SOLARRESERVE SOUTH AFRICA (PTY) LTD

Proposed construction of up to a 19 MW Photovoltaic Solar Power Plant on Farm 267 near Daniëlskuil, Northern Cape Province

Final Basic Assessment Report

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Date:	1 June 2012
Document Title:	Proposed construction of up to a 19 MW Photovoltaic Solar Power Plant on Farm 267 near Daniëlskuil, Northern Cape Province
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For:	SiVEST Environmental

	(For official use only)
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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.

11. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

Details and Experience of EAP

In line with Section 22(2) of the Environmental Impact Assessment Regulations 2010 in Government Notice (GN) No. R543 which requires that a basic assessment must include the Environmental Assessment Practitioner (EAP) who prepared the report; and the expertise of the EAP to carry out basic assessment procedures, the brief is outlined below. For comprehensive curriculum vitae of the EAPs, please refer to Appendix G1.

SiVEST is the independent Environmental Consulting company (EAP), Kelly Tucker is the lead environmental consultant for the proposed development. Kelly has nine years experience in the environmental impact assessments and fills the role of a project leader. Kelly has led several large EIA's. Projects include full Environmental Impact Assessments as well as Basic Assessments (please refer to Appendix G1 for a comprehensive curriculum vitae). Examples of projects conducted include:

- Environmental Impact Assessment Process for three proposed Wind Farm Developments in the Northern Cape Province for Mainstream Renewable Power SA.
- Medupi Power Station, Eskom Generation – Environmental management on site during the construction phase.
- 400KV Transmission Powerline which is 150km in length for the Botswana Power Corporation in Botswana
- Arcelor Mittal Steel Capacity Expansion Project at the existing Plant, South of Johannesburg, South Africa.
- Eskom Transmission: Mercury – Garona 400kV Transmission Line, a distance of approximately 570 km.
- Eskom Generation: Steelpoort Pumped Storage Scheme Project.
- EIA for the New-Multi Products Pipeline – a 500km mixed use Fuel Pipeline from Durban to Johannesburg for Transnet. Kelly was project Manager for the social aspect of this process.
- Eskom Generation: Proposed installation of an additional 500m3 Bulk Storage Fuel Oil Tank at the Grootvlei Power Station, Mpumalanga Province.

Shaun Taylor is the assisting environmental consultant and has four years experience as an environmental assessment practitioner and has completed numerous basic assessments, various exemption and amendment applications, compiled environmental management plans and conducted environmental auditing (Please refer to Appendix G1 for a comprehensive curriculum vitae). Examples of projects undertaken to date include:

- Basic Assessment for the proposed installation of an additional 500m3 Bulk Storage Fuel Oil Tank at the Grootvlei Power Station, Mpumalanga Province.
- Basic Assessment for Portion 318 Erand A.H. Light Industrial Development
- Basic Assessment for Holding 1 Withok Light Industrial Development
- Basic Assessment for Blue Hills Holdings 1 & 2 Commercial Development

- Basic Assessment for Mostyn Park 11Kv power cable crossing under a river
- Basic Assessment for Weltevreden 202 IQ Office Park Development
- Basic Assessment for Carslwald Shopping Centre Billboard Development
- Basic Assessment for Broadacres Shopping Centre Billboard Development

Executive Summary

SolarReserve South Africa (Pty) Ltd (hereafter referred to as SolarReserve) has appointed SiVEST to undertake a Basic Assessment (BA) process for the proposed construction of a 19 MW Photovoltaic (PV) Solar Power Plant on Farm 267 (Arriesfontein) near Daniëlskuil, Northern Cape Province. The objective of the project is to generate electricity to feed into Eskom's national electricity grid by means of the construction of up to a 19MW solar PV Solar Power Plant and associated infrastructure.

The intention of SolarReserve is to develop numerous small-scale commercial renewable energy projects to diversify the local energy generation 'mix' and reduce South Africa's dependency on non-renewable fossil fuel resources (i.e. coal). Factors such as increased economic growth and social development, rapid community development advancement among others have lead to the growth in demand for electricity in Southern Africa. By 2007, the electricity demand in South Africa had been growing at approximately 3% a year thus increasing pressure on South Africa's existing power generation capacity. As one of the strategies to meet future energy consumption requirements, the country is opting for the use of renewable energy technologies such as PV Solar Power Plants. This technology is therefore fast becoming an important energy option in South Africa. As a result, SolarReserve plan to establish a PV Solar Power Plant on Farm 267 (Arriesfontein) near Daniëlskuil, in the Northern Cape Province.

The proposed development requires Environmental Authorisation (EA) from the Department of Environmental Affairs (DEA). However provincial authorities have also been consulted i.e. the Northern Cape Provincial Government - Department of Environment and Nature Conservation (DENC). The proposed environmental assessment process will be conducted in terms of the Environmental Impact Assessment Regulations (2010) promulgated in terms of section 24(2) and section 24(D) of the National Environmental Management Act (No. 107 of 1998) (NEMA), which were amended and came into effect on 2 August 2010. In terms of these regulations, a BA is required for the proposed project. All relevant legislations and guidelines were consulted during the BA process and will be complied with at all times.

The proposed project is to consist of:

- the proposed construction of up to a 19MW PV Solar Power Plant on the Farm 267 (Arriesfontein) near Daniëlskuil, Northern Cape Province;
- the establishment of associated infrastructure as required.

The following key components for the PV Solar Power Plant are to be constructed:

- PV solar panels and arrays;
- PV Panel mountings;
- DC-AC current inverters and transformers;
- Substation (approximately 50m x 50m);

- Switchyard (approximately 50m x 50m); and
- Underground cabling (approximately 1m deep)/overhead power lines (where required on site).

In terms of the associated infrastructure required for the proposed development, the following is to be constructed:

- one meteorological station (approximately 30m x 30m) - to collect data on the solar resource;
- a small site office and storage facility (approximately 100m x 100m) - including security and associated facilities;
- visitor centre (approximately 50m x 50m);
- internal gravel roads (approximately 4m to 6m wide);
- security system - closed circuit video-surveillance system;
- site fencing;
- car park area (approximately 50m x 50m); and
- a temporary lay-down area (approximately 100m x 100m) - for the temporary storage of materials during the construction activities.

Figure i and ii below provide an illustration of the two layout alternatives.

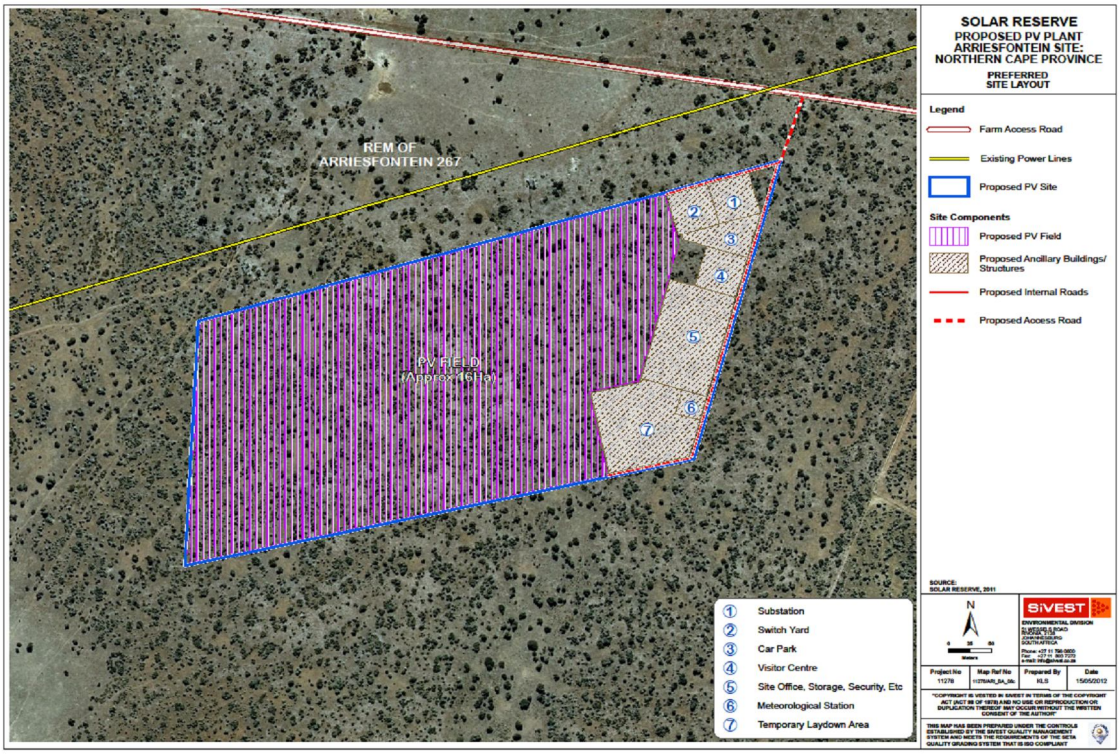

Figure i: Site Layout Alternative 1 for the proposed development

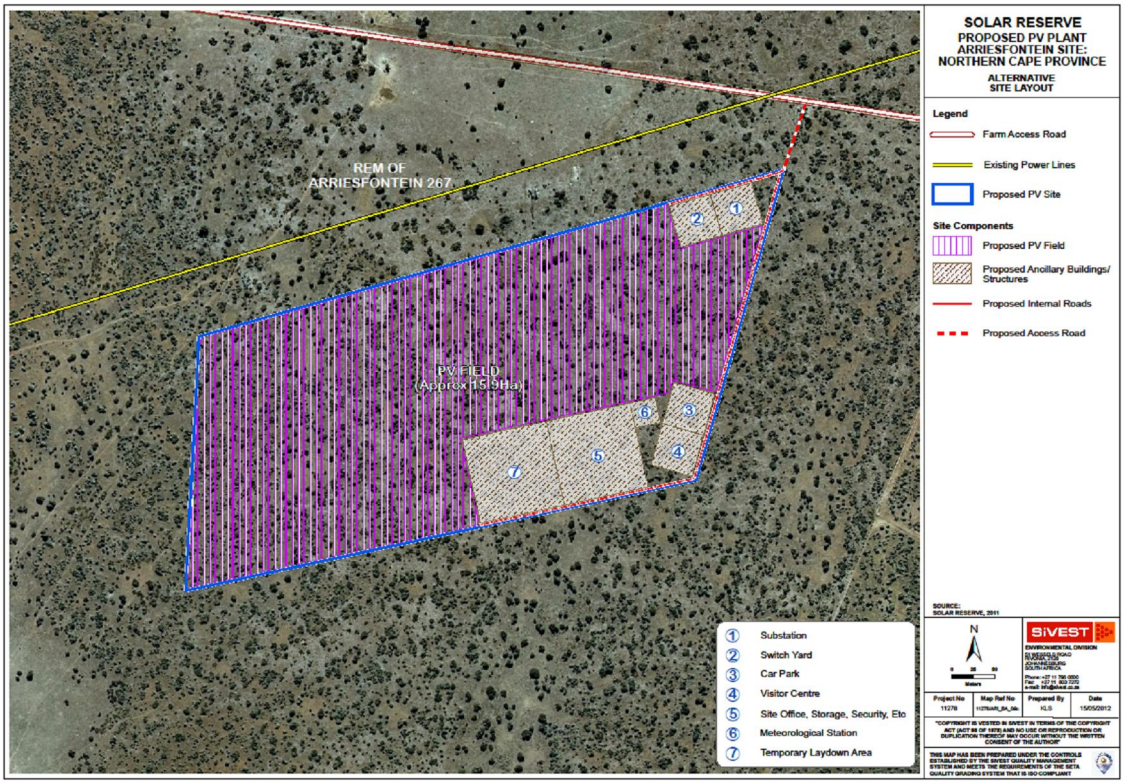

Figure ii: Site Layout Alternative 2 for the proposed development

The topography of the study area is characterized by flat plains and gently undulating landscape. No significant topographical features are present in the immediate vicinity of the study area. The study area is representative of the regional vegetation type which is described as Ghaap Plateau Vaalbosveld. The vegetation on the study site comprises a dominant shrub / tree layer and a diverse herbaceous layer. No Red Data species are known to occur in the quarter degree grid in which the study area is located. Furthermore, habitat types encountered in the study area are typical of the region and no habitat type of unique quality is present that is particularly suitable for the potential presence of Red Data flora species.

Several specialist studies were conducted during the BA to identify the issues associated with the proposed development. These include:

- Biodiversity (fauna and flora)
- Surface Water
- Agricultural Potential and Soils
- Heritage and Palaeontology
- Socio-economic

Table i: Summary of findings

Environmental Parameter	Summary of major findings	Recommendations
Biodiversity	▪ The study area is representative of the regional vegetation type which is described as Ghaap Plateau Vaalbosveld. ▪ A total of 89 plant species were recorded during the site investigation. ▪ The vegetation on the greater farm boundary comprises a dominant shrub / tree layer and a diverse herbaceous layer. ▪ The following macro habitat types were verified during the site investigation: 1. Natural Woodland Habitat, including (*Searsia lancea*) Open Woodland; (*Tarchonanthus camphoratus*) Closed Shrubveld; and 2. Endorheic Pans. ▪ A total of 80 animal species was recorded during the site investigation. None were Red Data species. ▪ It is estimated that 73 of the 96 Red Data animal species of the Northern Cape have a low probability of occurring in the study area, 12 have a moderate-low probability, six (6) a moderate probability, (3) a moderate-high and (2) species a high probability of occurring in the study area. ▪ The following protected tree species however, are present in the study area: 1. *Acacia erioloba*; and *2. Olea europaea* subsp. *africana* ▪ Potential impacts identified for flora include: 1. Direct impacts on flora species of conservation importance; 2. Loss or degradation of natural vegetation, sensitive or protected habitat; 3. Loss/ degradation of surrounding habitat; 4. Impacts on SA's conservation obligations & targets; 5. Increase in local and regional fragmentation/ isolation of habitat; and 6. Increase in environmental degradation, pollution (soils, surface water).	▪ No preference with regards to alternative site layouts. ▪ It is necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species on the property for the submission of application forms to the Northern Cape Department of Environment and Nature Conservation (NCDENC) and the Department of Agriculture, Forestry and Fisheries (DAFF) prior to any disturbance of these individuals. This will need to be carried out by a suitably qualified biodiversity specialist. ▪ All suggested mitigation measures are to be considered and implemented where practical and included in the Environmental Management Programme (EMPr).

Environmental Parameter	Summary of major findings	Recommendations
	▪ Potential impacts identified for fauna include: 1. Direct impacts on Red Data fauna species; 2. Loss or Degradation of natural faunal habitat & in surrounding areas; 3. The disruption of ecological connectivity and migration routes of larger, flightless animals as well as territorial infringement; and 4. Direct impacts on common fauna species & interactions with structures & personnel. ▪ Low but negative potential impacts were evaluated for the various impacts during the construction, operation, decommissioning phases to flora and fauna.	
Surface Water	▪ Approximately 5.5 % of the Farm 267 (Arriesfontein) was classified as wetland, with most of the wetland areas consisting of shallow, ephemeral pans. A total of 12 pans, ranging in size from 0.1 ha to over 23 ha in size, were identified. In addition to the pans a small drainage line and associated seepage area, as well as a natural spring were delineated. ▪ Importantly, no wetlands were identified within the PV study area, though a pan is located immediately to the north of the site. ▪ The proposed development site falls outside the delineated wetland areas as well as outside the 50m buffer zone. No loss of wetland habitat is thus expected. ▪ The following potential impacts are anticipated for various phases of the proposed development: Planning Phase: No impacts to the wetlands are expected during the planning phase. (This is based on the assumption that the planning phase will not involve the establishment of any infrastructure, even temporary, on site and that only existing access routes to the site will be utilised for site visits and preliminary studies).	▪ No preference with regards to alternative site layouts. ▪ Most of the identified potential impacts are of moderate to low significance and can be easily mitigated through implementation of a number of recommended interventions. Of greatest importance is the implementation of an adequate storm water management plan. ▪ It is important to point out that any activity which is contemplated and which will impact on the wetlands within the study area or which falls within 500m of any delineated wetland areas is subject to

Environmental Parameter	Summary of major findings	Recommendations
	Construction Phase: 1. Potential loss of wetland habitat; 2. Increased sediment movement into the wetlands on site; 3. Water quality deterioration; and 4. Disturbance to wetland habitat and fauna. Operational Phase: 1. Increased water inputs to the wetlands (altered hydroperiod); 2. Stormwater discharge; 3. Waste water discharge; and 4. Disturbance to wetland habitat and fauna. Decommissioning Phase: 1. Increased sediment movement into the wetlands on site; 2. Water quality deterioration; and 3. Disturbance to wetland habitat and fauna.	authorisation under Section 21 of the National Water Act (Act 36, 1998) in terms of water uses 21 (c) and 21 (i). This will be applied for the proposed development.
Agricultural Potential and Soils	▪ The site is almost flat and lies at a height of approximately 1 415m above sea level, sloping to the south-east. No permanent drainage ways are present in the area and only a few small dry pans occur. ▪ The climate of the study area (Koch & Kotze, 1986) can be regarded as warm to hot with rain in summer and dry winters. The long-term average annual rainfall in this region of the Northern Cape is only 329 mm, of which 142 mm, or 80%, falls from November to April. Rainfall is erratic, both locally and seasonally and therefore cannot be relied on for agricultural practices. ▪ The geology of the area comprises Tertiary and Quaternary deposits including surface limestone outcrops ▪ The greater farm boundary of Farm 267 (Arriesfontein) consists of two land types namely: Ae9 (Deep, red, freely-drained soils, high base status) and Fc4 (Shallow	▪ Both alternative site layouts are equally acceptable from a soils and agricultural potential perspective. ▪ The main mitigation measure would be to ensure that as little pollution or other non-physical disturbance occurs. ▪ As far as the soils are concerned, the predominance of shallower, calcareous soils (land type Fc4) means that this area is most

Environmental Parameter	Summary of major findings	Recommendations
	soils, usually calcareous). ▪ The area where the study site is located comprises shallow calcareous soils (land type Fc4). ▪ The climatic restrictions mean that this part of the Northern Cape is suited at best for grazing. The grazing capacity is low, around 20 ha/large stock unit. ▪ The major impact on the natural resources of the study area would be the loss of potentially arable land due to the construction of the various types of infrastructure.	recommended for placement of infrastructure. ▪ Due mainly to the prevailing unfavourable climatic conditions for arable agriculture, as well as the prevalence of soils with limited depth, it is not envisaged that any more detailed soil investigation will be required.
Heritage	▪ The HIA has shown that the study area has a rich history of occupation from the Stone Age with hunter gatherers to the Thlaping and Thlaro during the Iron Age period. The 1800's saw the rise of the Griqua people in the area and their loss of sovereignty after 1880 to Cape rule and the South African War at the turn of the century of 1900, all ads to the richness of the heritage landscape. ▪ The field work that feeds into the HIA utilised the findings of the archival research as a guideline. No heritage resources were identified in the study area. ▪ Potential construction phase impacts may occur. The principal potential impact relates to the destruction of sub-surface heritage resources. ▪ The overall potential impact of the development on heritage resources is seen as acceptably low and potential impacts can be mitigated to acceptable levels.	▪ No preference with regards to alternative site layouts. ▪ Heritage Management Guideline in Section 7 has been incorporated in to the EMPr for the project. ▪ In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the South African Heritage Resources Agency (SAHRA) needs to be contacted. An enquiry must be lodged with

Environmental Parameter	Summary of major findings	Recommendations
		them into the necessity for a Heritage Impact Assessment.
Social	▪ The proposed 19MW Power Plant is expected to generate both positive and negative impacts. ▪ On one hand the project is expected to increase the production in the country to the value of R303.2 million and create 470 full time employment (FTE) employment positions during construction, whilst during operations it will generate new business sales to the value of R54.2 million and create a sustainable 26 FTE employment opportunities considering direct and multiplier effects. Households benefiting from the construction or operation phase, will experience an increase of their earnings to the value of R45 million during construction and R3.0 million per annum during operations. During operations, the facility is envisaged to contribute R0.5 million per annum towards social development projects thus benefiting the community even more. ▪ On the other hand, the project is likely to sterilise low potential grazing agricultural land (about 20 ha) and have negative impacts on the nearby economic activities due to visual effects. Constantia Safaris is situated adjacent the proposed development site and borders Farm 267 (Arriesfontein) in the east. Constantia Safaris generates income from trophy hunters and Bed and Breakfast accommodation and is dependent on the area maintaining the natural environment and scenic value. Visual effects ensued from the development of the proposed project are expected to negatively affect the number of international tourists visiting the game farm and may result in the decline of its revenue. The proposed development can potentially have a further negative impact on social components such as crime, social conflicts, possible deterioration of social and economic infrastructure, housing infrastructure and service delivery, and property values.	▪ No preference with regards to alternative site layouts. ▪ Proposed mitigations measured should be implemented and negative effects on the surrounding activities should be considered and implemented where practical.

Environmental Parameter	Summary of major findings	Recommendations
	However, security measures will accompany the proposed development in the form of 24 hour security, fencing off of the proposed development area, security access control and video surveillance. ▪ Most of the negative impacts can be mitigated as briefly referred to above. The extent of mitigation and most importantly the effects thereof on the negative impact would differ. Impacts associated with property values and visual effects are expected to be the most significant and at the same time the most challenging to address. Overall, positive impacts associated with the proposed 19MW PV Power Plant are expected to outweigh the negative effects, albeit to a smaller degree. ▪ The overall significance of socio-economic impacts during construction is expected to be low but positive both before and after mitigations. The same situation is expected during operations, although the ratings are expected to be slightly smaller than that observed during construction. As far as the closure phase is concerned, it is impossible to estimate at this stage whether the net effects will be positive or negative; however most of the impacts observed during construction will also take place during the closure phase and will be temporary. Rehabilitation of the land though could restore the agricultural nature on the farm and eliminate the visual effects altogether thus creating opportunities for development of visually sensitive activities in the area such as trophy hunting and photographic safaris.	

An impact assessment was conducted to ascertain the level of significance of each identified potential impact, as well as to determine the nature and degree of mitigation measures which may be required. The potential positive and negative impacts identified within these studies have been evaluated and rated accordingly. The results of the specialist studies have indicated that no fatal flaws exist in terms of the proposed development.

Based on the findings of the specialist studies and due to technical and feasibility reasons, Site Layout Alternative 1 is the preferred layout for the proposed development.

It is the opinion of the Environmental Assessment Practitioner (EAP) that the proposed project should be awarded environmental authorization (EA) and allowed to proceed provided that the recommended mitigation measures as stipulated in the EMPr are implemented, and provided the following conditions as included are adhered to:

- It is necessary to conduct a vegetation survey that will determine the number and relevant details pertaining to protected tree species on the property for the submission of application forms to NCDENC and DAFF prior to any disturbance of these individuals.
- A vegetation removal/destruction permit will need to be applied for from the NCDENC and DAFF.
- All suggested mitigation measures and suggested buffer zones are to be strictly adhered to and included in the EMPr where relevant.
- Heritage Management Guidelines referred to in the Heritage specialist study needs to be incorporated into the EMP for the project.
- In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the South African Heritage Resources Agency needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment.
- An adequate storm water management plan is required in terms of storage, use, re-use, and disposal of imported potable water, waste water, and storm water. Once compiled this is to be included in the EMPr.
- No water should be discharged into the pans on site.
- The proposed development footprint as well as the footprint of any temporary infrastructure or lay-down areas should be fenced off and all activities restricted to these areas during construction. Once construction has completed, the lay-down area may then be utilised for the PV array area.
- Staff should receive training and awareness education on the value of the natural environment and the need for protection of the environment. Ideally staff numbers on site should be limited during non-working hours through off-site staff housing to prevent illegal hunting in or near wetlands.
- Any activity which is contemplated and which will impact on the wetlands within the study area or which falls within 500m of any delineated wetland areas is subject to a water use

license under Section 21 of the National Water Act (Act 36, 1998) in terms of water uses 21 (c) and 21 (i).

- All proposed mitigation measures should be implemented and negative impacts on surrounding properties must be considered and implemented where practical.
- Final EMPr should be approved by DEA prior to construction.

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Glossary of Terms

Basic Assessment: The process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application.

Biodiversity: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

Corona: In electricity, a corona discharge is an electrical discharge brought on by the ionization of a fluid surrounding a conductor that is electrically energized. The discharge will occur when the strength of the electric field around the conductor is high enough to form a conductive region, but not high enough to cause electrical breakdown or arcing to nearby objects. The discharge creates a low hissing or buzz noise known as corona.

Cultural Significance: This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Cumulative Impact: In relation to an activity, cumulative impact means the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Environmental Impact Assessment: In relation to an application, to which Scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application.

Environmental Management Programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures which must be implemented by several responsible parties throughout the duration of the proposed project.

Heritage Significance Grades:
a) Grade I: Heritage resources with qualities so exceptional that they are of special national significance;
(b) Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and
(c) Grade III: Other heritage resources worthy of conservation,

Heritage Resources: This means any place or object of cultural significance. See also archaeological resources above

Historical Period: Since the arrival of the white settlers - c. AD 1840 - in this part of the country

Iron Age: Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and they herded cattle as well as sheep and goats. These people, according to archaeological evidence, spoke early variations of the Bantu Language. Because they produced their own iron tools, archaeologists call this the Iron Age.
Early Iron Age AD 200 - AD 900
Middle Iron Age AD 900 - AD 1300
Late Iron Age AD 1300 - AD 1820

Kilovolt (kV): a unit of electric potential equal to a thousand volts (a volt being the standard unit of electric potential. It is defined as the amount of electrical potential between two points on a conductor carrying a current of one ampere while one watt of power is dissipated between the two points).

Red Data Species: All those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.

List of Abbreviations

ATNS	Air Traffic Navigation Services
BA	Basic Assessment
BAR	Basic Assessment Report
C&RR	Comments and Response Report
DAFF	Department of Agriculture, Forestry and Fisheries
DWA	Department of Water Affairs
EIA	Environmental Impact Assessment
EMF	Electric and Magnetic Fields
EMPr	Environmental Management Programme
EWT	Endangered Wildlife Trust
FTE	Full Time Employment
GIS	Geographic Information System
GN	Government Notice
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
KLM	Kgatelopele Local Municipality
kV	Kilovolt
NCDENC	Northern Cape Department of Environment and Nature Conservation
NEMA	National Environmental Management Act, 1998 (Act No.107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFA	National Forests Act, 1998 (Act No. 84 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998
PPP	Public Participation Process
SACAA	SA Civil Aviation Authority
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency
SDF	Spatial Development Framework
SDM	Siyanda District Municipality

SG	Surveyor General
VIA	Visual Impact Assessment
VT	Vegetation Type
WESSA	Wildlife and Environmental Society of South Africa

INTRODUCTION

SolarReserve South Africa (Pty) Ltd (hereafter referred to as SolarReserve) has appointed SiVEST to undertake a Basic Assessment (BA) process for the proposed construction of up to a 19 MW Photovoltaic (PV) Solar Power Plant on Farm 267 (Arriesfontein) near Daniëlskuil, Northern Cape Province. The objective of the project is to generate electricity which will be fed into Eskom's national electricity grid by means of the construction of up to a 19MW PV Solar Power Plant and associated infrastructure.

Importantly, it must be stated that an Environmental Impact Assessment (EIA) is being conducted on the remaining area of Farm 267 (Arriesfontein). The EIA is for the proposed development of a Concentrated Solar Plant (CSP) facility and PV facilities. The EIA is currently in the impact phase of the EIA and is being undertaken as a separate environmental assessment process from this BA. The reference numbers for the various other phases of the EIA solar facility are as follows:

- 75MW PV Phase 1 - DEA Ref: 12/12/20/2647; NEAS Ref: DEA/EIA/0000850/2011
- 75MW PV Phase 2 - DEA Ref: 12/12/20/2648; NEAS Ref: DEA/EIA/0000848/2011
- 75MW PV Phase 3 - DEA Ref: 12/12/20/2649; NEAS Ref: DEA/EIA/0000854/2011
- 100MW CSP Phase 4 - DEA Ref: 12/12/20/2646; NEAS Ref: DEA/EIA/0000853/2011

Please note that this BA is separate from the greater EIA of the remaining farm portion and falls within a smaller sub-area. This BA is therefore being undertaken as a separate environmental application process.

1 Overall Project Need and Desirability

The intention of SolarReserve is to develop numerous small-scale commercial renewable energy projects to diversify the local energy generation 'mix' and reduce South Africa's dependency on non-renewable fossil fuel resources (i.e. coal). Factors such as increased economic growth and social development, rapid community development advancement among others have led to the growth in demand for electricity in Southern Africa. By 2007, the electricity demand in South Africa had been growing at approximately 3% a year thus increasing pressure on South Africa's existing power generation capacity. As one of the strategies to meet future energy consumption requirements, the country is opting for the use of renewable energy technologies such as PV Solar Power Plants. This technology is therefore fast becoming an important energy option in South Africa. As a result, SolarReserve plan to establish a PV Solar Power Plant on the Farm 267 (Arriesfontein) near Daniëlskuil, in the Northern Cape Province.

2 Project Description

The proposed project is to consist of:

- the proposed construction of up to a 19MW PV Solar Power Plant on the Farm 267 (Arriesfontein) near Daniëlskuil, Northern Cape Province;
- the establishment of associated infrastructure as required.

The following key components for the PV Solar Power Plant are to be constructed:

- PV solar panels and arrays;
- PV Panel mountings;
- DC-AC current inverters and transformers;
- Substation (approximately 50m x 50m);
- Switchyard (approximately 50m x 50m); and
- Underground cabling (approximately 1m deep)/overhead power lines (where required on site).

The PV panels that are proposed to be used typically measure up to 6 m² in size per panel. The PV panels will be arranged in rows (arrays) and made up of approximately 100 m sections unless environmental or space constraints restrict the layout design. Each row or array of the PV Panels will be connected to a number of inverters depending on the amount of PV Panels in an array. The PV panels will be mounted on steel or metal frames with a maximum height of approximately 3 m above the ground, supported by rammed, concrete or screw pile foundations. The PV Panels will face to the north in order to capture the highest degree of sunlight. The foundation of an individual PV panel can be up to 2 metres deep where required. However, the foundation depth requirements for the site will be only be finalised once a detailed geo-technical assessment has been done prior to construction. The angle at which the PV panels are to be tilted is approximately 25° from the horizontal plane.

The Substation is to be approximately 50m x 50m in size which will house the transformers and associated infrastructure to evacuate the energy generated by the PV Solar Power Plant to the switchyard which will feed into the Eskom grid. Underground power cables will be used to connect the PV Panel arrays to the dedicated inverters and subsequently to the on-site substation. The depth of the excavations can be up to 1m. Overhead distribution power lines will be utilized where required to connect the PV Power Plant to the Eskom grid on site. It is important to note that the overhead distribution power line infrastructure off-site (which will link into the Eskom national grid) will be assessed in a separate environmental assessment. The capacity of the power lines on-site will therefore be dependent of the capacity of the powerlines off-site linking into the Eskom national grid. The capacity of the on-site overhead distribution power lines is likely to be 132kV and will be no more than 275kV. No servitudes will be associated with the PV Solar Power Plant infrastructure although servitudes for Eskom infrastructure may be required on site.

In terms of the associated infrastructure required for the proposed development, the following is to be constructed:

- one meteorological station (approximately 30m x 30m) - to collect data on the solar resource;
- a small site office and storage facility (approximately 100m x 100m) - including security and associated facilities;
- visitor centre (approximately 50m x 50m);
- internal gravel roads (approximately 4m to 6m wide);
- security system - closed circuit video-surveillance system;
- site fencing;
- car park area (approximately 50m x 50m); and
- a temporary lay-down area (approximately 100m x 100m) - for the temporary storage of materials during the construction activities.

Figure 1 and 2 below provide an illustration of the two layout alternatives.

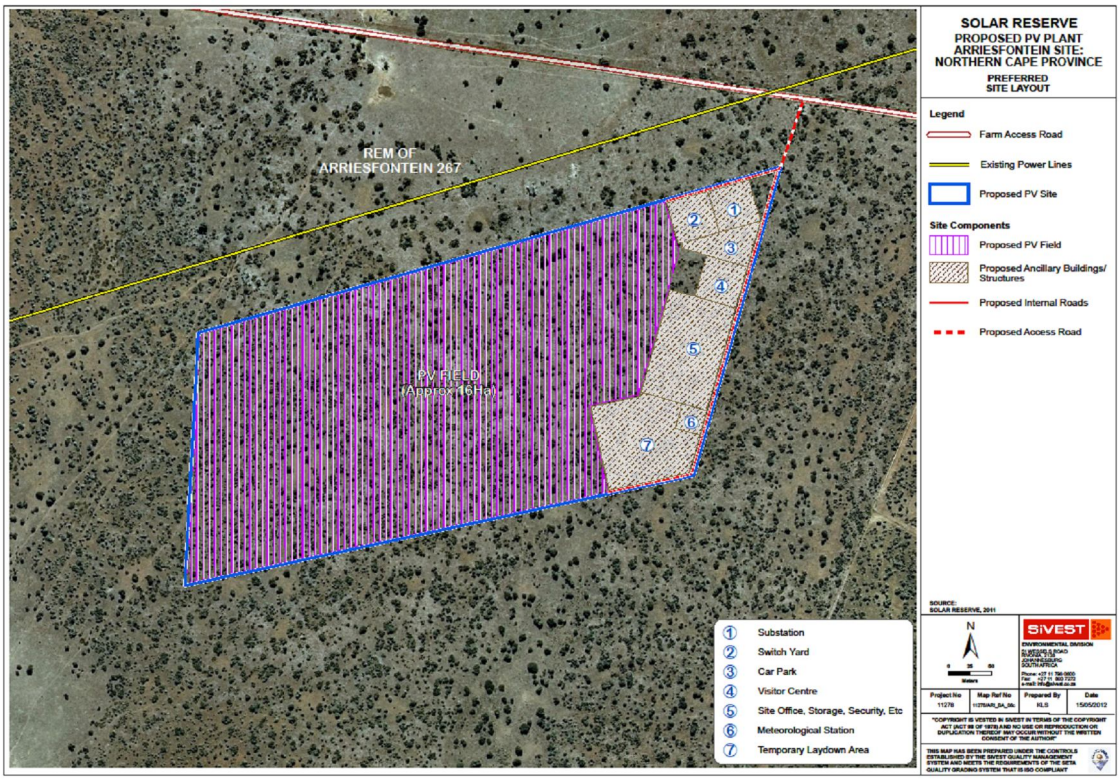

Figure 1: Site Layout Alternative 1 for the proposed development

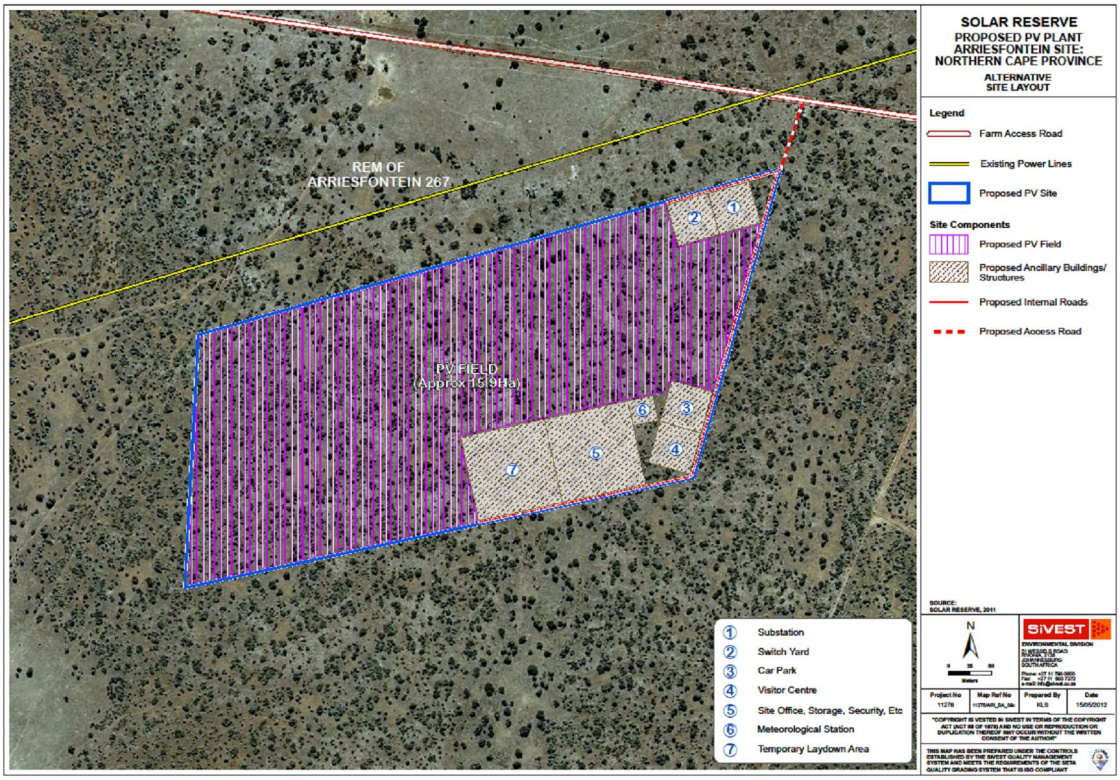

Figure 2: Site Layout Alternative 2 for the proposed development

3 Brief Description of the Receiving Environment

The study area is located on Farm 267 (Arriesfontein) near Daniëlskuil, about 30km to the east of the mining town of Lime Acres and approximately 30km south east of the mining town Daniëlskuil in the Northern Cape Province (Figure 3). The proposed development site is situated within the Kgatelopele Local Municipality which forms part of the Siyanda District Municipality.

The topography of the study area is characterized by flat plains and gently undulating landscape. No significant topographical features are present in the immediate vicinity of the study area (Figure 4). The study area is representative of the regional vegetation type which is described as Ghaap Plateau Vaalbosveld. The vegetation on the study site comprises a dominant shrub/ tree layer and a diverse herbaceous layer.

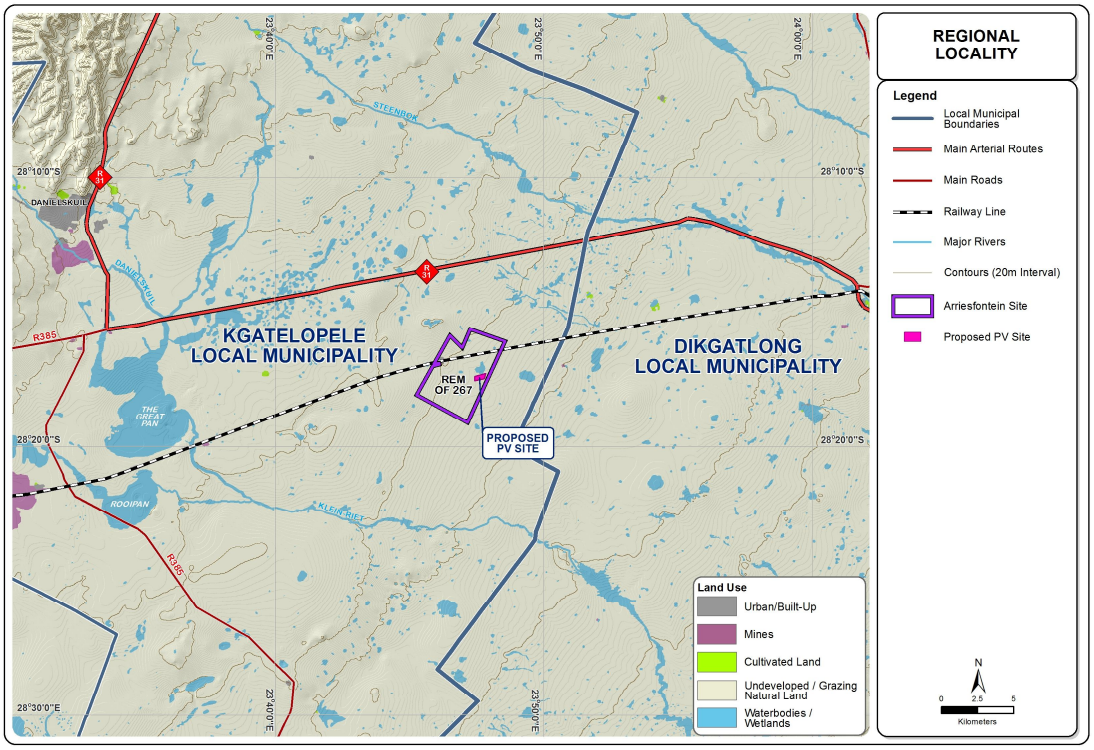

Figure 3: Regional Locality Map

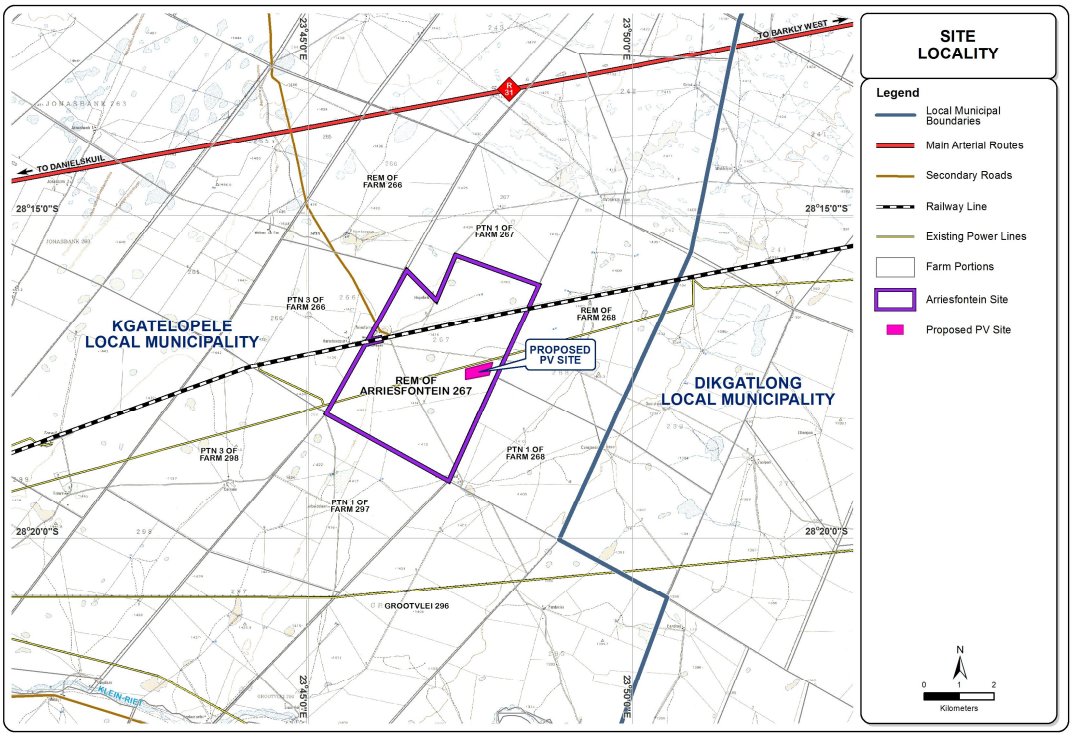

Figure 4: Site Locality Map

The study area can be found just off the R31 heading from Delportshoop towards Postmasburg. The site is not pertinently visible from the R31, and access has to be gained by means of a gravel road. This road is used by more than one farmer and runs straight through the site.

4 Expertise of the Environmental Assessment Practitioner

Table 1: Environmental consultants

Name and Organisation	Role
Kelly Tucker, SiVEST	Project Leader / Senior Environmental Consultant
Shaun Taylor, SiVEST	Environmental Consultant
Nicolene Venter, Imaginative Africa	Senior Public Participation Consultant
Mabel Qinisile, SiVEST	Public Participation Assistant
Kerry Schwartz, SiVEST	GIS and Mapping
Riaan Robbeson and Dewald Kamffer, Bathusi Environmental Consulting	Biodiversity
Dieter Kassier, Wetland Consulting Services (Pty) Ltd	Wetlands
Garry Paterson, Agriculture Research Council – Institute for Soil, Climate and Water	Agricultural Potential and Soils
Wouter Fourie, PGS Heritage and Grave Relocation Consultants	Heritage
Elena Broughton, Urban-Econ: Development Economists	Socio-economic

Please refer to attached CV's for more information (See Appendix G1).

5 Authority Consultation

The Department of Environmental Affairs (DEA) is the competent authority whom will be responsible for considering and reviewing this application. It is important to note that the activity for which SolarReserve is applying for Environmental Authorisation, requires that a BA be undertaken. An application was submitted to DEA on the 11th of January 2012. The application was approved on the 25th of January 2012 and the following reference numbers were allocated for the project.

- DEA: 14/12/16/3/3/1/428
- NEAS: DEA/EIA/0000922/2012

Authorisation was thus granted to continue with a Basic Assessment for the proposed project. All authority consultation is included within Appendix G2.

6 Basic Assessment Report Structure

This Final Basic Assessment Report (FBAR) is structured as follows:

- **Section A** describes the activity and technical project components, including the proposed alternatives, location and physical size of the activity. This section also provides an activity motivation by describing the need and desirability for the proposed project. Section A expands on the legal ramifications applicable to the project and describes relevant development strategies and guidelines. Finally the section explains the infrastructural requirements of the proposed project such as waste, effluent, emission water use and energy efficiency.
- **Section B** provides a description of the site and region in which the proposed development is intended to be located. Although the chapter provides a broad overview of the region, it is also specific to the application.
- **Section C** describes the Public Participation Process (PPP) undertaken during the Basic Assessment and tables issues and concerns raised by Interested and Affected Parties (I&APs).
- **Section D** identifies potential issues associated with the proposed project by outlining the impacts that may result from the planning, design, construction, operational, decommissioning and closure phases. Section D also provides a description of the mitigation and management measures for each potential impact. The section concludes with an Environmental Impact Statement which summarises the impacts that the proposed development may have on the environment.
- **Section E** outlines the recommendations of the Environmental Assessment Practitioner (EAP).

7 Assumptions, Uncertainties and Gaps in Knowledge

The following assumptions and limitations have been taken into account when compiling this FBAR:

- It is assumed that all technical information provided by SolarReserve to SiVEST is technically acceptable and accurate.
- The scope of the study is limited to assessing the environmental impacts associated with the proposed development of a PV Power Plant and associated infrastructure on site and excludes powerline infrastructure off-site.
- It is assumed that the information provided by the various specialists is unbiased and accurate.
- The following assumptions, uncertainties and gaps in knowledge were encountered by the various specialists:

- Results presented in the biodiversity report are based on a snapshot investigation of the study area and not on detailed and long-term investigations of all environmental attributes and the varying degrees of biological diversity that may be present in the study area.
- In particular, rare and endemic species normally do not occur in great densities and, because of customary limitations in the search and identification of Red Listed species, the detailed investigation of these species was not possible. Biodiversity results are ultimately based on estimations and specialist interpretation of imperfect data.
- No detailed soil classification was undertaken and only general soil characteristics were noted.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?	YES √	

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.

A Declaration of Interest for each specialist is included in Appendix G3 and all specialist reports are included in Appendix D.

1 Activity Description

Describe the activity, which is being applied for, in detail[1]:

Project Description

The intention of SolarReserve is to develop numerous small-scale commercial renewable energy projects to diversify the local energy generation 'mix' and reduce South Africa's dependency on non-renewable fossil fuel resources (i.e. coal). Factors such as increased economic growth and social development, rapid community development advancement among others have led to the growth in demand for electricity in Southern Africa. By 2007, the electricity demand in South Africa had been growing at approximately 3% a year thus increasing pressure on South Africa's existing power generation capacity. As one of the strategies to meet future energy consumption requirements, the country is opting for the use of renewable energy technologies such as Photovoltaic (PV) Plants. This technology is therefore fast becoming an important energy option in South Africa. As a result, SolarReserve plan to establish a Photovoltaic (PV) plant on the Farm 267 (Arriesfontein) near Daniëlskuil, in the Northern Cape Province.

The proposed project is to consist of:

- the proposed construction of up to a 19MW PV Solar Power Plant on the Farm 267 (Arriesfontein) near Daniëlskuil, Northern Cape Province;
- the establishment of associated infrastructure as required.

[1] Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description.

The following key components for the PV Solar Power Plant are to be constructed:

- PV solar panels and arrays;
- PV Panel mountings;
- DC-AC current inverters and transformers;
- Substation (approximately 50m x 50m);
- Switchyard (approximately 50m x 50m); and
- Underground cabling (approximately 1m deep)/overhead power lines (where required on site).

The PV panels that are proposed to be used typically measure up to 6m² in size per panel. The PV panels will be arranged in rows (arrays) and made up of approximately 100 m sections unless environmental or space constraints restrict the layout design. Each row or array of the PV Panels will be connected to a number of inverters depending on the amount of PV Panels in an array. The PV panels will be mounted on steel or metal frames with a maximum height of approximately 3 m above the ground, supported by rammed, concrete or screw pile foundations. The PV Panels will face to the north in order to capture the highest degree of sunlight. The foundation of an individual PV panel can be up to 2m deep where required. However, the foundation depth requirements for the site will be only be finalised once a detailed geo-technical assessment has been done prior to construction. The angle at which the PV panels are to be tilted is approximately 25° from the horizontal plane.

The Substation is to be approximately 50m x 50m in size which will house the transformers and associated infrastructure to evacuate the energy generated by the PV Solar Power Plant to the switchyard which will feed into the Eskom grid. Underground power cables will be used to connect the PV Panel arrays to the dedicated inverters and subsequently to the on-site substation. The depth of the excavations can be up to 1m. Overhead distribution power lines will be utilized where required to connect the PV Power Plant to the Eskom grid on site. It is important to note that the overhead distribution power line infrastructure off-site (which will link into the Eskom national grid) will be assessed in a separate environmental assessment. The capacity of the power lines on-site will therefore be dependent of the capacity of the powerlines off-site linking into the Eskom national grid. The capacity of the on-site overhead distribution power lines is likely to be 132kV and will be no more than 275kV. No servitudes will be associated with the PV Solar Power Plant infrastructure although servitudes for Eskom infrastructure may be required on site.

In terms of the associated infrastructure required for the proposed development, the following is to be constructed:

- one meteorological station (approximately 30m x 30m) - to collect data on the solar resource;
- a small site office and storage facility (approximately 100m x 100m) - including security and associated facilities;

- visitor centre (approximately 50m x 50m);
- internal gravel roads (approximately 4m to 6m wide);
- security system - closed circuit video-surveillance system;
- site fencing;
- car park area (approximately 50m x 50m); and
- a temporary lay-down area (approximately 100m x 100m) - for the temporary storage of materials during the construction activities.

Relevant Listed Activities

In terms of the Environmental Impact Assessment (EIA) Regulations 2010, Government Notice (GN) No. R544 promulgated in terms of Sections 24(2) and 24D of the National Environmental Management Act (No. 107 of 1998) (NEMA), as amended, the listed activities that pertain to the development are identified in the table below. Where activities that were listed in the original Application Form submitted to the DEA (11th January 2012) have not become relevant and/or applicable, this has been identified and stipulated in the table below.

Government Notice No. R544 - Listing Notice 1 of 2010			
Government Listing Notice	**Activity Number**	**Applicable Description**	**Applicability**
R. 544 (18 June 2010)	1	*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*	Applicable
R. 544 (18 June 2010)	10	*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; or*	Applicable
R. 544 (18 June 2010)	22	*The construction of a road, outside urban areas,* *(i) with a reserve wider than 13,5 meters or,* *(ii) where no reserve exists where the road is wider than 8 metres, or* *(iii) for which an environmental*	No longer applicable

		authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	
R. 544 (18 June 2010)	23	*The transformation of undeveloped, vacant or derelict land to –* *(ii) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares; -* *except where such transformation takes place for linear activities*	Applicable
Government Notice No. R546 - Listing Notice 3 of 2010			
R. 546 (18 June 2010)	4	*The construction of a road wider than 4 metres with a reserve less than 13,5 metres.* *(ii) Outside urban areas, in:* *(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;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.*	Applicable
R. 546 (18 June 2010)	12	*The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.* *b) Within critical biodiversity areas identified in bioregional plans;*	Applicable
R. 546 (18 June 2010)	13	*The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes vegetation in:*	Applicable

			(a) Critical biodiversity areas and ecological support areas as identified in the systematic biodiversity plans adopted by the competent authority. *(b) In Eastern Cape, Free State, KwaZulu Natal, Limpopo, Mpumalanga, Northern Cape and Western Cape:* *(ii) Outside urban areas, in:* *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;*		

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 assessment of alternatives is a legal requirement for any environmental assessment. The following types of alternatives however have been excluded from the assessment (the reasons for exclusion from this environmental assessment are additionally supplied below):

- Site Alternatives

The proposed development is site specific in that agreements have been established with the landowner for development to take place on Farm 267 (Arriesfontein). Additionally, preliminary research from SolarReserve has identified Farm 267 (Arriesfontein) as the most suitable and beneficial location in the local area for solar renewable energy. As such, no site alternatives will be assessed for the proposed development. The specific location for the proposed development of the PV Solar Power Plant in the western area of Farm 267 (Arriesfontein) is due to on-site limitations for the planned CSP and PV facilities forming part of the EIA process for the remaining area of the property.

- Technology Alternatives

In terms of renewable energy technologies, wind farm and hydroelectricity technology options are not suitable for the site. The option of CSP is currently being assessed in the EIA for the remaining area of the property along with several other PV Solar Power Plants, as mentioned earlier. PV is currently considered on of the most viable renewable solar energy sources that can be utilised for smaller areas. This technology has therefore been selected as the most suitable and feasible technology for the specific site for this BA should Environmental Authorisation not be granted for the EIA conducted on the remaining area of the property. The above mentioned technology alternatives have therefore been excluded for assessment in this application.

- Operating alternatives

In terms of possible feasible and reasonable operation alternatives for a PV facility, no PV facility has been constructed in the country as yet. Hence, no reasonable or feasible operating alternatives are available to assess the possible operation optimisation of PV facilities. This alternative has therefore been excluded from this BA.

For the proposed development, the following alternatives are proposed and have been evaluated and assessed in this BA:

- Layout Alternatives;
- No-go Alternative.

Layout Alternatives

Two alternative site layouts were investigated in order to determine the potential impact for the proposed development on the application site. This specifically relates to the arrangement of the various building components and associated infrastructure of the proposed development on the application site. The

investigated alternative layouts are named as follows:

- Layout Alternative 1 (Preferred)
- Layout Alternative 2

SITE LAYOUT ALTERNATIVE 1 (Preferred)

Several key components and associated infrastructure will be required for the proposed development. The following key components for the PV Solar Power Plant are to be constructed:

- PV solar panels and arrays;
- PV Panel mountings;
- DC-AC current inverters and transformers;
- Substation (approximately 50m x 50m);
- Switchyard (approximately 50m x 50m); and
- Underground cabling (approximately 1m deep)/overhead power lines (where required on site).

The associated infrastructure that the proposed development requires include the following:

- one meteorological station (approximately 30m x 30m) - to collect data on the solar resource;
- a small site office and storage facility (approximately 100m x 100m) - including security and associated facilities;
- visitor centre (approximately 50m x 50m);
- internal gravel roads (approximately 4m to 6m wide);
- security system - closed circuit video-surveillance system;
- site fencing;
- car park area (approximately 50m x 50m); and
- a temporary lay-down area (approximately 100m x 100m) - for the temporary storage of materials during the construction activities.

The above mentioned key components and associated infrastructure have been arranged to provide a preferred layout in terms of environmental, technical and feasible factors. The environmental parameters investigated encompass biodiversity, wetlands, heritage and palaeontology, socio-economic issues as well as agricultural potential and soils input. Initially, a layout (Site Layout Alternative 2 – See section below) had been designed based on efficient use of space and developable area for the PV arrays of the proposed development. However, based on the aforementioned studies, the initial layout of the site was re-arranged to take into consideration environmental factors as well as technical and feasible considerations. An environmentally preferred layout was therefore compiled and has been proposed as the ***preferred*** site layout alternative (Site Layout Alternative 1).

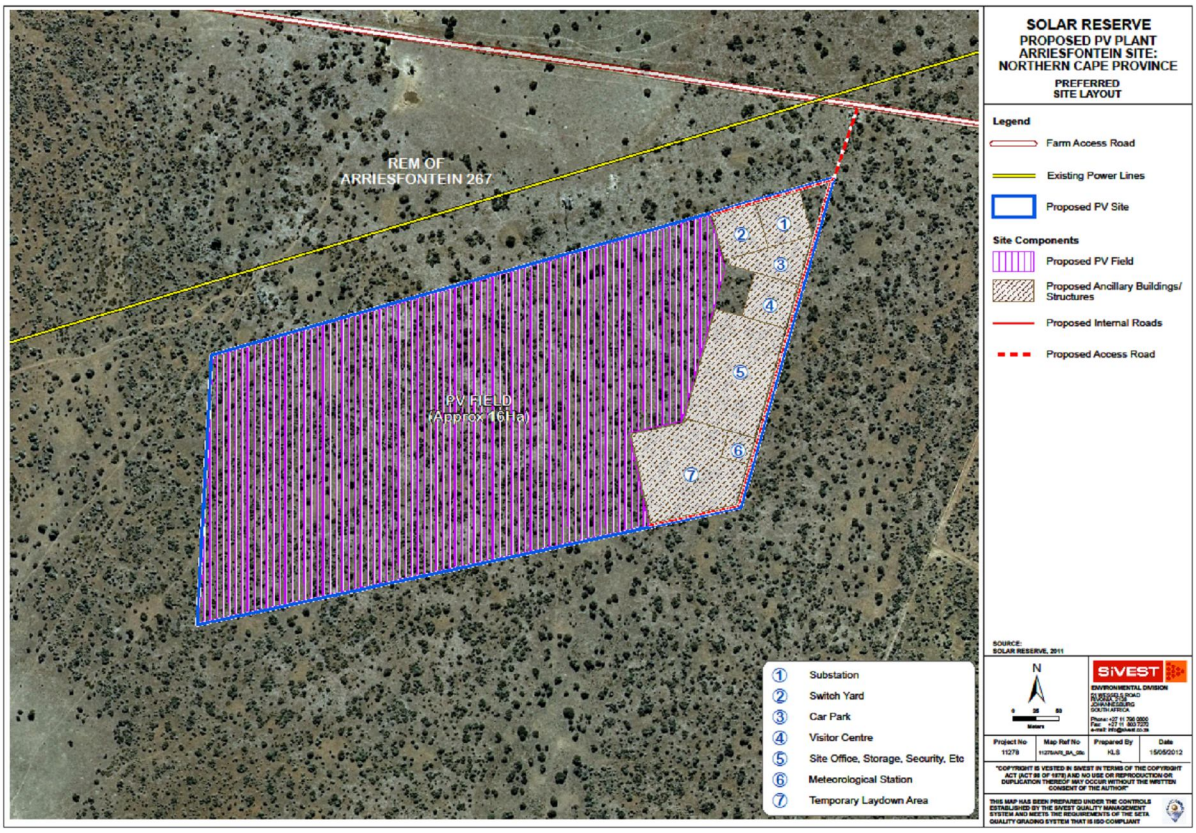

Figure 5: Site Layout Alternative 1

Please refer to Appendix A for an A3 illustration of Site Layout Alternative 1 and associated environmental maps.

SITE LAYOUT ALTERNATIVE 2

The essential key components and infrastructural elements of the layout for both site layouts are identical. For a breakdown of these components and elements please refer to the section above.

As mentioned above, initially, a layout had been designed to account for efficient use of space and developable area for the PV arrays of the proposed development. This site layout therefore constitutes the second site layout alternative (Site Layout Alternative 2).

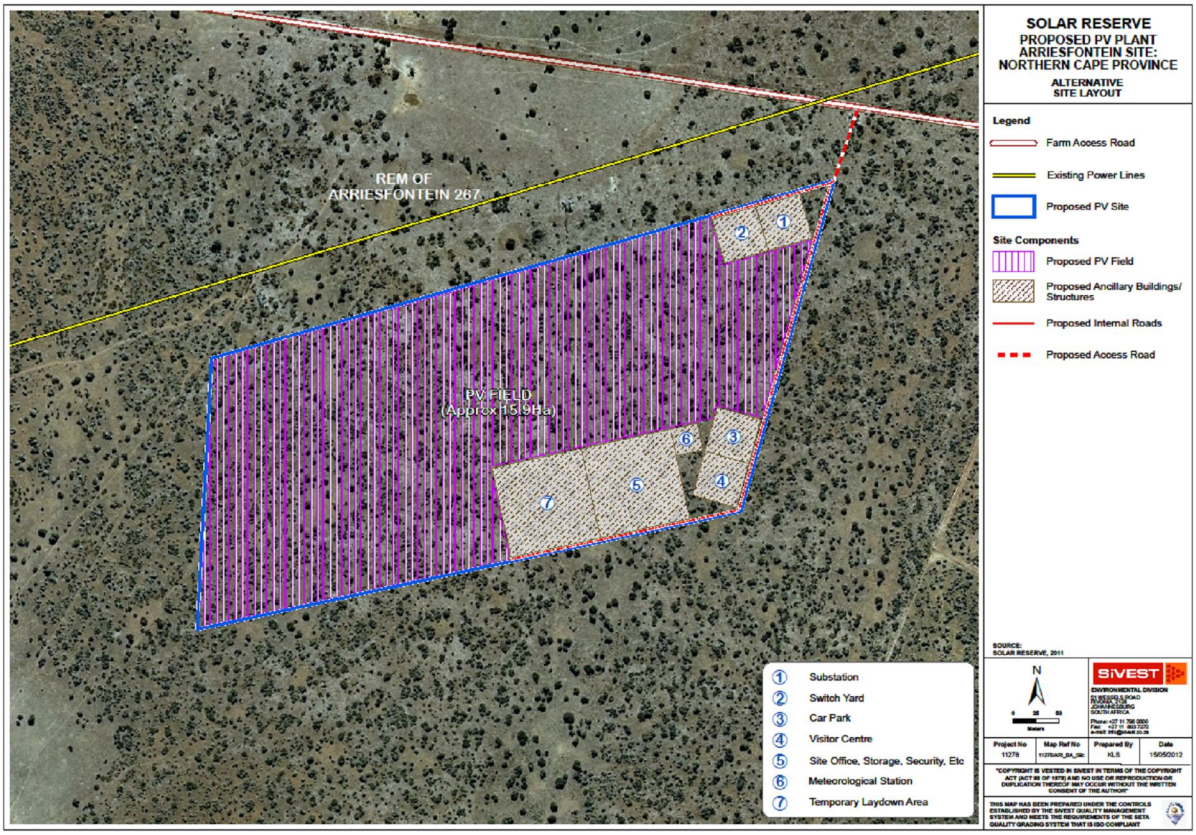

Figure 6: Site Layout Alternative 2

Please refer to Appendix A for an A3 illustration of Site Layout Alternative 2 and associated environmental maps.

No-Go Alternative

The No-Go alternative entails maintaining the status quo, which is essentially the non-occurrence of the proposed development. In this case, it would mean that a PV Solar Power Plant and associated infrastructure will not be constructed and the application site will remain as the current status quo. The existing receiving environment will therefore not be affected by the proposed development and it shall remain in the current condition. The No-Go alternative will be assessed and will serve as the baseline against which the impacts of all alternatives are assessed.

Should the construction and operation of the proposed PV Solar Power Plant and associated infrastructure not be developed, South Africa's potential for harnessing and utilising renewable energy as opposed to coal powered energy will be a missed opportunity for sustainable development. Additionally, pressure for relief on existing power demands, socio-economic benefits for the local community and provision of electricity to local areas shall also not be realised.

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[2] (only one site for both layout alternatives)	-28°	17.415‘	23°	47.609‘
Alternative S2 (if any)	°	‘	°	‘
Alternative S3 (if any)	°	‘	°	‘

In the case of linear activities:

Alternative:	**Latitude (S):**		**Longitude (E):**	
Alternative S1 (preferred or only route alternative)				
Starting point of the activity	n/a	n/a	n/a	n/a
Middle/Additional point of the activity	n/a	n/a	n/a	n/a
End point of the activity	n/a	n/a	n/a	n/a
Alternative S2 (if any)				
Starting point of the activity	n/a	n/a	n/a	n/a
Middle/Additional point of the activity	n/a	n/a	n/a	n/a
End point of the activity	n/a	n/a	n/a	n/a
Alternative S3 (if any)				
Starting point of the activity	n/a	n/a	n/a	n/a
Middle/Additional point of the activity	n/a	n/a	n/a	n/a
End point of the activity	n/a	n/a	n/a	n/a

[2] “Alternative S..” refer to site alternatives.

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

4 Physical size of the activity

Indicate the physical size of the preferred activity as well as alternative activity (footprints):

Alternative:	**Size of the activity:**
Alternative A1[3]	160 360m^2
Alternative A2	159 268m²

or, for linear activities:

Alternative:	**Size of the activity:**
Alternative S1 (preferred location alternative)	n/a
Alternative S2	n/a
Alternative A14 (preferred activity alternative)	n/a
Alternative A2	n/a
No-Go Alternative	n/a

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

Alternatives:	**Size of the site:**
Alternative A1 (only one site for both layout alternatives)	204 300m^2
Alternative A2 (only one site for both layout alternatives)	204 300m²

or, for linear activities:

Alternative:	**Size of the activity:**
Alternative S1 (preferred location alternative)	n/a
Alternative S2	n/a

[3] "Alternative A" refer to activity alternatives.

[4] "Alternative A.." refer to activity, process, technology or other alternatives.

Alternative A15 (preferred activity alternative)	n/a
Alternative A2	n/a
No-Go Alternative	n/a

5 Site Access

Does ready access to the site exist?

YES√	

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

Access to the site is readily available by means of a gravel/dirt road that tees off from the R31. The short length of internal roads stemming from the existing access gravel/dirt road is to be made of gravel. The gravel roads to be established will be approximately 4m to 6m wide and will consist of a compacted gravel layer of approximately 40cm thick.

It is important to state that the proposed internal gravel roads do not trigger any relevant listed activities according to GN. 544 Listing Notice 1 (2010) and GN. 545 Listing Notice 2 (2010) as none of the thresholds are triggered and therefore do not require environmental authorisation.

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;

[5] "Alternative A.." refer to activity, process, technology or other alternatives.

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.

Site plans for the proposed PV Power Plant and associated infrastructure are included in 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.

Site photographs with short descriptions of the proposed development site are included in Appendix B. Key environmental characteristics of the site are depicted in the site photographs.

8 Facility Illustrations

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.

A schematic drawing of the proposed tower type for the on-site overhead distribution power lines is included in 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 R250 million
What is the expected yearly income that will be generated by or as a result of the activity?	Approximately R80 million
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?	Approximately 45 (direct jobs)
What is the expected value of the employment opportunities during the development phase?	Approximately R6 million
What percentage of this will accrue to previously disadvantaged individuals?	Approximately 75%
How many permanent new employment opportunities will be created during the operational phase of the activity?	Approximately 15-20 (direct jobs)
What is the expected current value of the employment opportunities during the first 10 years?	Approximately R 20 million
What percentage of this will accrue to previously disadvantaged individuals?	Approximately 80%

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?	**YES √**	
3.	If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:		
	Validation for Items 1 and 2: The Northern Cape Provincial Spatial Development Framework (NCPSDF, 2012) asserts the major energy challenges are securing energy supply to meet growing demand and providing everybody with access to energy services. As such, a number of feasibility studies have been conducted in the		

	Northern Cape, to which many has suggested the province as being the ideal location for various forms of renewable energy developments. It is stated that innovation and new energy technologies are essential to make progress towards securing access to reliable, sustainable and affordable energy services to realize sustainable economic growth and development (NCPSDF, 2012). Amongst the new energy technologies promoted, solar renewable energy offers a viable solution to alleviating the electrical demands not only for the Northern Cape but the country at large.

DESIRABILITY:			
1.	Does the proposed land use / development fit the surrounding area?		**NO √**
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:		
	Explanation for Item 1: The surrounding area is characterised mainly by grasslands used for cattle grazing and livestock keeping. Although the proposed development does not pertinently suite the character of the surrounding area, the need to address both the country and the Northern Cape's energy demands can be considered an area of prioritisation as stipulated in the NCPSDF (2012). The NCPSDF moreover states that the competitive advantages of the Northern Cape for solar power are *inter alia* as a result of the following factors: • Relative closeness to the national power grid compared to other areas with comparable • Sunshine. • Water from the Orange River. • Access to two airports. • Good major roads. • A flat landscape. These factors therefore contribute to the suitability of areas in the Northern Cape for solar energy and provide justification for the proposed development of a PV Power Plant and associated infrastructure on the application site.		
	Validation to Item 2 and 3: According to the NCPSDF (2012), there is currently a national electricity supply shortage and the country is now in a position where it needs to commission additional power plants urgently. As a result, renewable energy projects are considered to be high priority (LED Strategy). Additionally, the Northern Cape Provincial Government Development Strategy states that renewable energy is an initiative to diversify the economy and thereby promote the green economy in the		

	province and therefore can assist in reaching energy demands in a more environmentally friendly manner as opposed to coal and nuclear energy generation. The White Paper on Renewable Energy (2003) has set a target of 10 000 GWh of energy to be produced from renewable energy sources (mainly biomass, wind, solar, and small-scale hydro) by 2013. As such, the proposed development will be able to contribute in reaching the abovementioned targets and priorities for the province. Additionally, considering the urgent need for energy in the country, the requirement for the proposed development and associated land use can be considered to outweigh the negative impacts of it.		
5.	Will the proposed land use / development impact on the sense of place?	**YES √**	
6.	Will the proposed land use / development set a precedent?	**YES √**	
7.	Will any person's rights be affected by the proposed land use / development?	**YES √**	
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.		
	Explanation for Item 5: The impact of sense of place is a matter of subjectivity in that how one individual feels or perceives an environment can differ dramatically from the perception of another individual. Having stated this, although the proposed land use differs from the existing landscape, impacts both positive and negative should be evaluated. From a negative point of view, the proposed development may detract from the existing environment. However, from a positive perspective, the proposed development has the ability to promote tourism and stimulate income generation to the locality and the region. A visitor centre has been proposed as a component which will contribute to education, awareness and potential development of solar energy.		
	Explanation for Item 6: The scale of the proposed development is relatively small and is not expected to set a pattern of development. However, from the uniqueness of the proposed development can serve as an example for other PV Power Plants for the region or the country.		
	Explanation for Item 7: The proposed development will impact on the individuals (land owners) where a proposed overhead distribution power line and associated tower structures will be constructed on the land on which they are residing. However, it must be acknowledged that the overhead distribution power line will be routed to avoid dwellings and agricultural land.		

BENEFITS:			
1.	Will the land use / development have any benefits for society in general?	**YES √**	
2.	Explain:		
	Explanation for Item 1: The proposed development will benefit society in general by improving the electricity supply to the national grid. In addition to this, a stable electricity supply will have a positive impact and promote economic growth. On a local scale, during the construction phases it is expected that there will be a number of jobs for skilled and unskilled labour may be generated in the vicinity of the site. This could help to promote the local economy and quality of life in the immediate area. During the operational phase of the proposed development, a number of skilled and unskilled jobs are likely to be available although this is anticipated to be less than in the construction phase.		
3.	Will the land use / development have any benefits for the local communities where it will be located?	**YES √**	
4.	Explain:		
	Explanation for Item 3: As previously mentioned, local income generation to skilled and unskilled workers is likely to be generated. Aside from this, tax income generation can also be seen as an indirect benefit that will accrue to the local community via the municipalities and the services provided and local initiatives planned for the area. The proposed development can also provide a means of potentially stabilizing the local grid and this ensuring electrical supply to the local area.		

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:
Legislation		
Constitution of the Republic of South Africa (Act 108 of 1996)	The Constitutional Court	1996
National Environmental Management Act (No. 107 of 1998)	Department of Environmental Affairs (DEA)	1998
National Heritage Resources Act (No. 25 of 1999)	South African Heritage Resources Authority (SAHRA)	1999
National Water Act (No 36 of1998)	Department of Water Affairs (DWA)	1998
National Environmental Management: Biodiversity Act (No. 10 of 2004)	Department of Environmental Affairs (DEA) and South African	2004

	National Biodiversity Institute (SANBI)	
Northern Cape Nature Conservation Act (No 9 of 2009)	Northern Cape Provisional Government – Department Environment, Nature and Conservation	2009
National Environmental Management: Protected Areas Act (No 57 of 2003)	Department of Environmental Affairs (DEA)	2003
National Forests Act, 1998 (Act No. 84 of 1998)	Department of Agriculture, Forestry and Fisheries (DAFF)	1998
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	Department of Agriculture, Forestry and Fisheries (DAFF)	1983
International Conventions		
Convention on Biological Diversity		1993
Convention on International Trade in Endangered Species of Wild Life and Fauna		1975
Regulations		
EIA Regulations 2010, Government Notice (GN) No. R543 - 546	Department of Environmental Affairs (DEA)	2010
Guidelines		
Northern Cape Provincial Spatial Development Framework: Volume 1 & 2	Office of the Premier of the Northern Cape and the Department of Rural Development and Land Reform	2011

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?	Between 5-10 m^3

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

Solid waste generated will consist mainly of cleared vegetation, domestic waste and spoil from site clearing activities. This will be disposed of at a registered landfill site with sufficient capacity to assimilate the waste. Metal off-cuts can also be expected.

Skip waste containers and waste collection bins will be maintained on site and the contractor will arrange for them to be collected regularly and transported to the landfill site. All solid construction waste collected shall be disposed of at registered/licensed landfill site.

Under no circumstances will waste be burned or buried on site.

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

All solid waste will be disposed of at a licensed/registered landfill site. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to the management of the waste.

Will the activity produce solid waste during its operational phase?		**No √**
If yes, what estimated quantity will be produced per month?	n/a	

n/a

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

n/a

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

n/a

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 √**

n/a

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?		**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?	**YES √**	

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 connection to the existing sewer network is not possible, a septic tank may be required for sewage. However, it will be below 2 000m³. This will therefore not trigger any waste management activities that require authorization.

Will the activity produce effluent that will be treated and/or disposed of at another facility?		**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:

None.

11(c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere?		**NO √**
If yes, is it controlled by any legislation of any sphere of government?	YES	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.

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

11(d) Generation of noise

Will the activity generate noise?

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

YES √	
	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.

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

Noise will be generated during the construction phase mainly as a result of vehicular activity but also due to the use of construction equipment. This impact is seen as transient and is unlikely to increase the ambient noise level as the site is located some distance from the nearest landowners/ developments. The impact of the project on noise therefore does not warrant a specialist noise impact assessment.

During the operational phase very little noise will be generated as a result of the operation of the PV Power Plant. This will mainly relate to minimal vehicle activity. However, the power lines are likely to generate a low hissing noise, known as corona. This noise will vary depending on the weather conditions and in dry conditions; the noise level is highly unlikely to be higher than the usual ambient noise level in the environment. In addition, the inverters may also generate a minimal amount of noise but not to a significant degree.

12 Water Use

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

Municipal √ Sedibeng Water	water board	groundwater	river, stream, dam or lake	Other	the activity will not use water

Water supply will link into the existing water pipeline that runs through the property. The estimated water use is approximately 2m³ per day.

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:	Approximately 2m³ per day
Does the activity require a water use permit from the Department of Water Affairs?	**YES √**

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.

A wetland is located to the north of the site which falls within 500m of the delineated wetland area. According to the National Water Act (No. 36 of 1998) the proposed activity is subject to a water use license under Section 21 in terms of water uses 21 (c) and 21 (i). However, it is important to state that a water use license application for the site will be undertaken in conjunction with the larger CSP and PV EIA for the property which will cover all the necessary water uses for the property as a whole. The water use license application is to be submitted to the Department of Water Affairs imminently. Once submitted, this can be forwarded to the Department at request.

13 Energy Efficiency

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

The PV Solar Power Plant will operate by using energy generated by the activity which is being applied for. Hence, the proposed development will be energy self sufficient and efficient.

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

The proposed development will function off PV Panels supplied by renewable energy, and is in itself an alternative energy source to coal fired energy.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:
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.

The proposed development will take place on a single portion of land that is approximately 20ha in extent within the greater farm boundary of Farm 267 (Arriesfontein). The proposed development footprint will however, be less than 20ha. As a single portion will be used for the proposed development, this section is only completed once.

Section C Copy No. (e.g. A): [redacted]

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

2. Has a specialist been consulted to assist with the completion of this section? **YES √** [redacted]

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.

A Declaration of Interest for each specialist is included in Appendix G7 and all specialist reports are included in Appendix D.

Property description/physical address:	Farm 267, Kimberley, Northern Cape. (Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application. 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:	Agricultural

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)

An A3 Locality Map is included in Appendix A.

1 Gradient of the Site

Indicate the general gradient of the site.

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:

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

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:
Shallow water table (less than 1.5m deep)	**NO √**
Dolomite, sinkhole or doline areas	**NO √**
Seasonally wet soils (often close to water bodies)	**NO √**
Unstable rocky slopes or steep slopes with loose soil	**NO √**
Dispersive soils (soils that dissolve in water)	**NO √**
Soils with high clay content (clay fraction more than 40%)	**NO √**
Any other unstable soil or geological feature	**NO √**
An area sensitive to erosion	**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).

A specialist soils and agricultural potential study was undertaken by Agriculture Research Council – Institute for Soil, Climate and Water in addition to a specialist wetlands study undertaken by Wetland Consulting Services as well as a Biodiversity study undertaken by Bathusi Environmental Consulting is included in Appendix D3 , D2 and D1 respectively.

4 Groundcover

Indicate the types of groundcover present on the site:

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 infestationE	Veld dominated by alien species^{E}	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

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.

A specialist biodiversity (flora and fauna) study was undertaken by Bathusi Environmental Consulting and is included in Appendix D3.

5 Land use Character of Surrounding Area

Indicate land uses and/or prominent features that currently occurs 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 √ - Natural habitat and vegetation will need to cleared and

protected tree species may need to be removed. A plant removal permit will be required Northern Cape Department of Environment and Nature Conservation (NCDENC) and the Department of Agriculture, Forestry and Fisheries (DAFF) where protected tree species have been identified.

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 √ - In terms of agricultural potential, the soils have been classified as having low potential for crop irrigation and low for grazing potential. Impact is likely to be minimal.

5.34 River, stream or wetland √ - A wetland is located to the north of the proposed development. The wetland was delineated and a buffer zone of

50m was applied. Importantly, the wetland and associated 50m buffer zone falls outside of the proposed development area. Hence, environmental authorization is not required in terms of Activity 18 GN. 544 Listing Notice 1. However, the proposed development does fall within 500m of the delineated wetland area. According to the National Water Act (No. 36 of 1998) the proposed activity is subject to a water use license under Section 21 in terms of water uses 21 (c) and 21 (i). This will be applied for the proposed development.

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
5.42 Other land uses (describe)

If any of the boxes marked with an "N "are ticked, how will this impact / 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:

n/a

The proposed development site is located in a natural area and not in close proximity to any

developments or dense human settlements.

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?	**NO √**
If YES, explain:	n/a

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.

A specialist heritage and archaeological study was undertaken by PGS and is included in Appendix D4.	
Briefly explain the findings of the specialist:	The Heritage Impact Assessment (HIA) has shown that the study area has a rich history of occupation from the Stone Age with hunter gatherers to the Thlaping and Thlaro during the Iron Age period. The 1800's saw the rise of the Griqua people in the area and their loss of sovereignty after 1880 to Cape rule and the South African War at the turn of the century of 1900, which all adds to the richness of the heritage landscape. The field work that feeds into the HIA has utilised the findings of the archival research as a guideline. No heritage resources were identified in the study area. The Heritage Impact Assessment is included in Appendix D5.

Will any building or structure older than 60 years be affected in any way?	**NO √**
n/a	

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	**NO √**
n/a	

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

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

(a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—

- (i) the site where the activity to which the application relates is or is to be undertaken; and
- (ii) any alternative site mentioned in the application;

(b) giving written notice to—

- (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
- (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
- (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
- (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
- (v) the municipality which has jurisdiction in the area;
- (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
- (vii) any other party as required by the competent authority;

(c) placing an advertisement in—

- (i) one local newspaper; or
- (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;

(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and

(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—

- (i) illiteracy;
- (ii) disability; or
- (iii) any other disadvantage.

Public Participation Process

Having submitted the application forms for the proposed development to the Department of Environmental Affairs (11th January 2012), the DEA and NEAS reference numbers were obtained and the public participation process was initiated in January 2012. The following reference numbers were received:

NEAS Reference Number	**DEA/EIA/0000922/2012**
DEA Reference Number	**14/12/16/3/3/1/428**

The public participation activities undertaken for the proposed development are outlined in the table below.

Activity	**Date**
BA Notification Newspaper Advertisements: ▪ Kalahari Bulletin ▪ Diamond Fields Advertiser	 9th February 2012 10th February 2012
Erecting Site Notices	29th February 2012
BID distributed (English and Afrikaans, BID distributed by email to I&AP's on the database and by hand to local communities)	29th February 2012
Public Availability of DBAR (30 Day Review Period) and Invitation to Public Meetings\Key Stakeholder Workshops Newspaper Advertisements: ▪ Kalahari Bulletin ▪ Kalahari Bulletin	 5th April 2012 10th May 2012

The 30 day public review period took place from Wednesday the 11th April until Monday the 14th May 2012. Advertisements were placed in the Kalahari Bulletin on Thursday the 5th of April 2012 notifying the public of the availability of the draft Basic Assessment Report. Public notices were erected to inform the public of the availability of the draft Basic Assessment report. The draft Basic Assessment report was made available at the Postmasburg Public Library from Wednesday the 11th April until Monday the 14th May 2012.

The dates for the Public Meeting and the Key Stakeholder Workshop were arranged for the 2nd May 2012 and the 3rd May 2012 respectively. The Public Meeting was held at the Postmasburg City Hall and took place from 17:00pm to 19:00pm. The Key Stakeholder Workshop was held at the Flamingo Casino near Kimberley and took place from 11:00am to 13:00pm.

Due to the non-attendance of both the aforementioned Public Meeting and Key Stakeholder Workshop, it was deemed appropriate to undertake another round of meetings closer to the proposed development in Daniëlskuil. Another Public Meeting was therefore arranged closer to the proposed development site in Daniëlskuil at the Daniëlskuil High School and held on the 17th May 2012 which took place from 18:00pm to 20:00pm. Additionally, a focus group meeting (FGM) was arranged for the surrounding landowners at 325 Garden Street. The FGM was held on the 17th May 2012 and took place from 10:00am to 12:00am. Finally, a FGM was held with the Kgatelopele Local Municipality on the 17th May 2012. The municipal FGM took place at the Daniëlskuil City Hall and took place from 14h00 to 15h00.

A thorough public participation process has been undertaken to date to involve I&AP's as well as key stakeholders in the proposed project. Notifications (phone calls, invites, emails and sms's for the key stakeholder workshop and two public meetings and two focus group meetings have been sent to the relevant I&AP's and key stakeholders.

Please refer to Appendix E for Site Notices, Advertisements, Advert tearsheets, Proof of Site Notices, Background Information Documents (BID), Interested and Affected Parties (I&AP) Database and proof of Correspondence to and from all I&APs..

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 the manner in which and the person to whom representations in respect of the application may be made.

Please refer to Appendix E for Site Notices, Advertisements, Advert tearsheets, Proof of Site Notices, Background Information Documents (BID) and Interested and Affected Parties (I&AP) Database.

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.

Please refer to Appendix E for Site Notices, Advertisements, Advert tearsheets, Proof of Site Notices, Background Information Documents (BID) and Interested and Affected Parties (I&AP) Database.

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.

It was determined that one (1) Key Stakeholder Workshop, two (2) Public Meetings and two (2) Focus Group Meetings were sufficient for the public participation process for this proposed development.

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.

The Comments and Response Report (C&RR) is included in Appendix E5.

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.

A database of all organs of state / authorities consulted during the BA process is included in Appendix E7.

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:

National / Provincial Authorities:

- Department of Environmental Affairs (DEA)
- Northern Cape Provincial Government Department of Environment and Nature Conservation (NCPG DENC)
- Department of Water Affairs (DWA)
- Northern Cape Department of Agriculture and Land Reform (DALR)
- Northern Cape Department of Economic Development (DED)
- Department of Agriculture, Forestry and Fisheries (DAFF)
- Department of Roads and Public Works (DRPW)
- Provincial Heritage Resources Authority – Northern Cape
- South African Heritage Resource Authority (SAHRA)

Local Authorities:

- Kgatelopele Local Municipality (KLM)
- Siyanda District Municipality (SDM)

Parastatals / Organs of State

- Eskom
- Telkom
- Square Kilometer Array
- Air Traffic and Navigation Services (ATNS)
- SA Civil Aviation Authority (SACAA)
- Transnet Freight Rail
- South African National Roads Agency (SANRAL – Western Region)

NGO's / Other Entities

- Birdlife South Africa
- Endangered Wildlife Trust (EWT)
- Wildlife and Environmental Society of South Africa (WESSA)

List of authorities from whom comments have been received:

No official comments in terms of the proposed development and the draft Basic Assessment Report have been received as yet. Any comments received during the Department of Environmental Affairs review period of the FBAR will be forwarded to the Department.

Details of correspondence received from Authorities / Organs of State are included in Appendix E5 and proof thereof in Appendix E4.

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?	NO √

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

The initial 30 day public review and comment period took place from 11th April 2012 to the 14th May 2012. However, it was required that additional public participation was required. Hence, the public review and comment period was extended to the 21st May 2012.

Despite the extension of the public comment and review period, no official comments in terms of the proposed development and the draft Basic Assessment Report have been received as yet from any stakeholders. Any comments received during the Department of Environmental Affairs review period of the FBAR will be forwarded to the Department.

Full details of the correspondence received to date are included in Appendix E5 and proof thereof in Appendix E4.

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.

In line with the EIA Regulations this impact assessment takes into account the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- planning
- construction
- operation
- decommissioning (if required)

Where necessary, the proposal for mitigation or optimisation of a positive impact is detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

- **Rating System Used To Classify Impacts**

The rating system applied to the potential impact on the receiving environment includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into one rating. Table 2 below outlines the criteria used for assessing the significance of each issue (including an allocated point system).

Table 2: Rating System

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	International and National	Will affect the entire country
2	Province/region	Will affect the entire province or region
3	Local/district	Will affect the local area or district
4	Site	The impact will only affect the site

PROBABILITY		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Irreversible	The impact is irreversible and no mitigation measures exist.
2	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
3	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
4	Completely reversible	The impact is reversible with implementation of minor mitigation measures
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will

		be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible Cumulative Impact	The impact would result in negligible to no cumulative effects
2	Low Cumulative Impact	The impact would result in insignificant cumulative effects
3	Medium Cumulative impact	The impact would result in minor cumulative effects
4	High Cumulative Impact	The impact would result in significant cumulative effects
INTENSITY / MAGNITUDE		
Describes the severity of an impact		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).

3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

SIGNIFICANCE

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.

The summation of the different criteria will produce a non weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.

74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

1 Issues Raised by Interested and Affected Parties

List the main issues raised by interested and affected parties.

I&AP / Stakeholder	Date Received	Summary of Comments
Mr. Johan Visser Adjoining landowner	11th May 2012	Several Issues were raised by Mr. Visser which include the following: • Number of construction workers expected during construction; • Number of permanent staff during operation; • Expected trend of movement of permanent staff during operation; • Safety of farm workers and surrounding occupants during the construction and operation phase; • Expected water use quantity; • Duration including the environmental application process until construction commences; • Criteria used to select the proposed development site; • Queried whether drilling was taking place for the proposed development; • Location of accommodation for construction workers; • How will cattle or game theft

		be dealt with.
Gerrit Niewoudt Adjoining landowner Constantia Safaris	17th May 2012	Concern and comments were expressed in terms of the proposed development in light of the following: • Security and safety; • Advantages that surrounding landowners could expect from the proposed development; • Traffic volumes and safety.
Johan Hattingh Surrounding landowner	17th May 2012	Several comments were made. These include the following: • Would the site be rehabilitated should the site be decommissioned; • Would re-cycled water be used for cleaning the panels; • Would dust from the surrounding mines impact on the PV panels.
Kobus Gous	17th May 2012	Concern was expressed about the quantity and source of water to be used for the proposed development in relation to water resources becoming more limited in the region.

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 Appendix E):

Full details of the comments submitted and responses from the practitioner to all the issues and comments raised are contained in the Comments and Response Report which is included in Appendix E5.

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.

The proposed development will occupy the majority of the site in both instances for the preferred and second alternative site layouts. The environmental impacts are highly identical in many respects and are summarised below according to each environmental aspect. The impact of the proposed developed on the biophysical and social environment are indicated as well as the constraints that the environment will impose on the development.

2(a) Biodiversity

A Biodiversity Impact Assessment was conducted by Bathusi Environmental Consulting and is included in Appendix D1.

The study area is representative of the regional vegetation type which is described as Ghaap Plateau Vaalbosveld. A total of 89 plant species were recorded during the field investigations. The vegetation on the study site comprises a dominant shrub/ tree layer and a diverse herbaceous layer. The following macro habitat types were verified by fieldwork:

- Natural Woodland Habitat, including (*Searsia lancea*) Open Woodland; (*Tarchonanthus camphoratus*) Closed Shrubveld; and
- Endorheic Pans.

A total of 80 animal species was recorded during the site investigation. None were Red Data species. It is estimated that 73 of the 96 Red Data animal species of the Northern Cape have a low probability of occurring in the study area, 12 have a moderate-low probability, 6 a moderate probability, 3 a moderate-high and 2 species a high probability of occurring in the study area. Potential impacts identified for flora include:

1. Direct impacts on flora species of conservation importance;
2. Loss or degradation of natural vegetation, sensitive or protected habitat;
3. Loss/ degradation of surrounding habitat;
4. Impacts on SA's conservation obligations & targets;
5. Increase in local and regional fragmentation/ isolation of habitat; and
6. Increase in environmental degradation, pollution (soils, surface water).

Potential impacts identified for fauna include:

1. Direct impacts on Red Data fauna species;
2. Loss or Degradation of natural faunal habitat & in surrounding areas;
3. The disruption of ecological connectivity and migration routes of larger, flightless animals as well as territorial infringement; and
4. Direct impacts on common fauna species & interactions with structures & personnel.

Low but negative potential impacts were evaluated for the various impacts during the construction, operation, decommissioning phases to flora and fauna. The following protected tree species however, are present in the study area:

1. *Acacia erioloba*; and
2. *Olea europaea* subsp. *Africana*

Construction Phase Impacts

Table 3: Impact rating table for direct impacts (loss) of flora species of conservation importance

Environmental Parameter	**Direct impacts (loss) of flora species of conservation importance**	
Issue/Impact/Environmental Effect/Nature	Impacts on flora species of conservation importance	
Extent	Impact will be local, effect is regional	
Probability	Definite, protected trees are known to occur on the site	
Reversibility	Moderately reversible, additional trees can be planted,	
Irreplaceable loss of resources	Marginal, these species occur extensively on a regional scale	
Duration	Species are likely to re-establish subsequent to decommissioning	
Cumulative effect	Developments in the immediate surround will have similar impacts	
Intensity/magnitude	Local extent renders this impact of a low intensity	
Significance Rating	Mitigation measures will not prevent the impact, only ameliorate on a local scale	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	3	3
Irreplaceable loss	2	1
Duration	3	3
Cumulative effect	2	1
Intensity/magnitude	-3	-2
Significance rating	-48 (Medium negative)	-28 (Low negative)
Mitigation measures	Contain impacts to development site, satisfy legal requirements pertaining to removal of protected plants	

Table 4: Impact rating table for loss, degradation of natural habitat, vegetation, sensitive or protected habitat

Environmental Parameter	**Loss, degradation of natural habitat, vegetation, sensitive or protected habitat**	
Issue/Impact/Environmental Effect/Nature	Surface clearance will result in irreversibly changes to vegetation	
Extent	Restricted to site	
Probability	Definite, no mitigation possible	
Reversibility	Irreversible, vegetation will not revert to original status	
Irreplaceable loss of resources	Marginal, similar habitat present in surrounding area	
Duration	Permanent, vegetation will not revert to original status	
Cumulative effect	Moderate, similar developments in surrounding areas	
Intensity/magnitude	Moderate, site relative small	
Significance Rating	Mitigation measures will not prevent the impact, cumulative impacts important	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	4
Reversibility	4	4
Irreplaceable loss	2	2
Duration	4	4
Cumulative effect	3	3
Intensity/magnitude	-2	-2
Significance rating	-36 (Medium negative)	-36 (Medium negative)
Mitigation measures	Contain impacts to development site, ensure that nearby sensitive areas are adequately protected	

Table 5: Impact rating table for loss, degradation of surrounding habitat

Environmental Parameter	**Loss/ degradation of surrounding habitat**	
Issue/Impact/Environmental Effect/Nature	Peripheral impacts spilling into adjacent areas	
Extent	Restricted to site and immediate surrounds	
Probability	Likely, any development results in peripheral impacts on adjacent areas	
Reversibility	Moderate/ high, impacts can be prevented and contained	
Irreplaceable loss of resources	Low, impacts generally of low status	
Duration	Ceases with the cessation of operation	
Cumulative effect	Moderate, similar developments in surrounding areas	
Intensity/magnitude	Low, site relative small	
Significance Rating	Mitigation measures cannot prevent the impact	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	2

Reversibility	3	2
Irreplaceable loss	2	1
Duration	3	2
Cumulative effect	2	1
Intensity/magnitude	-2	-1
Significance rating	-28 (Low negative)	-9 (Low negative)
Mitigation measures	Contain impacts to development site, monitoring of boundaries, ensuring adequate protection for surrounding areas	

Table 6: Impact rating table for impacts on South African conservation obligations and targets

Environmental Parameter	**Impacts on SA's conservation obligations & targets**	
Issue/Impact/Environmental Effect/Nature	Loss of vegetation of conservation status (Griqualand West CoE)	
Extent	Restricted to site and immediate surrounds	
Probability	Definite	
Reversibility	Irreversible, vegetation does not revert to original status	
Irreplaceable loss of resources	Low, site relative small	
Duration	Permanent, habitat does not revert to original status	
Cumulative effect	Moderate, similar developments in surrounding areas	
Intensity/magnitude	Low, site relative small	
Significance Rating	Mitigation measures cannot prevent the impact	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	4	4
Irreplaceable loss	2	2
Duration	4	4
Cumulative effect	2	2
Intensity/magnitude	-2	-2
Significance rating	-36 (Medium negative)	-36 (Medium negative)
Mitigation measures	Ensure that impacts are contained to the development site, avoid unnecessary roads and linear infrastructure	

Table 7: Impact rating table for increase in local / regional fragmentation / isolation of habitat

Environmental Parameter	**Increase in local / regional fragmentation / isolation of habitat**
Issue/Impact/Environmental Effect/Nature	Loss of untransformed habitat, fragmentation & isolation of uninterrupted habitat
Extent	Restricted to site and immediate surrounds
Probability	Definite
Reversibility	Moderately reversible, subclimax vegetation develops subsequent to decommissioning
Irreplaceable loss of resources	Low, site relative small

Duration	For duration of development	
Cumulative effect	Moderate, similar developments in surrounding areas	
Intensity/magnitude	Low, site relative small	
Significance Rating	Moderate	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	3	3
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	2	2
Intensity/magnitude	-2	-1
Significance rating	-32 (Medium negative)	-16 (Low negative)
Mitigation measures	Implement correct rehabilitation to ensure development of suitable vegetation cover, avoid unnecessary roads and linear infrastructure	

Table 8: Impact rating table for increase in environmental degradation, pollution

Environmental Parameter	**Increase in environmental degradation, pollution**	
Issue/Impact/Environmental Effect/Nature	Degradation of nearby sensitive habitat types	
Extent	Restricted to site and immediate surrounds	
Probability	Highly likely, numerous impacts occur during construction phase	
Reversibility	Moderate/ high, impacts can be rehabilitated	
Irreplaceable loss of resources	Low, impacts usually restricted to site and surrounds	
Duration	Short, impacts can be rehabilitated within short periods	
Cumulative effect	Low/ moderate, number and magnitude of incidences will determine	
Intensity/magnitude	Low, impacts usually restricted to site and surrounds	
Significance Rating	Low	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	4	3
Reversibility	2	2
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	2	1
Intensity/magnitude	-2	-1
Significance rating	-24 (Low negative)	-9 (Low negative)
Mitigation measures	Ensure that impacts are contained to the development site, develop protocol for handling incidences that threatens nearby areas	

Operational and Maintenance Phase Impacts

Table 9: Impact rating table for loss, degradation of natural habitat, vegetation, sensitive or protected habitat

Environmental Parameter	**Loss, degradation of natural habitat, vegetation, sensitive or protected habitat**	
Issue/Impact/Environmental Effect/Nature	Operational issues could result in impacts on protected species located nearby	
Extent	Restricted to site and immediate surrounds	
Probability	Moderate possibility of occurring	
Reversibility	Irreversible	
Irreplaceable loss of resources	Potential loss of some protected trees	
Duration	Likely to be limited to operational lifespan	
Cumulative effect	Marginal, effects limited to immediate surrounds	
Intensity/magnitude	Low, only some individuals potentially affected	
Significance Rating	Low/ moderate	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	3
Reversibility	2	2
Irreplaceable loss	2	1
Duration	3	1
Cumulative effect	2	1
Intensity/magnitude	-2	-1
Significance rating	-26 (Low negative)	-9 (Low negative)
Mitigation measures	Ensure that peripheral impacts do not spread to adjacent areas	

Table 10: Impact rating table for loss, degradation of surrounding habitat

Environmental Parameter	**Loss/ degradation of surrounding habitat**	
Issue/Impact/Environmental Effect/Nature	Surrounding sensitive habitat could potentially be affected	
Extent	Largely restricted to immediate surrounds	
Probability	Moderate possibility due to peripheral impacts of development	
Reversibility	Depends on nature and extent of impact	
Irreplaceable loss of resources	Moderate, surrounding habitat might be highly sensitive	
Duration	Could potentially be permanent	
Cumulative effect	Moderate, similar developments in surrounds	
Intensity/magnitude	Moderate/ low, impacts can be prevented	
Significance Rating	Moderate	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	2
Reversibility	2	2

Irreplaceable loss	2	2
Duration	4	3
Cumulative effect	2	1
Intensity/magnitude	-3	-2
Significance rating	-45 (Medium negative)	-22 (Low negative)
Mitigation measures	Ensure that peripheral impacts do not spread to adjacent areas	

Table 11: Impact rating table for increase in environmental degradation, pollution

Environmental Parameter	**Increase in environmental degradation, pollution**	
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to degradation/ pollution of the environment	
Extent	Site/ local, depending on the nature and extent of the impact	
Probability	Low, severe impacts can generally be avoided through proper mitigation	
Reversibility	Moderate/ low, depending on the nature and extent of the impact	
Irreplaceable loss of resources	Low/ moderate depending on the nature and extent of the impact	
Duration	Permanent/ temporary, depending on the nature and extent of the impact	
Cumulative effect	Moderate, regional impacts are constantly increasing	
Intensity/magnitude	Moderate, depending on the nature and extent of the impact	
Significance Rating	Moderate/ low	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	2
Reversibility	2	1
Irreplaceable loss	2	1
Duration	3	2
Cumulative effect	2	2
Intensity/magnitude	-2	-1
Significance rating	-28 (Low negative)	-9 (Low negative)
Mitigation measures	Ensure that peripheral impacts do not spread to adjacent areas, monitoring of suitable aspects	

Closure and Decommissioning Phase Impacts

Table 12: Impact rating table for loss / degradation of surrounding habitat

Environmental Parameter	**Loss / degradation of surrounding habitat**	
Issue/Impact/Environmental Effect/Nature	Rehabilitation/ residual impacts could lead to impacts in surrounding areas	
Extent	Local, peripheral impacts	
Probability	Low, impacts are generally benign	
Reversibility	Moderate/ high, depending on the nature and extent of the impact	
Irreplaceable loss of resources	Low, impacts are generally benign	
Duration	Moderate, short	
Cumulative effect	Low, impacts are generally benign	
Intensity/magnitude	Low, impacts are generally benign	
Significance Rating	Low	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	2	1
Reversibility	2	1
Irreplaceable loss	2	1
Duration	3	2
Cumulative effect	2	1
Intensity/magnitude	-1	-1
Significance rating	-13 (Low negative)	-7 (Low negative)
Mitigation measures	Ensure the implementation of proper rehabilitation procedures	

Table 13: Impact rating table for increase in environmental degradation, pollution

Environmental Parameter	**Increase in environmental degradation, pollution**	
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to degradation/ pollution of the environment	
Extent	Site/ local, depending on the nature and extent of the impact	
Probability	Low, severe impacts can generally be avoided through proper mitigation	
Reversibility	Moderate/ low, depending on the nature and extent of the impact	
Irreplaceable loss of resources	Low/ moderate depending on the nature and extent of the impact	
Duration	Permanent/ temporary, depending on the nature and extent of the impact	
Cumulative effect	Moderate, regional impacts are constantly increasing	
Intensity/magnitude	Moderate, depending on the nature and extent of the impact	
Significance Rating	Moderate/ low	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1

Probability	2	1
Reversibility	2	1
Irreplaceable loss	2	1
Duration	2	2
Cumulative effect	2	1
Intensity/magnitude	-2	-1
Significance rating	-24 (Low negative)	-7 (Low negative)
Mitigation measures	Ensure the implementation of proper rehabilitation procedures	

Cumulative Impacts

When evaluating the cumulative effect of the project, the proposed established of a 3 x 75MW PV and 1 x 100MW CSP Solar Park on Farm 267 Arriesfontein by SolarReserve was taken into account in the impact rating tables above. Please refer to the tables above for cumulative impact ratings.

2(b) Surface Water Impact

A Wetlands Assessment was conducted by Wetland Consulting Services (Pty) Ltd and is included in Appendix D2.

Approximately 5.5 % of the Farm 267 (Arriesfontein) was classified as wetland, with most of the wetland areas consisting of shallow, ephemeral pans. A total of 12 pans, ranging in size from 0.1 ha to over 23 ha in size, were identified. In addition to the pans a small drainage line and associated seepage area, as well as a natural spring were delineated.

Importantly, no wetlands were identified within the PV study area, though a pan is located immediately to the north of the site. The proposed development site falls outside the delineated wetland areas as well as outside the 50m buffer zone. No loss of wetland habitat is thus expected.

The following potential impacts are anticipated for various phases of the proposed development:
Planning Phase:

- No impacts to the wetlands are expected during the planning phase (this is based on the assumption that the planning phase will not involve the establishment of any infrastructure, even temporary, on site and that only existing access routes to the site will be utilised for site visits and preliminary studies).

Construction Phase:

- Loss of wetland habitat;
- Increased sediment movement into the wetlands on site;
- Water quality deterioration; and

- Disturbance to wetland habitat and fauna.

Operational Phase:

- Increased water inputs to the wetlands (altered hydroperiod);
- Stormwater discharge;
- Waste water discharge; and
- Disturbance to wetland habitat and fauna.

Decommissioning Phase:

- Increased sediment movement into the wetlands on site;
- Water quality deterioration; and
- Disturbance to wetland habitat and fauna.

Construction Phase Impacts

Table 14: Rating of impacts for increased sedimentation

Environmental Parameter	**Increased sedimentation**	
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to increased sedimentation	
Extent	Site	
Probability	Probable	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resources	
Duration	Medium Term	
Cumulative effect	Medium cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Low negative	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	2	2
Cumulative effect	2	2
Intensity/magnitude	3	2
Significance rating	-26 (Low negative)	-22 (Low negative)
Mitigation measures	Major vegetation clearing activities and earthworks should be undertaken during the dry season as far as practically possible. The footprint of vegetation clearing should be limited to the direct footprint of the proposed developments and should be phased where possible. The construction servitude should be fenced off prior to the commencement of construction activities and all construction activities should be limited to this servitude.	

	Where possible vegetation clearing should be limited to removal of trees and shrubs only (if required), with the grass layer maintained as far as possible. Should it be necessary to remove the grass layer, grass cover should be re-established as soon as possible following completion of construction. Access roads and construction roads should include regular low level humps to slow down stormwater flow and direct stormwater off the road surfaces and into adjacent vegetation at regular intervals to minimise erosive energy of stormwater runoff. Stormwater infrastructure should include sediment traps.

Table 15: Rating of impacts for water quality deterioration.

Environmental Parameter	**Water Quality Deterioration**	
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to water quality deterioration	
Extent	Site	
Probability	Probable	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resources	
Duration	Medium Term	
Cumulative effect	Medium cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Low negative	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	2	2
Cumulative effect	2	2
Intensity/magnitude	3	2
Significance rating	-26 (Low negative)	-22 (Low negative)
Mitigation measures	All potentially polluting and hazardous substances used and stored on site should be stored in clearly demarcated areas. Storage areas for diesel, oil and other polluting substances must have adequate spillage containment measures to contain any spills within the direct area of the spill. Ideally, all potentially polluting substances should be stored in bunded areas of sufficient capacity to contain the full volume plus 10% of the storage containers. All re-fuelling areas and workshops should make use of drip	

	trays to capture fuel and oil spills during re-fuelling or during vehicle maintenance and repairs. Stormwater should be diverted around the storage areas of polluting substances to prevent contamination of clean stormwater. Sufficient quantities of spill clean-up materials (e.g. Drizit or Spillsorb) should always be available on site. Once used, absorbent material and contaminated soil should be disposed of at a registered hazardous waste disposal site. The following guidelines apply to the use of polluting substances on site, and specifically to the use of cement and concrete: • Carefully control all on-site operations that involve the use of cement and concrete. • Limit cement and concrete mixing to single sites where possible. • Use plastic trays or liners when mixing cement and concrete: Do not mix cement and concrete directly on the ground. • Dispose of all visible remains of excess cement and concrete after the completion of tasks. Dispose of in the approved manner (solid waste concrete may be treated as inert construction rubble, but wet cement and liquid slurry, as well as cement powder must be treated as hazardous waste)

Table 16: Rating of impacts for disturbance to wetland habitat and fauna

Environmental Parameter	**Disturbance to Wetland Habitat and Fauna**	
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to disturbance of wetland habitat and fauna	
Extent	Site	
Probability	Definite	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Significant loss of resources	
Duration	Medium Term	
Cumulative effect	Medium cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Medium negative	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	4
Reversibility	2	2
Irreplaceable loss	3	3

Duration	2	2
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	-30 (Low negative)	-28 (Low negative)
Mitigation measures	The proposed development footprint as well as the footprint of any temporary infrastructure (including construction camps) should be fenced off and all activities restricted to these areas. Staff should receive training and awareness education on the value of the natural environment and the need for protection of the environment. Ideally staff numbers on site should be limited during non-working hours through offsite staff housing to prevent illegal hunting etc. due to boredom. It is recommended that a veld management plan be compiled by a suitable specialist for management of all areas falling outside the proposed development footprints.	

Operational and Maintenance Phase Impacts

Table 17: Rating of impacts for increased water inputs

Environmental Parameter	**Increased water inputs**	
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to increased water inputs	
Extent	Site	
Probability	Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resources	
Duration	Long Term	
Cumulative effect	Low cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Low negative	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	2	1
Reversibility	2	2
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	2	2
Intensity/magnitude	2	2
Significance rating	-24 (Low negative)	-22 (Low negative)
Mitigation measures	No discharge of any treated or untreated water may take place on site unless authorised by the DWA. Water infrastructure should be regularly monitored to prevent any leakages. Leaks should be fixed immediately. Washing of heliostats should be limited to minimise water consumption. The increased soil moisture due to washing of heliostats and PV arrays is likely to encourage establishment of grass under the PV arrays and thus limit erosion during storm events and could thus be seen as a positive impact.	

Table 18: Rating of impacts for stormwater discharge

Environmental Parameter	**Stormwater Discharge**	
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to stormwater discharge	
Extent	Site	
Probability	Definite	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resources	
Duration	Long Term	
Cumulative effect	Medium cumulative effect	
Intensity/magnitude	High	
Significance Rating	Medium negative	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	1
Reversibility	2	2
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	2	1
Intensity/magnitude	3	1
Significance rating	-42 (Medium negative)	-22 (Low negative)
Mitigation measures	A detailed stormwater management plan must form part of the proposed development plan. The direct infiltration of rainwater into the soil should be encouraged to minimise generation of stormwater. Engineering safety standards for stormwater management on dolomitic areas must be complied with. No direct discharge of stormwater into any of the pans on site should be allowed. Possibilities of storing and re-using stormwater should be considered and investigated. Stormwater discharge points must be suitably protected against erosion through use of for example reno mattresses, energy dissipaters etc.	

Table 19: Rating of impacts for wastewater discharge

Environmental Parameter	**Wastewater Discharge**
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to wastewater discharge
Extent	Site
Probability	Definite
Reversibility	Partly reversible
Irreplaceable loss of resources	Marginal loss of resources

Duration	Long Term	
Cumulative effect	Medium cumulative effect	
Intensity/magnitude	High	
Significance Rating	Medium negative	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	1
Reversibility	2	2
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	2	1
Intensity/magnitude	3	1
Significance rating	-42 (Medium negative)	-22 (Medium negative)
Mitigation measures	A zero discharge policy with regards to discharge of waste water on site wastewater should be implemented. It has been indicated that during the construction phase portable loo's will be utilized and that during the operational phase the wastewater will be disposed of via municipal wastewater systems.	

Table 20: Rating of impacts for disturbance to wetland habitat and fauna

Environmental Parameter	**Disturbance to Wetland Habitat and Fauna**	
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to disturbance to wetland habitat and fauna	
Extent	Site	
Probability	Probable	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resources	
Duration	Long Term	
Cumulative effect	Medium cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Low negative	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	-28 (Low negative)	-24 (Low negative)
Mitigation measures	The proposed development footprint should be fenced off and all activities restricted to these areas. Staff should receive training and awareness education on the value of the natural environment and the need for protection of the environment. Ideally staff numbers on site should be limited during non-	

	working hours through offsite staff housing to prevent illegal hunting etc. due to boredom. It is recommended that a veld management plan be compiled by a suitable specialist for management of all areas falling outside the proposed development footprints.

Closure and Decommissioning Phase Impacts

Table 21: Rating of impacts for increased sediment movement

Environmental Parameter	**Increased Sediment Movement**	
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to disturbance to wetland habitat and fauna	
Extent	Site	
Probability	Probable	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resources	
Duration	Medium Term	
Cumulative effect	Medium cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Low negative	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	2	2
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	-26 (Low negative)	-22 (Low negative)
Mitigation measures	Major infrastructure clearing activities and earthworks should be undertaken during the dry season as far as practically possible. The footprint of decommissioning activities should be limited to the direct footprint of the proposed developments. All disturbed areas should be re-vegetated as soon as possible following decommissioning. A detailed monitoring plan should be compiled and implemented to ensure the success on re-vegetation and other rehabilitation activities.	

Table 22: Rating of impacts for water quality deterioration

Environmental Parameter	**Water Quality Deterioration**	
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to water quality deterioration	
Extent	Site	
Probability	Probable	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resources	
Duration	Medium Term	
Cumulative effect	Medium cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Low negative	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	2	2
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	-26 (Low negative)	-22 (Low negative)
Mitigation measures	All potentially polluting and hazardous substances used and stored on site should be stored in clearly demarcated areas. Storage areas for diesel, oil and other polluting substances must have adequate spillage containment measures to contain any spills within the direct area of the spill. Ideally, all potentially polluting substances should be stored in bunded areas of sufficient capacity to contain the full volume plus 10% of the storage containers. All re-fuelling areas and workshops should make use of drip trays to capture fuel and oil spills during re-fuelling or during vehicle maintenance and repairs. Sufficient quantities of spill clean-up materials (e.g. Drizit or Spillsorb) should always be available on site. Once used, absorbent material and contaminated soil should be disposed of at a registered hazardous waste disposal site. During the decommissioning phase all solid waste must be removed from site. Any contaminated soil must also be removed and disposed off in a suitably register landfill facility.	

Table 23: Rating of impacts for disturbance of wetland habitat and fauna

Environmental Parameter	**Wetland Habitat and Fauna**	
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to wetland habitat and fauna	
Extent	Site	
Probability	Definite	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Significant loss of resources	
Duration	Medium Term	
Cumulative effect	Medium cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Medium negative	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	2
Reversibility	2	2
Irreplaceable loss	3	2
Duration	2	2
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	-26 (Low negative)	-22 (Low negative)
Mitigation measures	The proposed development footprint as well as the footprint of any temporary infrastructure (including construction camps) should be fenced off and all activities restricted to these areas. Staff should receive training and awareness education on the value of the natural environment and the need for protection of the environment. Ideally staff numbers on site should be limited during non-working hours through offsite staff housing to prevent illegal hunting etc. due to boredom. It is recommended that a veld management plan be compiled by a suitable specialist for management of all areas falling outside the proposed development footprints.	

Cumulative Impact

Although the proposed Arriesfontein Phase 2 PV development in itself will not result in any direct impacts to the wetlands on site and will not contribute to any wetland loss, the Phase 2 PV development forms part of the overall development plan for the Farm Ariesfontein which includes the development of a CSP Plant and associated heliostat field, as well as extensive additional PV arrays. Taken together, these developments will result in the permanent transformation and loss of approximately 46.5 ha of wetland habitat. Pans form a common feature of the landscape in the area, with more than 700 pans occurring within a 20km radius of the site. Loss of the 4 pans falling within the greater development footprint of the Farm Ariesfontein thus represents well less than 1 % of the pans within a 20km radius. However, the importance of the pans in terms of biodiversity support lies in the collective habitat provided by all of the pans taken together, and not so much the individual pans. This is especially important in the case of mobile species such

as waterfowl that will move between pans as the habitat within the individual pans changes in response to the irregular and localized rainfall patterns of the area.
As such, the cumulative impact on wetlands of the proposed developments on the Farm Ariesfontein is considered to be of Moderate significance, given that the overall impact on wetlands of the area will be small in terms of number of pans affected, but that the loss of further individual pans will further decrease the ability of the overall pan habitat of the region to support aquatic biodiversity.

2(c) Agricultural Potential and Soil Impact

An Agricultural Potential and Soil Impact Assessment was conducted by the Agricultural Resources Council – Institute for Soil, Climate and Water and is included in Appendix D3.

The site is almost flat and lies at a height of approximately 1 415 metres above sea level, sloping to the south-east. No permanent drainage ways are present in the area and only a few small dry pans occur. The climate of the study area (Koch & Kotze, 1986) can be regarded as warm to hot with rain in summer and dry winters. The long-term average annual rainfall in this region of the Northern Cape is only 329 mm, of which 142 mm, or 80%, falls from November to April. Rainfall is erratic, both locally and seasonally and therefore cannot be relied on for agricultural practices. The geology of the area comprises Tertiary and Quaternary deposits including surface limestone outcrops

The greater farm boundary of Farm 267 (Arriesfontein) consists of two land types namely: Ae9 (Deep, red, freely-drained soils, high base status) and Fc4 (Shallow soils, usually calcareous). The area where the study site is located comprises shallow calcareous soils (land type Fc4). The climatic restrictions mean that this part of the Northern Cape is suited at best for grazing. The grazing capacity however is low, at around 20 ha/large stock unit. The major impact on the natural resources of the study area would be the loss of potentially arable land due to the construction of the various types of infrastructure.

Construction Phase Impacts

Table 24: Rating of impacts for loss of agricultural land

Environmental Parameter	Soils and Agricultural Potential Loss
Issue/Impact/Environmental Effect/Nature	Development could potentially lead to loss in agricultural land
Extent	Site
Probability	Probable
Reversibility	Partly reversible
Irreplaceable loss of resources	No loss of resources
Duration	Long Term

Cumulative effect	Negligible cumulative effect	
Intensity/magnitude	High	
Significance Rating	Medium negative	
Environmental Parameter	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	3
Reversibility	2	2
Irreplaceable loss	1	1
Duration	3	3
Cumulative effect	1	1
Intensity/magnitude	3	1
Significance rating	-33 (Low negative)	-22 (Low negative)
Mitigation measures	The main mitigation would be to ensure that as little pollution or other non-physical disturbance occurs.	

Operational and Maintenance Phase Impacts

No potential operational and maintenance phase impacts were identified from an agricultural potential and soils perspective for the proposed development.

Closure and Decommissioning Phase Impacts

No potential operational and maintenance phase impacts were identified from an agricultural potential and soils perspective for the proposed development.

Cumulative Impacts

Should the proposed development of the 19 MW Solar Power Plant commence in addition to the proposed CSP/PV Solar Power Plants on the remainder of Arriesfontein, there will be a greater negative potential impact with respect to loss of agricultural land. As such, the cumulative impact of both proposed developments are likely to be more severe as a larger area will be occupied for the proposed developments on the property. However, the presence of low potential soils, as well as the restrictive rainfall, means that the probable cumulative impact rating for both the proposed developments would not change significantly, and the significance would remain as moderate.

2(e) Heritage Impact

A Heritage Assessment was conducted by Professional Grave Solutions (PGS) and is included in Appendix D4.

The HIA has shown that the study area has a rich history of occupation from the Stone Age with hunter gatherers to the Thlaping and Thlaro during the Iron Age period. The 1800's saw the rise of the Griqua people in the area and their loss of sovereignty after 1880 to Cape rule and the South African War at the turn of the century of 1900, all ads to the richness of the heritage landscape.

The field work that feeds into the HIA utilised the findings of the archival research as a guideline. No heritage resources were identified in the study area.

Potential construction phase impacts may occur. The principal potential impact relates to the destruction of sub-surface heritage resources. The overall potential impact of the development on heritage resources is seen as acceptably low and potential impacts can be mitigated to acceptable levels. Additionally, Heritage Management Guideline in Section 7 is to be implemented and has been incorporated into the EMP for the project. Finally, in the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the South African Heritage Resources Agency (SAHRA) needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment.

Construction Phase Impacts

Table 25: Rating of impacts for the destruction of sub-surface heritage resources

Environmental Parameter	**Discovery of possible sub-surface heritage resources**	
Issue/Impact/Environmental Effect/Nature	Destruction of sub-surface heritage resources	
Extent	Limited to the site where discovery is made	
Probability	Possible	
Reversibility	Only reversible through mitigation measures as proposed in management sections	
Irreplaceable loss of resources	Cultural resources are irreplaceable	
Duration	If the cemetery is not avoided and destroyed without mitigation measures the loss will be permanent	
Cumulative effect	Low impact is expected	
Intensity/magnitude	High	
Significance Rating	High and negative potential impact but with the implementation of mitigation measures the potential impact can be reduced to low and negative.	
Environmental Parameter	Pre-mitigation impact	Post mitigation impact

	rating	rating
Extent	1	1
Probability	2	1
Reversibility	4	2
Irreplaceable loss	4	2
Duration	4	4
Cumulative effect	2	1
Intensity/magnitude	4	2
Significance rating	-68 (High negative)	-22 (Low negative)
Mitigation measures	Implement management measure for reporting heritage finds and action forward	

Operational and Maintenance Phase Impacts

No potential operational and maintenance phase impacts were identified from a heritage perspective for the proposed development.

Closure and Decommissioning Phase Impacts

No potential closure and decommissioning phase impacts were identified from a heritage perspective for the proposed development.

Cumulative Impacts

The proposed 20 hectare PV project will be surrounded in future by a larger 3 X 75MW PV and 1 x 100MW CSP proposed development on the rest of Farm 267 – Arriesfontein. This will increase the possibility of impacting on sub-surface heritage resources and add to the possible cumulative impact on possible heritage resources.

With regards to the cultural landscape, larger study area is already impacted and sensitised towards infrastructure, notably the railway lines, roads (tarred and dirt), however the addition of the planned greater solar park consisting mainly of mirror like panels may aggravate the cumulative effect of this infrastructure type on the cultural landscape.

The impact on heritage resources is seen as low negative with only the current project (20 hectare PV) implemented in the landscape. It is however in magnitude smaller than the larger proposed 3 X 75MW PV and 100MW CSP proposed project and the addition of this 20 hectare foot print will not add significantly to the cumulative impact of larger solar facility, and is thus seen as a low cumulative impact on possible heritage resources.

2(f) Social Impact

A Social Impact Assessment was conducted by Urban-Econ and is included in Appendix D5. The findings of the assessment are outlined below.

The proposed 19MW Power Plant is expected to generate both positive and negative impacts. On one hand the project is expected to increase the production in the country to the value of R303.2 million and create 470 FTE employment positions during construction, whilst during operations it will generate new business sales to the value of R54.2 million and create a sustainable 26 FTE employment opportunities considering direct and multiplier effects. Households benefiting from the construction or operation phase, will experience an increase of their earnings to the value of R45 million during construction and R3.0 million per annum during operations. During operations, the facility is envisaged to contribute R0.5 million per annum towards social development projects thus benefiting the community even more.

On the other hand, the project will sterilise agricultural land (about 20 ha) and have negative impacts on the nearby economic activities due to visual effects. Constantia Safaris that shares a border with Arriesfontein farm and is located to the east of the proposed location for the Power Plant generates its income from trophy hunters and is highly dependent on the area maintaining its natural environment. Visual effects ensued from the project are expected to negatively affect the number of international tourists visiting the game farm and result in the staggering decline of its revenue. In addition, crime, social conflicts, possible deterioration of social and economic infrastructure, pressure on housing and service delivery, as well as a decline in the value of selected properties are also expected.

Most of the negative impacts can be mitigated. The extent of mitigation and most importantly the effects thereof on the negative impact would differ. Impacts associated with property values and visual effects are expected to be the most significant and at the same time the most challenging to address. Overall, positive impacts associated with the proposed 19MW PV Power Plant are expected to outweigh the negative effects, albeit to a smaller degree.

The overall significance of socio-economic impacts during construction is expected to be low but positive both before and after mitigations. The same situation is expected for the period during operations, although the ratings are expected to be slightly smaller than that observed during construction. As far as the closure phase is concerned, it is impossible to estimate at this stage whether the net effects will be positive or negative; however most of the impacts observed during construction will also take place during the closure phase and will be temporary. Rehabilitation of the land though could bring back the agricultural nature of the farm and eliminate the visual effects altogether thus creating opportunities for development of visually sensitive activities in the area such as trophy hunting and photographic safaris.

Construction Phase Impacts

Table 26: Rating of impacts on balance of payment

Environmental Parameter	Economy	
Issue/Impact/Environmental Effect/Nature	Increase in imports and possible increase of the trade deficit during construction	
Extent	International and National	
Probability	Definite	
Reversibility	Barely reversible	
Irreplaceable loss of resources	Marginal loss of capital resource	
Duration	Short term	
Cumulative effect	Negligible Cumulative Impact as the effect on the trade deficit is expected to be marginal	
Intensity/magnitude	Low	
Significance Rating	The anticipated impact will have negligible negative effects and will require little to no mitigation.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	4
Probability	4	4
Reversibility	3	3
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	-15 (Low negative)	-15 (Low negative)
Mitigation measures	None at this stage – requires development of the local manufacturing capabilities	

Table 27: Rating of impacts on net production and value added during construction

Environmental Parameter	Economy	
Issue/Impact/Environmental Effect/Nature	Temporary net increase in production and value added in the country during construction	
Extent	International and National	
Probability	Definite	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Significant loss of resource	
Duration	Short term	
Cumulative effect	Negligible Cumulative Impact	
Intensity/magnitude	Medium	
Significance Rating	The anticipated impact will have moderate positive effects. The proposed mitigations measures would reduce it to a low significance rating.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating

Extent	4	4
Probability	4	4
Reversibility	2	2
Irreplaceable loss	2	3
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	2	2
Significance rating	-28 (Low positive)	+30 (Medium positive)
Mitigation measures	In order to optimise the stimulation of the economy through direct, indirect and induced effects, the following should be applied where possible: ▪ Engagement with the district and local municipalities and local business forums or chambers to investigate the possibility of procurement of construction materials, goods, and products from local suppliers where feasible ▪ Employ local contractors where possible The reduction in the potential loss of business sales experienced by the local safari industry will be difficult to mitigate, though the following mitigations measures could be considered. These measures are expected to have a small change on the loss of resources and subsequently in the rating of the impact. ▪ Since the visual impact and potentially noise generated during construction is the biggest trigger of the negative impact on the production of the industry, any mitigation that could reduce the visual effects should be considered, including the re-routing of the access road to Constantia Safaris and providing screening barriers between the development and the game farm. Establishment of the associated infrastructure on site, such as power lines, should also be guided by the principle of minimising the visual impact on the local safari industry. ▪ Constantia Safari could be approached with the enquiry to provide accommodation for the managers and highly skilled workers engaged in the construction. This could significantly reduce the losses of the local safari industry, albeit not to the full extent as most of the income derived by the local safari industry and associated activities such as taxidermy comes from trophy hunting activities.	

Table 28: Rating of impacts on employment

Environmental Parameter	Employment	
Issue/Impact/Environmental Effect/Nature	Temporary net increase in employment in the country due to the establishment of the facility	
Extent	International and National	
Probability	Definite	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resource	
Duration	Short term	
Cumulative effect	Low cumulative impact	
Intensity/magnitude	Medium	
Significance Rating	The anticipated impact will have moderate positive effects.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	4
Probability	4	4
Reversibility	2	2
Irreplaceable loss	3	3
Duration	1	1
Cumulative effect	2	2
Intensity/magnitude	2	2
Significance rating	+32 (Medium positive)	+32 (Medium positive)
Mitigation measures	The following is recommended to enhance the benefits of the created employment in the local area where feasible: • Consider employing labourers who would lose their jobs in the local safari industry due to the visual impact • Consider organising local community meetings to advise them on the project that is planned to be established and the jobs that can potentially be applied for by the local labour • Establish a local skills desk to determine the potential skills that could be sourced locally • Recruit local labour where supply and demand of skills match • Employ labour-intensive methods in construction where feasible • Sub-contract to local construction companies where possible • Utilise local suppliers where possible The proposed enhancement measures would increase the opportunities for local businesses and labour force, but would not change the total net impact. Thus the rating of the impact after enhancement measures remains the same.	

Table 29: Rating of impacts on household income

Environmental Parameter	Standard of living	
Issue/Impact/Environmental Effect/Nature	Temporary net increase in household earnings due to the project's investment	
Extent	International and National	
Probability	Definite	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resource	
Duration	Short-term	
Cumulative effect	Low cumulative impact	
Intensity/magnitude	Medium	
Significance Rating	The anticipated impact will have moderate positive effects.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	4
Probability	4	4
Reversibility	2	2
Irreplaceable loss	3	3
Duration	1	1
Cumulative effect	2	2
Intensity/magnitude	2	2
Significance rating	+32 (Medium positive)	+32 (Medium positive)
Mitigation measures	Considerations of the potential loss of the Arriesfontein farm owners' profit and businesses directly affected by the visual impact (i.e. local safari industry) during construction should be taken into account and the affected parties should be adequately reimbursed for this either through procurement of their services (i.e. accommodation) or through other arrangement. Such reimbursement should be fair and should be to the satisfaction of all affected parties.	

Table 30: Rating of impacts on government revenue

Environmental Parameter	Economy
Issue/Impact/Environmental Effect/Nature	Temporary net increase in government revenue during the construction period
Extent	International and National
Probability	Definite
Reversibility	Partly reversible
Irreplaceable loss of resources	Marginal loss of resource
Duration	Short-term
Cumulative effect	Negligible Cumulative Impact
Intensity/magnitude	Low
Significance Rating	The anticipated impact will have minor positive effects.

Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	4
Probability	4	4
Reversibility	2	2
Irreplaceable loss	3	3
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	+15 (Low positive)	+15 (Low positive)
Mitigation measures	The potential losses of government revenue could be reduced if the revenue losses generated by the local safari industry and associated activities due to visual impacts were mitigated. Thus, all mitigations proposed earlier are applicable, including: ▪ Reduction of the visual impact as far as possible, inclusive of the re-routing of the access road ▪ Renting Constantia Safaris' accommodation for the managers and highly skilled workers engaged on site	

Table 31: Rating of impacts on skills development

Environmental Parameter	**Employment**	
Issue/Impact/Environmental Effect/Nature	Skills transfer and knowledge sharing during the construction period	
Extent	International and National	
Probability	Possible	
Reversibility	Irreversible	
Irreplaceable loss of resources	No loss of resource	
Duration	Short-term	
Cumulative effect	Negligible Cumulative Impact	
Intensity/magnitude	Low	
Significance Rating	The anticipated impact will have minor positive effects.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	4
Probability	2	2
Reversibility	4	4
Irreplaceable loss	4	4
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	+16 (Low positive)	+16 (Low positive)
Mitigation measures	Facilitate knowledge and skills transfer between the foreign experts and South African professionals Set up apprenticeship programmes to build onto existing or develop new skills of construction workers, especially those coming from the	

	local communities

Table 32: Rating of impacts on crime situation and social conflicts in the local area

Environmental Parameter	Standard of living	
Issue/Impact/Environmental Effect/Nature	Possible increase in crime and other social conflicts due to influx of job seekers and migrant construction workers	
Extent	Local/district	
Probability	Probable	
Reversibility	Partly reversible	
Irreplaceable loss of resources	No loss of resource	
Duration	Short-term	
Cumulative effect	Low Cumulative Impact	
Intensity/magnitude	Medium	
Significance Rating	The anticipated impact will have moderate positive effects. The proposed mitigation measures will reduce it to a low significance rating.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	2
Reversibility	2	2
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	2	2
Intensity/magnitude	2	1
Significance rating	+24 (Low positive)	+10 (Low positive)
Mitigation measures	The following mitigation measures are proposed to reduce the adverse effects associated with the influx of job seekers and migrant construction workers: ▪ Employ locals as far as feasible (though the creation of the local skills base and recruitment of suitable candidates) ▪ Control the movement of workers between the site and construction camp to minimise loitering around the Arriesfontein farm and surrounding areas ▪ Engage communities with respect to their possible involvement during construction in providing supporting services such as catering, temporary housing of workers, transportation, etc. ▪ Formalise trading and service provision around the site, by providing a dedicate area for such services and signing contracts with service providers ▪ Set up a recruitment office in the nearby town (i.e. Danielskuil) and adhere to strict labour recruitment practices that would reduce the desire of potential job seekers to loiter around the properties in hope to find	

	temporary employment ▪ Establish a proper fence around the property and temporary camp to reduce the chances of trespassing on adjacent properties ▪ Set up a gate and controlled access system to monitor the movement of people to and from the property, as well as to reduce the influx of job seekers to the site itself

Table 33: Rating of impacts on economic and social infrastructure

Environmental Parameter	**Standard of living**	
Issue/Impact/Environmental Effect/Nature	Strained and possible deteriorated economic and social infrastructure during the construction period	
Extent	Local/district	
Probability	Probable	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resources	
Duration	Short-term	
Cumulative effect	Low Cumulative Impact	
Intensity/magnitude	Low	
Significance Rating	The anticipated impact will have negligible negative effects and will require little to no mitigation.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	2	2
Intensity/magnitude	1	1
Significance rating	-12 (Low negative)	-11 (Low negative)
Mitigation measures	Engage local authorities prior to the construction period and discuss with them the demands for various services such as water, electricity, etc. that are expected to ensue during the development and approaches to satisfy these demands Identify in consultation with local authorities the infrastructural services that will be affected the most and would be put under significant strain depending on the supply and capacity thereof at the time of construction and created demand by the proposed project Devise the plan to assist the municipality in addressing the challenges and thus reducing the pressure of the proposed development on the supply of such services and ensuring its uninterrupted supply to the site and other affected parties	

Operational and Maintenance Phase Impacts

Table 34: Rating of impacts on production and value added

Environmental Parameter	Economy	
Issue/Impact/Environmental Effect/Nature	Net effect on production and value added of the national and local economies during operations	
Extent	International and National	
Probability	Definite	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Significant loss of resources	
Duration	Long-term	
Cumulative effect	Low Cumulative Impact	
Intensity/magnitude	Low	
Significance Rating	The anticipated impact will have minor positive effects. The proposed mitigation measures might reduce the potential losses of resources, resulting in the higher significant rating for the impact but it will still remain minor.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	4
Probability	4	4
Reversibility	2	2
Irreplaceable loss	2	3
Duration	3	3
Cumulative effect	2	2
Intensity/magnitude	1	1
Significance rating	+17 (Low positive)	+18 (Low positive)
Mitigation measures	The 19MW PV Solar Power Plant should be encouraged to procure materials, goods and products required for the operation of their businesses from local suppliers to increase the positive impact in the local economy as far as possible. In general terms, however, this will not change the total impact and will only change the distribution of the impact; as a result, the weighting for the impact will not change after mitigations. The reduction of the potential losses associated with the visual impacts would be difficult to mitigate, as visual disturbance will be permanent. Site layout and the route for the possible power lines should be decided upon bearing visual effects in mind and with the objective to reduce them as far as possible. The developer should also engage with the affected businesses owner/s and agree on the approach to compensate for the potential losses of revenue. Impacts associated with sterilisation of land are expected to be marginal; nevertheless, the owner of the property should be compensated for it accordingly.	

Table 35: Rating of impacts on employment

Environmental Parameter	Employment	
Issue/Impact/Environmental Effect/Nature	Net effect on employment during operations	
Extent	Province/Region	
Probability	Probable	
Reversibility	Barely reversible	
Irreplaceable loss of resources	Significant loss of resources	
Duration	Long-term	
Cumulative effect	Negligible Cumulative Impact	
Intensity/magnitude	Low	
Significance Rating	The anticipated impact will have minor positive effects. The proposed mitigation measures might reduce the potential losses of resources, resulting in the higher significant rating for the impact, but it will still remain minor.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	3	3
Probability	3	3
Reversibility	3	3
Irreplaceable loss	2	3
Duration	3	3
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	+15 (Low positive)	+16 (Low positive)
Mitigation measures	All mitigations measures proposed to reduce the potential losses of the local safari industry and associated services are applicable. These include efforts to reduce the visual impacts, such as re-routing of the access road, screening of the facility from the game farm as far as possible, and locating ancillary infrastructure to minimise visual effects. Adequate compensation of the directly negatively impacted businesses should also be considered as it would most likely result in re-investment of the funds in other areas and would further negate the negative losses of employment.	

Table 36: Rating of impacts on skills development

Environmental Parameter	Employment
Issue/Impact/Environmental Effect/Nature	Development of new skills by the workers engaged in maintenance and operations of the facility
Extent	Site
Probability	Possible
Reversibility	Irreversible
Irreplaceable loss of	No loss of resource.

resources		
Duration	Long-term	
Cumulative effect	Negligible Cumulative Impact	
Intensity/magnitude	Low	
Significance Rating	The anticipated impact will have minor positive effects.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	2	2
Reversibility	4	4
Irreplaceable loss	4	4
Duration	3	3
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	+15 (Low positive)	+15 (Low positive)
Mitigation measures	Assist with further training and skills development of workers who are engaged not only in skilled positions, but also in semi-skilled and unskilled depositions such as cleaners and security.	

Table 37: Rating of impacts on household income

Environmental Parameter	**Standard of living**	
Issue/Impact/Environmental Effect/Nature	Net effect on household earnings during the operational period	
Extent	Province/Region	
Probability	Probable	
Reversibility	Barely reversible	
Irreplaceable loss of resources	Significant loss of resources	
Duration	Long-term	
Cumulative effect	Negligible Cumulative Impact	
Intensity/magnitude	Low	
Significance Rating	The anticipated impact will have minor positive effects. The proposed mitigation measures might reduce the potential losses of resources, resulting in the higher significant rating for the impact, but it will still remain minor.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	3	3
Probability	3	3

Reversibility	3	3
Irreplaceable loss	2	3
Duration	3	3
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	+15 (Low positive)	+16 (Low positive)
Mitigation measures	In order to increase the income retention in the local economy, local SMMEs should be employed to provide selected services, such as transportation or workers, supplies provision, maintenance, etc. All mitigations measures proposed to reduce the potential losses of the local safari industry and associated services are applicable, as it could allow negatively affected businesses to retain existing employment and reduce negative effects on household earnings. Furthermore, the developer should consider employing the people who would lose their existing opportunities due to the project's visual effects to minimise the income redistribution effect and subsequently lessen the negative impacts on the households.	

Table 38: Rating of impacts on government revenue

Environmental Parameter	**Economy**	
Issue/Impact/Environmental Effect/Nature	Net effect on employment during operations	
Extent	International and National	
Probability	Probable	
Reversibility	Barely reversible	
Irreplaceable loss of resources	Marginal loss of resource	
Duration	Long-term	
Cumulative effect	Negligible Cumulative Impact	
Intensity/magnitude	Low	
Significance Rating	The anticipated impact will have minor positive effects. The proposed mitigation measures might reduce the potential losses of resources, but it will not be significant to change the rating.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	4
Probability	3	3
Reversibility	3	3
Irreplaceable loss	3	3
Duration	3	3
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	+17 (Low positive)	+17 (Low positive)
Mitigation measures	All mitigations measures proposed to reduce the potential losses of	

	the local safari industry and associated services are applicable, as it could allow negatively affected businesses to reduce the revenue losses and retain existing employment, thus maintaining or only slightly reducing losses to national fiscus.

Table 39: Rating of impacts on housing and basic services

Environmental Parameter	Standard of living	
Issue/Impact/Environmental Effect/Nature	Impact on housing situation and basic service provision in the local community	
Extent	Local/district	
Probability	Possible	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss of resource	
Duration	Permanent	
Cumulative effect	Negligible Cumulative Impact	
Intensity/magnitude	Low	
Significance Rating	The anticipated impact will have negligible negative effects and will require little to no mitigation.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	2	2
Reversibility	1	1
Irreplaceable loss	1	1
Duration	4	4
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	11	11
Mitigation measures	The developer should consider providing assistance to its workers coming from outside the community with respect to finding suitable rental housing and permanent housing in the area.	

Table 40: Rating of impacts on social benefits derived from the project's local investment

Environmental Parameter	**Standard of living**
Issue/Impact/Environmental Effect/Nature	Social benefits derived from the project's social responsibility fund
Extent	Local/district
Probability	Definite
Reversibility	Irreversible
Irreplaceable loss of resources	No loss of resource
Duration	Long-term
Cumulative effect	Low Cumulative Impact
Intensity/magnitude	Low
Significance Rating	The anticipated impact will have minor positive effects.

Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	3
Reversibility	4	4
Irreplaceable loss	4	4
Duration	3	3
Cumulative effect	2	2
Intensity/magnitude	1	1
Significance rating	+18 (Low positive)	+18 (Low positive)
Mitigation measures	A three-year social development programme should be devised by the developer throughout the project's lifespan The plan should be developed through consultation with local authorities and local communities to identify community projects that would result in the greatest social benefits A plan should be reviewed on an annual basis and where necessary updated	

Table 41: Rating of impacts on property values

Environmental Parameter	**Property values**	
Issue/Impact/Environmental Effect/Nature	Declined values of selected properties in the visually affected area	
Extent	Site	
Probability	Definite	
Reversibility	Barely reversible	
Irreplaceable loss of resources	Marginal loss of resource	
Duration	Long-term	
Cumulative effect	Low Cumulative Impact	
Intensity/magnitude	Medium	
Significance Rating	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.	
Criteria	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	4
Reversibility	3	3
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	2	2
Intensity/magnitude	2	2
Significance rating	-30 (Medium negative)	-30 (Medium negative)
Mitigation measures	• Negotiate with the property owners whose property values will be negatively affected due to the proposed project to find the solution plausible for both parties	

Closure and Decommissioning Phase Impacts

Upon the expiry of the 19MW PV Solar Power Plant operational lifespan, the facility would be disbanded, and where necessary, the ground will be rehabilitated in an attempt to return it to the pre-project conditions. This means that all impacts that took place during the operational phase will cease to exist. At the same time, though, spending on the disassembly of the components and rehabilitation of land will increase the demand for construction activities and inputs from other industries, thus stimulating economic activity in the local area and in the country albeit over a temporary period.

Socio-economic impacts stimulated by the expenditure during the closure phase are expected to be similar to those that take place during the construction phase. They will also be temporary, but will require a considerably smaller expenditure than that observed during the construction phase. Importantly, closure of the facility and rehabilitation of the area to the pre-project state would made negative impacts associated with the visual effects of the project and sterilisation of agricultural land obsolete. However, during the closure phase itself the negative effects associated with sterilisation and visual impacts are still highly probable if it is assumed that the land use pattern and activities on the adjacent properties do not change from the status quo.

Unfortunately without the knowledge of the expenditure involved in the de-commissioning of the PV Solar Power Plant and high uncertainty regarding the land use pattern that will be observed in more than a quarter of the century, determining the net effects of the project on production, value added, employment, and government revenue is difficult. Regardless of their positive or negative net effects, though, they will be temporary and are not expected to be significantly greater or worse than impacts observed during construction.

Cumulative Impacts

When evaluating the cumulative effect of the project, the proposed established of a 3 x 75MW PV and 1 x 100MW CSP Solar Park on Farm 267 Arriesfontein by SolarReserve was taken into account in the impact rating tables above. Please refer to the tables above for cumulative impact ratings.

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 summarises the impact that the proposed development will have on the environment. A summary of the environmental impacts according to each environmental aspect, are provided for each activity alternative, including the option of not undertaking the development. Detailed information regarding the types of impacts, duration of the impacts, likelihood of the impacts actually occurring and the significance of the impacts are detailed in the impact rating tables, in section 2 above.

Layout Alternative L1 (Preferred Site Layout)

Environmental Aspect	Impact Summary
Biodiversity	The habitat types encountered in the study area are typical of the region and no habitat type of unique quality is present that is particularly apposite for the potential presence of Red Data flora species. Hence, provided that the mitigation measures are implemented and the relevant protected trees species are identified and application for disturbance of these individuals is lodged and approved, Site Layout Alternative 1 can be selected. Finally, the implementation of generic mitigation measures that will prevent the spread of impacts to nearby sensitive areas (such as the nearby pan) are therefore important but should be sufficient in ameliorating expected impacts.
Surface Water	No wetland resources were identified on the proposed development footprint. The proposed development will however occupy the entire footprint regardless of layout. Importantly, the proposed development is located outside the delineated wetland area and the 50m buffer zone, so no direct loss of wetland habitat will occur. Hence, Alternative Site Layout 1 can be chosen from a wetlands perspective as it is located away from the nearest wetland to the north of the study site, provided that mitigation measures are implemented that will address potential impacts to the nearby wetland and associated buffer zone.
Agriculture Potential and Soils	The agricultural potential is low both for grazing and crop production purposes. Alternative Site Layout 1 can therefore be chosen.
Heritage	No heritage or archaeological resources were identified on the proposed development footprint are. Hence, this option can be chosen from a heritage perspective provided that should heritage resources be found, SAHRA will need

	to be contacted and informed of the finds.
Social	From a social perspective there is no preference in terms of layout for the site as this will not have an impact on the social environment. Layout alternative 1 can be considered for the proposed development

Layout Alternative L2

Environmental Aspect	Impact Summary
Biodiversity	The habitat types encountered in the study area are typical of the region and no habitat type of unique quality is present that is particularly apposite for the potential presence of Red Data flora species. Hence, provided that the mitigation measures are implemented and the relevant protected trees species are identified and application for disturbance of these individuals is lodged and approved, Site Layout Alternative 2 can equally be selected. Finally, the implementation of generic mitigation measures that will prevent the spread of impacts to nearby sensitive areas (such as the nearby pan) are therefore important but should be sufficient in ameliorating expected impacts.
Wetlands	No wetland resources were identified on the proposed development footprint. The proposed development will however occupy the entire footprint regardless of layout. Importantly, the proposed development is located outside the delineated wetland area and the 50m buffer zone, so no direct loss of wetland habitat will occur. Hence, Alternative Site Layout 2 can similarly be chosen from a wetlands perspective as it is located away from the nearest wetland to the north of the study site, provided that mitigation measures are implemented that will address potential impacts to the nearby wetland and associated buffer zone.
Agriculture Potential and Soils	The agricultural potential is low both for grazing and farming purposes. Alternative Site layout 2 can therefore equally be chosen.
Heritage	No heritage or archaeological resources were identified on the study site. Hence, this option can equally be chosen from a heritage perspective provided that should heritage resources be found, SAHRA will need to be contacted and informed of the finds.
Social	From a social perspective there is no preference in terms of layout for the site as this will not have an impact on the social environment. Layout alternative 2 can be considered for the proposed development

No-go Alternative

The “no-go” alternative assumes that the proposed activity does not go-ahead, implying a continuation of the current situation or the status quo. The “no-go” or “no-action” alternative is regarded as a type of alternative that provides the means to compare the impacts of project alternatives with the scenario of a project not going ahead. In evaluating the “no-go” alternative it is important to also take into account the implications of foregoing the benefits of the proposed project.

From a biophysical perspective, should the proposed development not take place the current environmental baseline would remain as is and there would not be an impact on the local indigenous fauna and flora through means of potential habitat isolation, fragmentation and degradation as well as species loss. Potential impacts to the nearby wetland would similarly not occur although the impacts are likely to be limited given the proximity of the wetland. In terms of soils and agricultural potential, current land uses would be expected to continue in the form of grazing activities. No archaeological, heritage or palaeontological resources were found on site. The environmental baseline in terms of archaeological, heritage and palaeontological resources is therefore expected to be negligible. Finally, from a socio-economic point of view, current employment figures are likely to remain similar in the near future with the absence of development.

The absence of the new proposed development would mean that the power supply the proposed development would provide would be forgone thereby not contributing to the energy resources and renewable energy targets set by South Africa and the Northern Cape Province. In addition, labour opportunities and economic benefits would not accrue to the local area. Ultimately, the demand for energy in South Africa is increasing with coal and nuclear supply options unable to meet with current necessities. With viable sustainable and renewable energy generation options being proposed, the proposed development would constitute a missed opportunity should its development not take place. The potential energy supply and local economic benefits of the proposed development could therefore arguably be taken to outweigh the negative potential environmental impacts which will be limited to under a 20 hectare site.

As described above, Alternative Site Layout 1 or Alternative Site Layout 2 can equally be regarded as favourable for the proposed development. This is mainly due to the similarity of potential impacts taking place as a result of the development occupying the entire footprint of the site. However, due to technical and feasible reasons, ***Alternative Site Layout 1 is the preferred site layout***.

A summary of the major findings (both biophysical and social) as determined by each environmental specialist is provided in Table 42 below.

Table 42: Summary of major findings

Environmental Parameter	Summary of major findings
Biodiversity	▪ The study area is representative of the regional vegetation type which is described as Ghaap Plateau Vaalbosveld. ▪ A total of 89 plant species were recorded during the field investigations. ▪ The vegetation on the study site comprises a dominant shrub/ tree layer and a diverse herbaceous layer. ▪ The following macro habitat types were verified by field investigations:

Environmental Parameter	Summary of major findings
	1. Natural Woodland Habitat, including (*Searsia lancea*) Open Woodland; (*Tarchonanthus camphoratus*) Closed Shrubveld; and 2. Endorheic Pans (**Importantly, it must be noted that the wetland study confirmed the location of the wetland area to the north ***off-site*** and therefore supercedes and replaces the wetland area as identified in the biodiversity study from the proposed development site as sensitive. See the wetland study in Appendix D2**). ▪ A total of 80 animal species was recorded during the site investigation. None were Red Data species. ▪ It is estimated that 73 of the 96 Red Data animal species of the Northern Cape have a low probability of occurring in the study area, 12 have a moderate-low probability, six (6) a moderate probability, three (3) a moderate-high and two (2) species a high probability of occurring in the study area. ▪ The following protected tree species however, are present in the study area: 1. *Acacia erioloba*; and 2. *Olea europaea* subsp. *africana* ▪ Potential impacts identified for flora include: 1. Direct impacts on flora species of conservation importance; 2. Loss or degradation of natural vegetation, sensitive or protected habitat; 3. Loss/ degradation of surrounding habitat; 4. Impacts on SA's conservation obligations & targets; 5. Increase in local and regional fragmentation/ isolation of habitat; and 6. Increase in environmental degradation, pollution (soils, surface water). ▪ Potential impacts identified for fauna include: 1. Direct impacts on Red Data fauna species; 2. Loss or Degradation of natural faunal habitat & in surrounding areas; 3. The disruption of ecological connectivity and migration routes of larger, flightless animals as well as territorial infringement; and 4. Direct impacts on common fauna species & interactions with structures & personnel. ▪ Low but negative potential impacts were evaluated for the various impacts during the construction, operation, decommissioning phases to flora and fauna.
Surface Water	▪ Approximately 5.5 % of the total area of Farm 267 (Arriesfontein) was classified as wetland, with most of the wetland areas consisting of shallow, ephemeral pans. A total of 12 pans, ranging in size from 0.1 ha to over 23 ha in size, were identified. In addition to the pans a small drainage line and associated seepage area, as well as a natural spring were delineated on the greater farm boundary. ▪ Importantly, no wetlands were identified within the PV study area, though a pan is located immediately to the north of the site.

Environmental Parameter	Summary of major findings
	▪ The proposed development site falls outside the delineated wetland areas as well as outside the 50m buffer zone. No loss of wetland habitat is thus expected. ▪ The following potential impacts are anticipated for various phases of the proposed development: Planning Phase: 1. No impacts to the wetlands are expected during the planning phase. (This is based on the assumption that the planning phase will not involve the establishment of any infrastructure, even temporary, on site and that only existing access routes to the site will be utilised for site visits and preliminary studies). Construction Phase: 1. Loss of wetland habitat; 2. Increased sediment movement into the wetlands on site; 3. Water quality deterioration; and 4. Disturbance to wetland habitat and fauna. Operational Phase: 1. Increased water inputs to the wetlands (altered hydroperiod); 2. Stormwater discharge; 3. Waste water discharge; and 4. Disturbance to wetland habitat and fauna. Decommissioning Phase: 1. Increased sediment movement into the wetlands on site; 2. Water quality deterioration; and 3. Disturbance to wetland habitat and fauna.
Agricultural potential and soils	▪ The site is almost flat and lies at a height of approximately 1 415 metres above sea level, sloping to the south-east. No permanent drainage courses are present in the area and only a few small dry pans occur. ▪ The climate of the study area can be regarded as warm to hot with rain in summer and dry winters. The long-term average annual rainfall in this region of the Northern Cape is only 329 mm, of which 142 mm falls from November to April. Rainfall is erratic, both locally and seasonally and therefore cannot be relied on for agricultural practices. ▪ The geology of the area comprises Tertiary and Quaternary deposits including surface limestone outcrops ▪ The greater farm boundary of Farm 267 (Arriesfontein) consists of two land types namely: Ae9 (Deep, red, freely-drained soils, high base status) and Fc4 (Shallow soils, usually calcareous). ▪ The area where the study site is located comprises shallow calcareous soils (land type Fc4).

Environmental Parameter	Summary of major findings
	▪ The climatic restrictions mean that this part of the Northern Cape is suited at best for grazing. The grazing capacity is low, around 20 ha/large stock unit. ▪ The major impact on the natural resources of the study area would be the loss of potentially arable land due to the construction of the various types of infrastructure.
Heritage	▪ The HIA has shown that the study area has a rich history of occupation from the Stone Age with hunter gatherers to the Thlaping and Thlaro during the Iron Age period. The 1800's saw the rise of the Griqua people in the area and their loss of sovereignty after 1880 to Cape rule and the South African War at the turn of the century of 1900, all ads to the richness of the heritage landscape. ▪ The field work that feeds into the HIA utilised the findings of the archival research as a guideline. No heritage resources were identified in the study area. ▪ Potential construction phase impacts may occur. The principal potential impact relates to the destruction of sub-surface heritage resources which are known of which none have been identified on the study site. ▪ The overall potential impact of the development on heritage resources is seen as acceptably low and potential impacts can be mitigated to acceptable levels.
Social	▪ The proposed 19MW Power Plant is expected to generate both positive and negative impacts. ▪ From a positive perspective, the proposed development project has been estimated to increase the production in the country to the value of R303.2 million and potentially create 470 full time employment (FTE) employment positions during construction, whilst during operations it has been estimated that the proposed development project can generate new business sales to the value of R54.2 million and create a sustainable 26 FTE employment opportunities considering direct and multiplier effects. Households benefiting from the construction or operation phase, are estimated to experience an increase of their earnings to the value of R45 million during construction and R3.0 million per annum during operations. During operations, the facility is estimated to contribute R0.5 million per annum towards social development projects thus benefiting the local community. ▪ From a negative point of view, the project can be expected to sterilise grazing agricultural land (about 20 ha) and have negative impacts on the nearby economic activities due to visual effects. Constantia Safaris is situated adjacent the proposed development site and borders Farm 267 (Arriesfontein) in the east. Constantia Safaris generates income from trophy hunters and bed and breakfast accommodation and is dependent on the area maintaining the natural environment and scenic value. Visual effects ensued from the development of the proposed project are expected to negatively affect the number of international

Environmental Parameter	Summary of major findings
	tourists visiting the game farm and may result in the decline of its revenue. The proposed development can potentially have a further negative impact on social components such as crime, social conflicts, possible deterioration of social and economic infrastructure, housing infrastructure and service delivery, and property values. However, security measures will accompany the proposed development in the form of 24 hour security, fencing off of the proposed development area, security access control and video surveillance. ▪ Most of the negative impacts can be mitigated however as briefly referred to above. The extent of mitigation and most importantly the effects thereof on the negative impact would differ. Impacts associated with property values and visual effects are expected to be the most significant and at the same time the most challenging to address. Overall, positive impacts associated with the proposed 19MW PV Power Plant are expected to outweigh the negative effects, albeit to a smaller degree. ▪ The overall significance of socio-economic impacts during construction is expected to be low but positive both before and after mitigations. The same situation is expected during operations, although the ratings are expected to be slightly lower than that observed during construction. As far as the closure phase is concerned, it is impossible to estimate at this stage whether the net effects will be positive or negative; however most of the impacts observed during construction will also take place during the closure phase and will be temporary. Rehabilitation of the land though could restore the agricultural nature on the farm and eliminate the visual effects altogether thus creating opportunities for development of visually sensitive activities in the area such as trophy hunting and photographic safaris.

The impact rating of the proposed development according to each environmental aspect is provided in Table 43.

Table 43: Impact rating summary for the proposed development

Environmental Aspect	Environmental Impacts	Impact Rating with Mitigation
Biodiversity	Direct Impacts on fauna species of conservation status (construction phase)	Low negative (-26)
	Direct Impacts on fauna species of conservation status (operation phase)	Low negative (-18)
	Loss, degradation of natural habitat on site and surrounds (construction phase)	Low negative (-28)
	Loss, degradation of natural habitat on site and	Low negative (-12)

	surrounds (operation phase)	
	Loss, degradation of natural habitat on site and surrounds (decommissioning phase)	Low negative (-8)
	Disruption of connectivity, migration routes, territorial infringement (construction phase)	Low negative (-18)
	Disruption of connectivity, migration routes, territorial infringement (operation phase)	Low negative (-9)
	Interaction with humans, infrastructure etc. (construction phase)	Medium negative (-30)
	Interaction with humans, infrastructure etc. (operation phase)	Medium negative (-36)
	Increase in environmental degradation, pollution (operation phase)	Low negative (-26)
Surface Water	Increased sedimentation (construction phase)	Low negative (-26)
	Water quality deterioration (construction phase)	Low negative (-26)
	Disturbance to wetland habitat and fauna (construction phase)	Medium negative (-30)
	Increase water inputs (operation phase)	Low negative (-24)
	Stormwater discharge (operation phase)	Medium negative (-42)
	Wastewater discharge (operation phase)	Medium negative (-42)
	Disturbance to wetland habitat and fauna (operation phase)	Low negative (-28
	Increased sediment movement (decommissioning phase)	Low negative (-26)
	Water quality deterioration (decommissioning phase)	Low negative (-26)
	Disturbance to wetland habitat and fauna (decommissioning phase)	Medium negative (-30)
Agricultural Potential and Soil	Loss of agricultural land and / or production	Low negative (-22)
Heritage	Destruction of sub-surface heritage resources	Low negative (-22)
Social	Impact on balance of payment (construction phase)	Low negative (-15)
	Impact on production and value added (construction phase)	Moderate positive (+30)
	Impact on employment (construction phase)	Moderate positive (+30)
	Impact on household income (construction phase)	Moderate positive (+30)
	Impact on government revenue (construction phase)	Low positive (+14)
	Impact on skills development (construction phase)	Low positive (+16)
	Impact on crime situation and social conflicts (construction phase)	Low negative (-13)
	Impact on economic and social infrastructure	Low negative (-13)

	(construction phase)	
	Impact on production and value added (operation phase)	Low positive (+18)
	Impact on employment (operation phase)	Low positive (+16)
	Impact on skills development (operation phase)	Low positive (+15)
	Impact on household income (operation phase)	Low positive (+16)
	Impact on government revenue (operation phase)	Low positive (+17)
	Impact on housing and services (operation phase)	Low negative (-14)
	Impact of social benefits derived by local communities (operation phase)	Low positive (+18)
	Impact on properties values (operation phase)	Moderate negative (-30)

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 √**	

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):

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:

Recommendations of the Biodiversity Specialist

- It is necessary to conduct a vegetation survey that will determine the number and relevant details pertaining to protected tree species on the property. Submission of plant removal disturbance permit application forms to NCDENC and DAFF must be undertaken prior to any disturbance of the identified protected floral or tree species.
- A plant removal/destruction permit must be applied for from the NCDENC and DAFF.
- All suggested mitigation measures are to be strictly adhered to which have been included in the draft Environmental Management Programme (EMPr).

Recommendations of the Wetlands Specialist

- An adequate storm water and waste water management plan is required in terms of storage, use, re-use, and disposal of imported potable water, waste water, and storm water for the proposed development site.
- No water should be discharged into the pans on site.
- The proposed development footprint as well as the footprint of any temporary infrastructure should be fenced off and all activities restricted to these areas.
- Staff should receive training and awareness education on the value of the natural environment and the need for protection of the environment. Ideally staff numbers on site should be limited during non-working hours through off-site staff housing to prevent illegal hunting in or near wetlands.
- Any activity which is contemplated and which will impact on the wetlands within the study area or which falls within 500m of any delineated wetland areas is subject to a water use license under Section 21 of the National Water Act (Act 36, 1998) in terms of water uses 21 (c) and 21 (i). A water use license application is therefore required for the proposed development and is to be applied for prior to construction commencing.

Recommendations of the Agricultural Potential and Soils Specialist

- None.

Recommendations of the Heritage Specialist

- Heritage Management Guidelines referred to in the Heritage specialist study which have been incorporated into the EMP for the project are to be adhered to.
- In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the South African Heritage Resources Agency (SAHRA) needs to be contacted and an enquiry must be lodged into the necessity for a Heritage Impact Assessment.

Recommendations of the Social Specialist

- All proposed mitigation measures in the EMPr should be implemented and negative impacts on surrounding properties must be considered and implemented where practical.

General Recommendations of the EAP

- The final Environmental Management Programme must be approved by the Department of Environmental Affairs before construction commences.

Is an EMPr attached?	**YES √**	

The EMPr must be attached as Appendix F.

The EMPr is included with this report in Appendix F.

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