimum.
» Employment of locals should be stipulated in the contract between Suncorp/Solar Reserve JV and their EPC contractor.
» Training and capacity building programmes should be implemented to lessen any possible skills disparity between the local skills available and the requirements of the project.
» Local labourers should preferably remain at their existing residences. From a social perspective it would not be ideal to accommodate workers on site at night. This issue should thus be sensitively considered.
» The construction site should be fenced and permanent security personnel should be on site prior and during the construction and operational phases.
» The construction site should be properly managed to avoid any environmental pollution and disturbances to the social environment.

Cumulative impacts:

» Some additional pressure on infrastructure and service requirements, as well as on the neighbouring farm owners should the Hertzogville PV 2 project be implemented.

Residual impacts:

» Possibility of outside workers remaining in the area after construction has ceased

Nature of impact: **Inflow of jobseekers**

The unemployment levels within the area are high, with overall unskilled individuals. More

than half of the employed population is engaged in the farming sector and elementary jobs. Even though the site is approximately 12 km south of Hertzogville and Malebogo and can be reached via the R59 main road followed by gravel roads, the gathering of jobseekers at the construction site could occur. These jobseekers are anticipated to consist of individuals from Hertzogville and Malebogo, but could even include unemployed individuals from the surrounding farming community. It is however, unlikely that large groupings of individuals would gather at the construction sites due to the locality and the short timeframe associated with the construction phase. The negative impacts associated with the gathering of large groupings at any one location would thus be limited

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (21)**	**Low (15)**
Status (positive or negative)	Possibly Negative	Negative to Neutral
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes to a certain extent	

Mitigation:

» Maximise the use of local labour and contractors where possible by developing a strategy to involve local labour in the construction process.
» Communicate the recruitment process and the use of contractors to the local communities.
» The communication strategy of Suncorp/Solar Reserve JV regarding the proposed project should ensure that unrealistic employment expectations are not created.

Cumulative impacts:

» Possible additional pressure on service delivery and the existing infrastructure with resultant additional socio-economic burdens for the Tokologo Local Municipality and surrounding property owners should large groupings of jobseekers come to the area in the event that the Hertzogville PV 2 facility would be constructed.

Residual impacts:

» Possible permanent settlement of job seekers in the area with associated cumulative impacts as indicated

Nature of impact: **Skills Inequities**

This aspect refers to the extent to which employment opportunities emerging from the proposed project match the job skills of the unemployed in the area, as well as the creation of new job opportunities and employment equity of minority groups.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Highly Probable (4)
Significance	**Low (21)**	**Medium (36)**
Status (positive or negative)	Positive	Positive

Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	-

Mitigation:

» Suncorp/Solar Reserve JV and their EPC contractor should maximise the use of local labour.
» Suncorp/Solar Reserve JV and their EPC contractor should identify and involve relevant local organisations which could assist them in identifying people whose skills may correspond with the job specifications.
» Training and capacity building programmes should be implemented to lessen any possible skills disparity between the local skills available and the requirements of the project.
» In cases for the semi-skilled jobs, where the relevant skills do not exist, training should be provided to willing local community members to enable them to fill the positions.
» The skill requirements should be communicated to the local community leaders and community based organisations.

Cumulative impacts:

» Possible availability of skills among local labourers who obtained experience and skills for this project and who could be re-employed for the Hertzogville PV 2 project (if approved and implemented).

Residual impacts:

» Capacity building and skills development of those involved in the construction and operational phases of the project.

Nature of impact: **Potential impacts on Local Procurement**

Specialised equipment for the PV facility would possibly be sourced from international suppliers or even South African suppliers. The latter would possibly be situated outside the direct study area and even the Free State Province. Benefits in this regards are thus not taken into consideration in the following matrix.

The town of Hertzogville is in close proximity to the farms Wigt and Albert. It is therefore highly likely that general construction related goods, equipment and materials can be sourced from businesses located in Hertzogville. Some benefits in terms of local procurement would thus accrue to the local businesses and industries.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Highly Probable (4)
Significance	**Low (21)**	**Medium (36)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	-

Mitigation:

» Suncorp/Solar Reserve JV and their EPC contractor should create conditions that are conducive for the involvement of entrepreneurs, small businesses and SMMEs during the construction process
» Tender documentation should contain guidelines for the involvement of local labour, entrepreneurs, businesses and SMMEs from the local sector
» Local service providers, SMMEs and entrepreneurs should be sourced and be involved during the operational phase where possible

Cumulative impacts:
» None anticipated

Residual impacts:
» Very limited stimulation of local economy

Nature of impact: **Health Related Impacts**

During the construction phase limited noise and dust pollution could occur which is anticipated to have no or very limited health related impacts on the local host community. The intensity would thus depend on the locality of the facility and the access routes to the existing homesteads and other dwellings. Another health concern is the spread of HIV/Aids where dealing with an outside workforce.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Possible local negative impacts can be mitigated	-

Mitigation:
» Information distributed as part of the existing HIV/Aids awareness campaigns should again be focused on and communicated to the local workforce.
» Local labour should be maximised where possible.
» The PV facility should be operated in compliance with all relevant environmental regulations.
» Engineering aspects and the design of the facility should ensure that no environmental pollution occurs. Proper waste, water and sanitation infrastructure and facilities must thus be installed

Cumulative impacts:
» None anticipated

Residual impacts:
» None anticipated

Nature of impact: **Impact on Infrastructure and Services**

This variable refers to the increase or decrease in the requirements for and supply of basic infrastructure and services within the community because of the proposed project.
The provision of infrastructure on site would be the responsibility of Suncorp/Solar Reserve JV and off-site they would possibly link with existing infrastructure. Should locals be employed it would further limit the possible impact on the need for accommodation facilities for the temporary construction workforce.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	-

Mitigation:

» Local labour should be maximised to avoid additional housing needs during the construction phase of the project
» Any possible infrastructural requirements should be discussed with the Tokologo Local Municipality as a priority to ensure that the additional requirements are timely considered in the future planning of the municipality in this regard.
» The water requirements for the cleaning of the panels should be discussed and negotiated with the representatives of the Tokologo Local Municipality.

Cumulative impacts:

» Possible cumulative accommodation requirements should the proposed Hertzogville PV 2 project be implemented.

Residual impacts:

» Limited infrastructural and service requirements from the Tokologo Local Municipality

Nature of impact: **Impact on Infrastructure and Services**

The social impact associated with the impact on the sense of place relates to the change in the landscape character and visual impact of the proposed PV plant. The permanent visual impact on property owners in the area was assessed as part of the Visual Impact Assessment.

From a social perspective, however, it should be noted that a facility of between 19 MW would result in some changes in the landscape character of the area which would have a possible negative impact on the sense of place for the neighbouring property owners.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Very short duration (1)	Very short duration (1)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (21)**

Status (positive or negative)	Negative	Negative
Reversibility	Yes	-
Irreplaceable loss of resources?	No as limited farming activities can still continue on the property	-
Can impacts be mitigated?	From a social perspective, only during the construction phase	-

Mitigation:

» The design and specific positioning of the PV facility should aim to minimise the possible negative visual impact of the facility on the surrounding property owners.
» The panel mounts should have the lowest height practically possible.
» The vegetation absorption capacity should be utilised as far as possible to minimise the negative visual impact.
» It should be ensured that there is no reflection from the panels.
» The design of buildings should blend in with surrounding environment
» Lighting issues should receive the attention it deserves to avoid any light pollution at night
» The mitigation measures of the Visual Impact Assessment should be strictly implemented

Cumulative impacts:

» Cumulative visual impact should the proposed Hertzogville PV 2 project be implemented. Hertzogville PV 2 project be implemented.

Residual impacts:

» Distinct change in character and quality of the area

Comparison of Alternatives

From a social perspective no preference is given to either the farm Wigt or Albert for the development of the PV facility as it is anticipated that the social impacts for both the properties would be similar.

Implications for Project Implementation

» Locals should be provided an opportunity to be included in a list of possible local suppliers and service providers.
» Social benefits in terms of training, skills development and the use of local labour should thus be aspired to. These skills can be transferable to other employment sectors and would result in further sustainable benefits.
» The Lekwa-Teemane Local Municipality and community representatives and neighbouring property owners should be kept informed of the progress, decisions taken with regards to the development and construction schedules. The establishment of a community Management and Monitoring Committee consisting of key community representatives, and representatives of the Lekwa-Teemane Local Municipality could assist in this regard.
» Attention should be given to the extension and improvement of the existing HIV/Aids awareness programmes.
» Prior to construction, any concerns raised by neighbouring landowners should be addressed.

No Go Alternative

The 'Do-Nothing' alternative is the option of not constructing the proposed Hertzogville PV1 Solar Energy Facility. Should this alternative be selected impacts associated with the construction of the facility would not materialise.

The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits are explored in further detail in the South Africa REFIT Regulatory Guideline published by NERSA (March 2009), and include:

Increased energy security:
The current electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of power supplementation. In addition, given that renewables can often be deployed in a short timeframe and in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality in the short-term, while reducing expensive transmission and distribution losses.

Resource saving:
It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres per annum. This translates into revenue savings of R26.6 million per annum, as fuel for renewable energy facilities is free while compared to the continual purchase of fuel for conventional power stations. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability.

Exploitation of our significant renewable energy resource:
At present, valuable national resources including biomass by-products, solar radiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio in South Africa.

Pollution reduction:
The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation. The use of solar radiation for power generation is a non-consumptive use of a natural resource which produces zero emissions.

Climate friendly development:
The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for approximately 1% of global GHG emissions and is currently ranked 9th worldwide in terms of per capita carbon dioxide emissions.

Support for international agreements:
The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol, and for

cementing its status as a leading player within the international community.

Employment creation:
Although the immediate opportunity for job creation is limited due to a lack of local skilled, the sale, development, installation, maintenance and management of renewable energy facilities have significant potential for job creation in South Africa in the long-term.

Acceptability to society:
Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health and climate friendly development.

Support to a new industry sector:
The development of renewable energy offers the opportunity to establish a new industry within the South African economy.

Protecting the natural foundations of life for future generations:
Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change; thereby securing the natural foundations of life for generations to come. This is the basis of sustainable development.

Feasibility of the "No go Alternative
The feasibility of not constructing the Hertzogville PV Solar Energy Facility would result in no generation of electricity. The facility will contribute up to19 MW of electricity. In addition the Free State power supply will be deprived of an opportunity to benefit from the additional generated power being evacuated directly into the Province's grid.

The 'No go Alternative' is, therefore, not a preferred alternative.

2.3 IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

Alternative: Option 1 and Option 2

Potential impacts associated with the operation of the proposed PV facility are discussed below. The impacts are same for both sites unless otherwise stated. Detailed specialist studies are included within Appendix D.

1. Potential Soil Impacts

Nature: **Operation of vehicles on site and their associated impacts in terms of spillages of lubricants and petroleum products.**		
	Without mitigation	**With mitigation**
Extent	Low (1)	Low (1)
Duration	Short term 2)	Short term (2)
Magnitude	Low (2)	Low (2)
Probability	Very Probable (4)	Improbable (2)
Significance	**20 (low)**	**10(Low)**
Status (positive or negative)	Negative	-
Reversibility	Low	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	-
Mitigation: » Maintain vehicles. » Prevent and address spillages as per EMP		
Cumulative impacts: The cumulative impact of this activity will be small if managed.		
Residual impacts: None		

Nature: **The operation of vehicles on site and their associated dust generation** The excessive movement of vehicles could cause large amounts of dust.		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Short term 2)	Short term (2)
Magnitude	(2)	Low (2)
Probability	Very Probable (4)	Improbable (2)
Significance	**24 (low)**	**12(Low)**
Status (positive or negative)	Negative	-
Reversibility	Low	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	-
Mitigation: » Limit vehicle movement to absolute minimum. » Construct proper roads for access		

Cumulative impacts:
The cumulative impact of this activity will be small if managed but can have widespread impacts if ignored.
Residual impacts:
None

2. Potential Visual Impacts

Figures 7a and 7b provide an indication of viewer incidents and potential sensitive receptors as identified for Options 1 and 2. These maps include the visibility analysis, visual exposure and visual distance / observer proximity to the facility (refer to the specialist Visual Impact Assessment in Appendix D 1 for details of this methodology). **The effect of vegetation on visual exposure is not included in these maps and these therefore represent a *worst case scenario*.**

It is important to note that the visual screen does not include vegetation; however there is existing vegetation between the visual screen i. e between the homesteads and facility, which will result in a reduced visual impact to that predicted.

The proximity radii used for this study (calculated from the boundary lines of the proposed facility options) are shown on **Maps 7a** and **7b** for site options 1 and 2 respectively.

» 0 – 2 km - Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.
» 2 – 4 km - Medium distance views where the facility would be easily and comfortably visible and constitute a high visual prominence.
» 4 – 8 km - Medium to longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence.
» Greater than 8 km - Long distance view where the facility would still be visible though not as easily recognisable. This zone constitutes a low visual prominence for the facility.

The study area for the visual assessment encompasses a geographical area of 21x26 km (the extent of the maps displayed below) and includes a minimum 8km area of influence from the boundaries of the proposed development area.

In effect, option 1 will be visible to fewer visual receptors (approximately 7 within an 8km radius), but the severity of visual impact will be greater, while option 2 will be visible to more receptors (approximately 10 within an 8km radius), but the severity of visual impact will be less for these receptors.

In this respect, option 1 is preferred. The reason for this preference is the smaller viewshed, and the lower occurrence of potentially visually exposed homesteads within an 8km radius of the proposed facility.

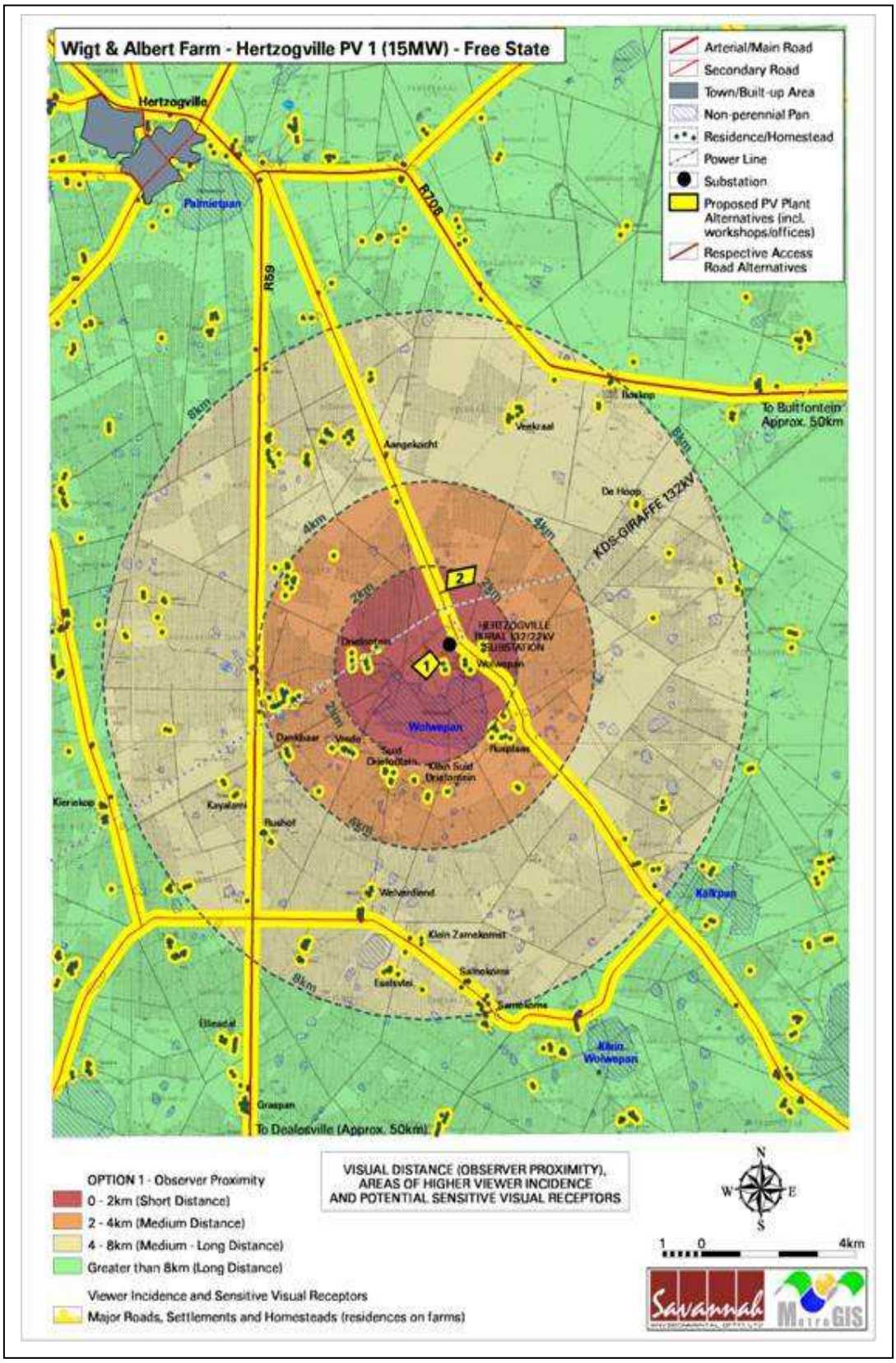

Figure 7a: Observer proximity, areas of high viewer incidence and potential sensitive visual

receptors (Option 1).

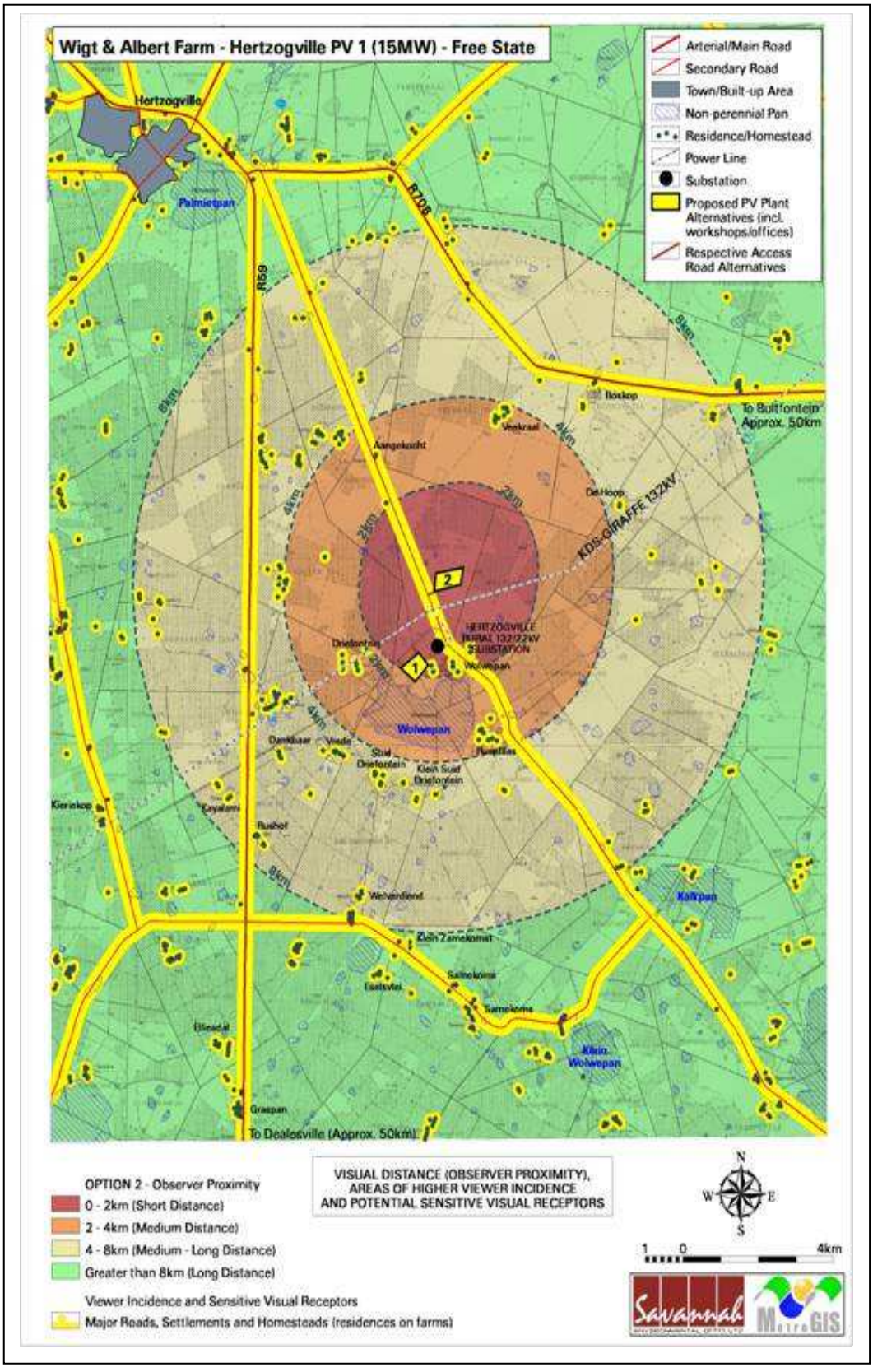

Figure 7b: Observer proximity, areas of high viewer incidence and potential sensitive visual

receptors (Option 2)

The following can be concluded from Figures 7a and 7b:

» Viewer incidence is calculated to be the arterial roads (i.e. the R708 and the R59) as well as along the secondary roads within the study area. Commuters using these roads could be negatively impacted upon by visual exposure to the facility, and are thus considered to be sensitive to visual intrusion.
» Other than along the above roads, viewer incidence will be concentrated within the agricultural homesteads and settlements within the study area.
» In terms of viewer sensitivity, the most vulnerable to potential visual impacts include residents of homesteads and settlements (who will be exposed while at home) and tourists visiting and travelling through the area. However, it is important to note that there is only one homestead that is located near Wolwepan.
» The severity of the visual impact on visual receptors decreases with increased distance from the proposed facility.

Impact tables indicating visual impacts

Potential impacts of temporary visual intrusions/distances to people
Primary infrastructure refers to the PV panels with a height of 2m, while ancillary infrastructure potentially includes the proposed on-site substation, workshop, office, fencing and a short stretch of new power line connecting with the existing KDS-Giraffe 132kV power line.

Both the primary and ancillary infrastructure could present a visual impact as these structures are built forms within a natural context. In addition, vegetation will need to be removed for these structures to be built.

Both site options require an access road, which will also require a degree of vegetation clearing and grading. The access road, although devoid of any vertical dimension, has the potential of manifesting as a scar in the landscape.

The anticipated visual impact resulting from the proposed SEF and ancillary infrastructure is likely to be of **high** significance for both site options, but may be mitigated to **moderate**.

The effect of vegetation on visual exposure is not included in these maps and these therefore represent a worst case scenario with local residences already being screened from the proposed facility.

Nature of impact: **Potential visual impact on sensitive visual receptors in close proximity to the proposed Solar Energy Facility during operation (Options 1 and 2).**
Primary infrastructure refers to the PV panels with a height of 2m, while ancillary infrastructure potentially includes the proposed on-site substation, workshop, office, fencing and a short stretch of new power line connecting with the Hertzogville 132/22kV Rural Substation.

Both the primary and ancillary infrastructure could present a visual impact as these structures

are built forms within a natural context. In addition, vegetation will need to be removed for these structures to be built.

Both site options require an access road, which will also require a degree of vegetation clearing and grading. The access road, although devoid of any vertical dimension, has the potential of manifesting as a scar in the landscape.

The anticipated visual impact resulting from the proposed SEF and ancillary infrastructure is likely to be of **high** significance for both site options, but may be mitigated to **moderate**.

	Without mitigation	**With mitigation**
Extent	Local **(4)**	Local **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	High **(8)**
Probability	Highly probable **(4)**	Probable **(3)**
Significance	High **(64)**	Moderate **(48)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

» Maintain the general appearance of the facility as a whole.
» Maintenance of roads to avoid erosion and suppress dust.

Cumulative impacts:

» The construction of the SEF and ancillary infrastructure will increase the cumulative visual impact of electrical type infrastructure within the region. This is relevant in light of the existing power lines, and the Hertzogville Rural Substation.
» In addition, the proposed Hertzogville PV2 150MW SEF is located in the immediate vicinity of the site, but has not yet been authorised (EIA).

Residual impacts:

The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.

Potential visual impact of lighting at night on observers in close proximity to the proposed SEF

Nature of impact: **Potential visual impact on of lighting on visual receptors in close proximity of the proposed SEF (option 1).**

The area immediately surrounding the proposed facility has a relatively low incidence of receptors and light sources, so light trespass and glare from the security and after-hours operational lighting for the facility will have some significance for visual receptors in close proximity.

	Without mitigation	**With mitigation**
Extent	Local **(4)**	Local **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**

Significance	Moderate **(42)**	Low **(28)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

» Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself);
» Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights;
» Making use of minimum lumen or wattage in fixtures;
» Making use of down-lighters, or shielded fixtures;
» Making use of Low Pressure Sodium lighting or other types of low impact lighting.
» Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

Cumulative impacts:

Some existing light impact exists as a result of the settlements and homesteads in close proximity. The development of the proposed SEF will therefore contribute to a cumulative lighting impact within an otherwise rural region.

Residual impacts:

The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.

Nature of impact: **Potential visual impact on of lighting on visual receptors in close proximity of the proposed SEF (option 2)**

The area immediately surrounding the proposed facility has a relatively low incidence of receptors and light sources, so light trespass and glare from the security and after-hours operational lighting for the facility will have some significance for visual receptors in close proximity.

	Without mitigation	**With mitigation**
Extent	Local **(4)**	Local **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Improbable **(2)**	V Improbable **(1)**
Significance	Low **(28)**	Low **(14)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

» As for option 1

Cumulative impacts:

As for option 1

Residual impacts:

As for option 1

Comparison of Alternatives

Option 1 will be visible to fewer visual receptors (approximately 7 within an 8km radius), but the severity of visual impact will be greater, while option 2 will be visible to more receptors (approximately 10 within an 8km radius), but the severity of visual impact will be less for these receptors.

Implications for Project Implementation

» The recommendations contained in the visual impact assessment should be implemented
» A lighting engineer should be consulted to assist in the planning and placement of light fixtures in order to reduce visual impacts associated with glare.

3. Potential Social Impacts

Nature of impact: **Employment opportunities during operation**

Between 10 to 20 individuals would be permanently employed during the operational phase of the PV facility. This phase would require more skilled personnel as 20% of those employed would require specialised skills. Those locals involved during the construction phase or other individuals undergoing specialised skills training could thus be employed.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (30)**	**Medium (36)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	

Mitigation:

» Suncorp/Solar Reserve JV and their Employment Procurement and Construction (EPC) contractor should maximise the use of local labour.
» Training and capacity building programmes should be implemented to lessen any possible skills disparity between the local skills available and the requirements of the project.
» The skill requirements should be communicated to the local community leaders and community based organisations.

Cumulative impacts:

» Further positive impacts with regards to job creation for individuals within the Tokologo Local Municipality, and possibly the region, in the event that the Hertzogville PV 2 facility would be implemented.

Residual impacts:

» An increase in individuals with specialised or enhanced skills due to skills training and capacity building**.**

Nature of impact: Potential impacts of safety and security risks to site and surrounds

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)

Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Medium (30)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	

Mitigation:

» Working hours should be kept to normal working hours (e.g. 6 am until 6 pm) during the construction phase.
» The construction site should be properly secured to prevent any unauthorised access to the site and permanent security personnel should be on-site prior to construction activities commencing.
» Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce.
» Construction workers should be easily identifiable by wearing uniforms and even identity tags.
» Local community organisations and policing forums / neighbourhood watches must be informed of the presence of the workforce.
» Permanent security personnel should be on site during the operational phase.
» Fencing of the site should be implemented and maintained.

Cumulative impacts:

Increasing crime levels due to more people present and moving around in the local area.

Residual impacts:

None anticipated.

Nature of impact: Inflow of outside workforce

This variable refers to the inflow of temporary workers as well as potential conflict between locals and this "outside" workforce during the construction phase, but also to the possibility of outsiders being permanently employed.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	**Low (20)**	**Low (8)**
Status (positive or negative)	Possibly Negative	Negative to Neutral
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	

Mitigation:

» Local labourers should be employed where applicable and the employment of outsiders

during the construction process should be kept to the minimum.
» Employment of locals should be stipulated in the contract between Suncorp/Solar Reserve JV and their EPC contractor.
» Training and capacity building programmes should be implemented to lessen any possible skills disparity between the local skills available and the requirements of the project.
» Local labourers should preferably remain at their existing residences. From a social perspective it would not be ideal to accommodate workers on site at night. This issue should thus be sensitively considered.
» The construction site should be fenced and permanent security personnel should be on site prior and during the construction and operational phases.
» The construction site should be properly managed to avoid any environmental pollution and disturbances to the social environment.

Cumulative impacts:
» Some additional pressure on infrastructure and service requirements, as well as on the neighbouring farm owners should the Hertzogville PV 2 project be implemented.

Residual impacts:
» Possibility of outside workers remaining in the area after construction has ceased

Nature of impact: Local Procurement		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Low (4)
Probability	Probable (3)	Highly Probable (4)
Significance	**Low (24)**	**Medium (40)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	-

Mitigation:
» Suncorp/Solar Reserve JV and their EPC contractor should create conditions that are conducive for the involvement of entrepreneurs, small businesses and SMMEs during the construction process
» Tender documentation should contain guidelines for the involvement of local labour, entrepreneurs, businesses and SMMEs from the local sector
» Local service providers, SMMEs and entrepreneurs should be sourced and be involved during the operational phase where possible

Cumulative impacts:
» None anticipated

Residual impacts:
» Very limited stimulation of local economy

Nature of impact: **Health Related Impacts**		
	Without mitigation	**With mitigation**
Extent	Local (2)	Regional (3)

Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Low (4)
Probability	Probable (3)	Highly probable (4)
Significance	**Low (24)**	**Medium (44)**
Status (positive or negative)	Potentially positive	Positive
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Possible national positive impacts can be enhanced	-

Mitigation:

» Information distributed as part of the existing HIV/Aids awareness campaigns should again be focused on and communicated to the local workforce.
» Local labour should be maximised where possible.
» The PV facility should be operated in compliance with all relevant environmental regulations.
» Engineering aspects and the design of the facility should ensure that no environmental pollution occurs. Proper waste, water and sanitation infrastructure and facilities must thus be installed

Cumulative impacts:

» None anticipated

Residual impacts:

» None anticipated

Nature of impact: **Impact on Infrastructure and Services**

It is anticipated that the facility would to a large extent, be self-sufficient. No major impacts on the provision of infrastructure and services on the local municipality are thus foreseen. The water requirements for the cleaning of the panels should be discussed and negotiated with the representatives of the Tokologo Local Municipality.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Medium (30)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	-
Irreplaceable loss of resources?	No	-
Can impacts be mitigated?	Yes	-

Mitigation:

» Local labour should be maximised to avoid additional housing needs during the construction phase of the project
» Any possible infrastructural requirements should be discussed with the Tokologo Local Municipality as a priority to ensure that the additional requirements are timely considered in the future planning of the municipality in this regard.
» The water requirements for the cleaning of the panels should be discussed and negotiated

with the representatives of the Tokologo Local Municipality.
Cumulative impacts:
» Possible cumulative accommodation requirements should the proposed Hertzogville PV 2 project be implemented.
Residual impacts:
» Limited infrastructural and service requirements from the Tokologo Local Municipality

Nature of impact: **Impact on Sense of Place**

The PV facility could be seen as an intrusion on the rural visual environment which is currently associated with farming and agricultural activities. However, it should also be considered that the farms Wigt and Albert are already disturbed by infrastructure such as gravel roads, a substation and power lines. It is thus anticipated that the proposed facility would have some negative impact on the sense of place which is unlikely to be effectively mitigated.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Medium (36)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	-
Irreplaceable loss of resources?	No as limited farming activities can still continue on the property	-
Can impacts be mitigated?	No	-

Mitigation:

» None

Cumulative impacts:

» Cumulative visual impact should the proposed Hertzogville PV 2 project be implemented. Hertzogville PV 2 project be implemented.

Residual impacts:

» Distinct change in character and quality of the area

Comparison of Alternatives

From a social perspective no preference is given to either the farm Wigt or Albert for the development of the PV facility as it is anticipated that the social impacts for both the properties would be similar.

Implications for Project Implementation

It is against the background of the above summary that the following conclusions are made:

- From a social perspective no preference is given to either the farm Wigt or Albert for the development of the PV facility as it is anticipated that the social impacts for both the properties would be similar.

- Positive and negative social impacts associated with the proposed project, although the negative impacts are not anticipated to be of such a nature that the proposed project could not continue.
- The majority of negative impacts commensurate with construction activities but is of a short duration and concentrated on the site.

  Based on the basic social assessment it can be concluded that the long term positive impacts (even limited) take precedence over the short term negative impacts.

No Go Alternative

The 'Do-Nothing' alternative is the option of not operating the proposed Solar Energy Facility. Should this alternative be selected then the socio-economic and environmental benefits of this renewable energy facility will not be realised. The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits are explored in further detail in the South Africa REFIT Regulatory Guideline published by NERSA (March 2009), and include:

Increased energy security:
The current electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of power supplementation. In addition, given that renewables can often be deployed in a short timeframe and in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality in the short-term, while reducing expensive transmission and distribution losses.

Resource saving:
It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres per annum. This translates into revenue savings of R26.6 million per annum, as fuel for renewable energy facilities is free while compared to the continual purchase of fuel for conventional power stations. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability.

Exploitation of our significant renewable energy resource:
At present, valuable national resources including biomass by-products, solar radiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio in South Africa.

Pollution reduction:
The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation. The

use of solar radiation for power generation is a non-consumptive use of a natural resource which produces zero emissions.

Climate friendly development:
The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for approximately 1% of global GHG emissions and is currently ranked 9th worldwide in terms of per capita carbon dioxide emissions.

Support for international agreements:
The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol, and for cementing its status as a leading player within the international community.

Employment creation:
Although the immediate opportunity for job creation is limited due to a lack of local skilled, the sale, development, installation, maintenance and management of renewable energy facilities have significant potential for job creation in South Africa in the long-term.

Acceptability to society:
Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health and climate friendly development.

Support to a new industry sector:
The development of renewable energy offers the opportunity to establish a new industry within the South African economy.

Protecting the natural foundations of life for future generations:
Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change; thereby securing the natural foundations of life for generations to come. This is the basis of sustainable development.

Feasibility of the "No go Alternative"
The feasibility of not constructing and operating the Hertzogville PV Solar Energy Facility would result in no generation on electricity. The facility will contribute up to19 MW of electricity. In addition the Free State power supply will be deprived of an opportunity to benefit from the additional generated power being evacuated directly into the Province's grid.

The 'No go Alternative' is, therefore, not a preferred alternative.

2.4 IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE

Option 1 and Option 2

The impacts during the decommissioning and closure phases will be similar to impacts of the construction phase as discussed above.

Nature of impact: Potential visual impact on sensitive visual receptors in close proximity to the proposed SEF (options 1 and 2).		
	Without mitigation	**With mitigation**
Extent	Local **(4)**	Local **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	High **(8)**
Probability	Highly probable **(4)**	Probable **(3)**
Significance	High **(64)**	Moderate **(48)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
» Remove infrastructure and roads not required for the post-decommissioning use of the site. » Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. » Monitor rehabilitated areas post-decommissioning and implement remedial actions.		
Cumulative impacts: The construction of the SEF and ancillary infrastructure will increase the cumulative visual impact of electrical type infrastructure within the region. This is relevant in light of the existing power lines, and the Hertzogville Rural Substation. In addition, the proposed Hertzogville PV2 150MW SEF is located in the immediate vicinity of the site, but has not yet been authorised (EIA).		
Residual impacts: The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.		

No Go Alternative

The 'Do-Nothing' alternative is the option of not decommissioning the proposed Hertzogville PV 1 Solar Energy Facility at the end of its life span. At the end of its life span the efficiency of the facility would be reduced such that less electricity is produced. However, the additional electricity that could continue to be evacuated into the Eskom grid in the area would be beneficial. In addition, implementation of the no go alternative would mean that job opportunities are not lost. The feasibility of decommissioning the facility at the end of its life span should be undertaken at the time in order to determine the best option in this regard.

3. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

This section provides a summary of the assessment conclusions for the proposed development site. In doing so, it draws on the information gathered as part of the Basic Assessment process and the knowledge gained by the environmental consultants during the course of the process and presents an informed opinion of the environmental impacts associated with the proposed project.

The specialist studies that were undertaken for the proposed development considered both site options which are located about 12km south east of Hertzogville within the Free State Province: Option1 and Option 2. The following conclusions were made:

» The overall **heritage** impact is likely to be of **medium significance**. Three sites of heritage significance were identified during the survey. These sites however are located are located outside the study area approximately 85 m to the east of PV plant option 1. Since no heritage sites or features have been recorded in PV plant **Option 2** this is from a heritage point of view, the preferred option for the PV plant.

» The overall impact on ecology is likely to be of medium significance given the implementation of mitigation measures. There are two major vegetation types that occurs in the study area, namely Western Free State Clay Grassland and Highveld Salt Pans, both classified as Least Threatened. The natural vegetation across most of the site is therefore not considered, from this perspective, to have high conservation status. The site does not occur within any Centre of Floristic Endemism. The study concluded that there are no threatened plant species that are likely to occur on site, but there is one near threatened species that could occur on site (*Sporobolus oxyphyllus*) and one declining species that definitely occurs on site (*Acacia erioloba*).

The study area is in a mostly natural condition. Except for an area of cultivation in the northern part of the site, most of the site is in a natural state. The pans and drainage areas on site are classified as having high sensitivity. There is a large pan in the southern part of the site (Wolwepan). Other than this feature, there are no other topographic features of note on sight.

There is a low likelihood of any threatened, near threatened or protected animal species being directly affected by the proposed project. Birds and other animals that could potentially occur on site are relatively mobile and will move away during construction. The footprint of the solar array is small relative to the overall availability of habitat in the general area. The potential impact on them due to a loss of a small area of habitat is therefore not considered to be significant.

From an ecological perspective, **Option 2 is preferred** to Option 1. The preference is based on the proximity of Option 1 to Wolwepan, which introduces a number of risks, including the presence or potential presence of plant species of conservation concern, protected trees, impacts on watercourses and/or pans and a slightly greater risk of affecting animal and bird species of conservation concern.

» The overall **social and socio-economic** impact in terms of positive and negative impacts is likely to be of a **low significance** during both the construction and operational phases with the implementation of enhancement/mitigation measures. The potential negative impacts associated with the construction phase are typical of construction-related activities and are expected to respond to the mitigation measures proposed. Issues identified include the influx of outside workers, whether locals would be employable during the construction phase of the project as on-site skills development and training would be imperative to ensure that the benefits of employment could be maximised, the intrusion impacts associated with

construction, and impacts on the daily living and movement patterns of neighbouring landowners and road users.

The possible job creation and skills development, although limited in extent, are regarded as a **significant positive** injection into the area. The project would result in significant positive economic spin-offs for the local area and region primarily because of the labour intensive operational practices that would be associated with it.

Impacts on the social environment are expected to be similar regardless of the option selected. There is therefore **no preference** in terms of the option selected from a social perspective.

» The overall Visual Impact Assessment revealed that the Option 1 will be visible to fewer visual receptors (approximately 7 within an 8km radius), but the severity of visual impact will be greater, while option 2 will be visible to more receptors (approximately 10 within an 8km radius), but the severity of visual impact will be less for these receptors.

In this respect, **option 2 is preferred**, as the visual impacts will be less for the receptors. Visual impacts related to lighting will be both site options are likely to be of **moderate** significance, and may be mitigated to **low**.

» The overall impact on soils and agricultural potential during construction and operation is not expected to have large impacts due to the relatively low agricultural potential of the site. A dedicated feasibility study will have to be conducted for such an exercise.

Due to the homogeneity of the soils and slopes on the site there is **no preferred option**.

Based on the findings from the specialist studies, the two Options are acceptable with the implementation of mitigation, however Option 2 is the preferred option.

Therefore, based on the findings of the studies undertaken, in terms of environmental constraints identified through the Environmental Basic Assessment process, no environmental fatal flaws were identified to be associated with the establishment of the proposed Hertzogville PV 1 and associated infrastructure. Therefore, it is recommended that the project should be authorised. However, a number of issues requiring mitigation have been highlighted. Environmental specifications for the management of these issues / impacts are detailed within the Draft Environmental Management Programme (EMP) included within Appendix F.

No-go alternative (compulsory)

The 'Do-Nothing' alternative is the option of not operating the proposed Solar Energy Facility. Should this alternative be selected then the socio-economic and environmental benefits of this renewable energy facility will not be realised. The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits are explored in further detail in the South Africa REFIT Regulatory Guideline published by NERSA (March 2009), and include:

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The 'No go Alternative' is, therefore, not a preferred alternative.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	YES ✓	[redacted]

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment):

N/A

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

There are no fatal flaws associated with the establishment of the proposed Hertzogville PV 1 at either site option investigated. The impacts associated with the proposed development on this site are expected to be of moderate to low significance with the implementation of appropriate mitigation measures, and are considered acceptable from an environmental perspective. Where potential impacts on the environment have been identified, these can be mitigated to acceptable levels. Based on the assessment of alternatives undertaken, **Option 2** and its associated infrastructure is recommended as the preferred alternative for implementation, although both site options assessed are considered to be acceptable from an environmental perspective.

The Heritage study suggests that if Option 1 is earmarked for development, proposed site be moved south west, however it is recommended that the footprint is moved to the north west. This would prevent the proposed site layout from being closer to the Wolwepan pan.

The construction of the proposed Hertzogville PV 1 should be implemented according to the EMP to adequately mitigate and manage potential impacts associated with construction activities. The construction activities and relevant rehabilitation of disturbed areas should be monitored against the approved EMP, the Environmental Authorisation and all other relevant environmental legislation.

Relevant conditions to be adhered to include:

Design and Construction Phase:
The following mitigation and management measures should be implemented during the construction phase in order to minimise potential environmental impacts:

» Ensuring that the slope of the stockpiled material is such that surface runoff is minimal.
» Additions of stabilising agents such as organic material or vegetative cover for erosion control.
» Building of swales and berms to decrease water runoff speed.
» Building of attenuation ponds to ensure slow release of water into the water course.
» Exclude areas of wetland related habitat from the proposed development.
» Appoint an independent Environmental Control Officer (ECO) during the construction phase of the facility.
» Establish the Terms of Reference for the ECO prior to the onset of the construction phase.
» Demarcate all areas where no impacts will be allowed, clearly marking these areas with high visibility signs, inform all contractors and construction workers to refrain from entering/

affecting these areas.

» Prevent impacts on any surface water as a result of hazardous materials, contamination, unnecessary crossing by vehicles or personnel, extraction, drinking or other human uses, construction and maintenance activities.
» Implement a weed monitoring and control programme.
» All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) the implementation of a monitoring programme in this regard is recommended.
» The removal or picking of any protected or unprotected plants shall not be permitted and no horticultural specimens (even within the demarcated working area) shall be removed, damaged, or tampered with unless agreed to by the ECO.
» No painting or marking of rocks or vegetation to identify locality or other information shall be allowed as it will disfigure the natural setting. Marking shall be done by steel stakes with tags, if required.
» Make use of existing access roads, ensuring proper upgrade/ construction/ maintenance in order to limit erosion, proliferation of weeds.
» Use of branches of trees and shrubs for fire making purposes is strictly prohibited.
» Prevent open fires; provide demarcated fire-safe zones, facilities, and fire control measures.
» Fire fighting equipment shall be made available on all vehicles and at various suitable points within the development site.
» No animal may be hunted, trapped, or killed for any purpose whatsoever.
» In the event that animals are present that may pose a risk to human safety, a suitable animal handler must be requested to remove the animal in an environmentally responsible manner. This specifically refers to snakes and scorpions.
» Limit construction, maintenance, and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion, destabilizing of substrate in areas of high slopes, riparian zones, etc.
» Develop emergency maintenance operational plan to deal with any event of contamination, pollution, or spillages, particularly in riparian areas.
» Use only local indigenous species in the rehabilitation/ revegetation process.
» Compile a detailed waste management plan.
» Compile a storm water management plan.
» Erosion is considered to be a moderate risk on the site and it must be controlled through adequate mitigation and control structures.
» Impacts from vehicles, such as spillages of oil and hydrocarbons, should be prevented and mitigated.
» Dust generation on site should be mitigated and minimised as the dust can negatively affect the quality the surrounding environment and can also contribute to dust loads from surrounding land uses.
» If, during construction, any archaeological finds are made (e.g. stone tools, skeletal material), the operations must be stopped, and the archaeologist must be contacted for an assessment of the finds.
» If PV plant option 1 is earmarked for the development it is recommended that the footprint is moved to the north west to facilitate the preservation of Site 1 in situ. Site 1, 2 and 3 will have to be fenced off with danger tape during the construction phase of the development to protect them, against accidental impacts.

Operation Phase:

The following mitigation and management measures should be implemented during the operation phase in order to minimise potential environmental impacts:

» Maintenance of erosion control measures (i.e. berms)
» Development and implementation of a storm water management plan
» Erosion is considered to be a moderate risk on the site and it must be controlled through adequate mitigation and control structures.
» Impacts from vehicles, such as spillages of oil and hydrocarbons, should be prevented and mitigated.
» Dust generation on site should be mitigated and minimised as the dust can negatively affect the quality the surrounding environment and can also contribute to dust loads from surrounding land uses.

Is an EMPr attached?	YES	[redacted]

The EMPr must be attached as Appendix F.

SECTION F: APPENDIXES

The following appendixes must be attached as appropriate:

Appendix A: Site plan(s)

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix E: Comments and responses report

Appendix F: Environmental Management Programme (EMPr)

Appendix G: Other information