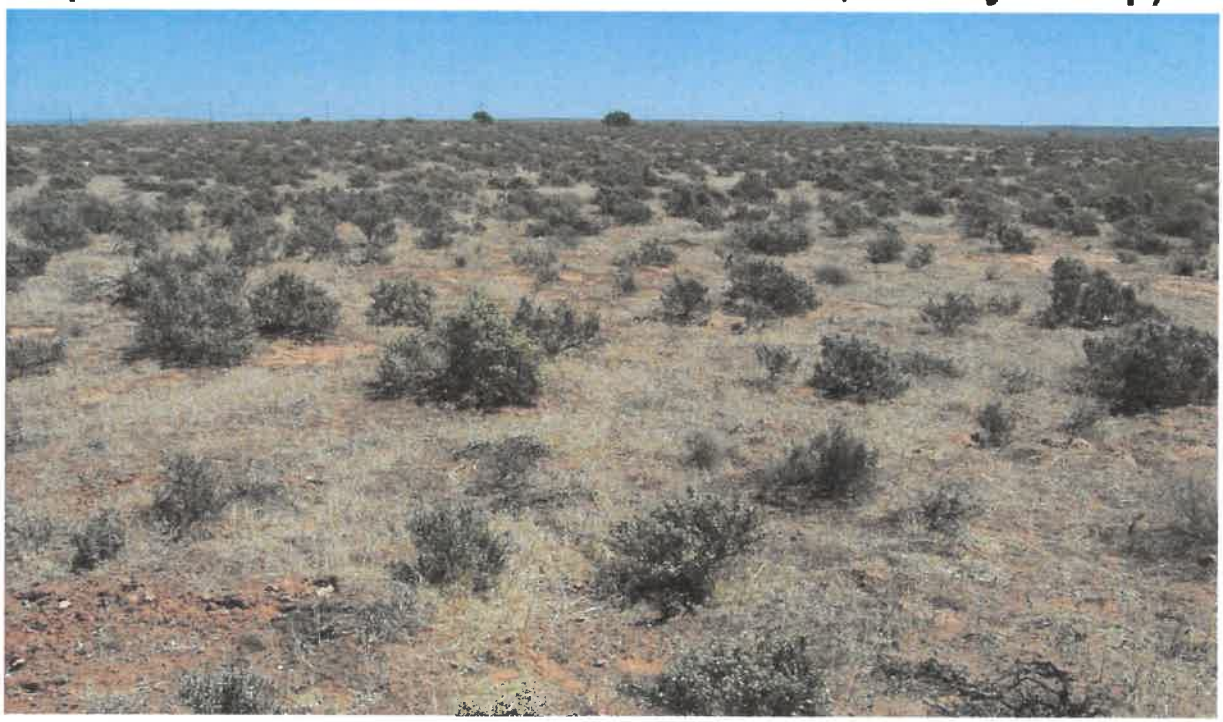
EnviroAfrica
Environmental Management and Impact Assessment
Omgewingsbestuur en Impakbeoordeling

ROMA ENERGY

VANRHYNSDORP SOLAR PV FACILITY

(Remainder of Farm De Duinen No.258, Vanrhynsdorp)



FINAL BASIC ASSESSMENT REPORT VOLUME 1 OF 2

DEA REFERENCE NO. : 14/12/16/3/3/1/1854

December 2017

ROMA ENERGY VANRHYNSDORP SOLAR PLANT

(Remainder of Farm De Duinen No.258, Vanrhynsdorp)

APPLICATION FOR AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT NO. 107 OF 1998 (AS AMENDED) AND THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED)

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DEA Reference Number: 14/12/16/3/3/1/1854

20 December 2017

Ms. T van der Merwe / Ms. A. Essop
Department of Environmental Affairs
Environment House
473 Steve Biko Road
Arcadia
PRETORIA

Dear Madam

re.: **Final Basic Assessment Report** for environmental authorisation (EA) for a proposed solar PV facility on remainder of Fram De Duinen No. 258, Vanrhynsdorp, Matzikama Local Municipality, West Coast District Municipality, Western Cape Province

DEA Reference: 14/12/16/3/3/1/1854

Enclosed, please find one hard copy and two cds containing the Final Basic Assessment Report for your perusal and decision, as well as two hard copies and a cd containing the relevant corrected EA application form. All appendices and the original specialist reports are included on the CD.

If you need any additional information please call EnviroAfrica on 021-851 1616.

Yours sincerely

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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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File Reference Number:	
Application Number:	
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, 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, 2014 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. This report format is current as of **08 December 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. 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.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. 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.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. 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.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. 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.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

SECTION A: ACTIVITY INFORMATION

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

If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

Several specialists were consulted as part of this application. Details of specialists and declarations of interest are included as part of the respective specialists' reports as per Appendix D.

1. PROJECT DESCRIPTION

a) Describe the project associated with the listed activities applied for

Activity Overview

The project is the establishment of an array of crystalline solar photovoltaic (PV) modules grouped into tables or panels of 20 modules each, together with associated infrastructure for the generation of 5MW of electricity. The PV tables would form an array covering an area of 20ha, surrounded by a perimeter fire access road and fence. The PV tables will be raised approximately 500mm above ground level and have single axis tracking systems allowing maximisation of solar energy harvesting for conversion to electrical energy. A similar solar PV array is depicted in Figure 1 below.

Figure 1: Single axis solar PV module tables raised 500mm above ground level

Proposed associated infrastructure includes a fenced construction staging area, a maintenance shed, three inverter-transformer stations on concrete pads, one to two office buildings on the 20ha site, a switch panel for connection to the power grid, as well as about 2,4km of 22kV overhead powerline from the southern section of the PV array to connect or tie-in the proposed development to Eskom's Vanrhynsdorp substation which is located south of the proposed development site. Figure 2 below indicates the position of the proposed solar PV array within the 20ha site, as well as the proposed overhead power line route for evacuation of power to the nearby (Eskom) Vanrhynsdorp substation.

Environmental authorisation (EA) was originally granted by the Department of Environmental Affairs (DEA) on 10 November 2012 for this proposed development but the EA expired before physical work on the project could commence. The original EA Registration Number was 12/12/20/2677 and original National Environmental Authorisation System Reference Number, DEA/EIA/0000889/2011. To this end, specialist reports from the original application, as well as updated/reviewed 2017 specialist draft reports/addendums have been included with this post application draft basic assessment report (DBAR). The updated specialist reports take into account potential cumulative environmental impacts in a 30km radius from proposed solar PV development site relative to other approved renewable energy projects in the region.

Application Rationale

In March 2011, the Department of Energy's (DoE's) Integrated Resource Plan (IRP) 2010-2030 was promulgated with the aim of providing a long-term, cost-effective strategy to meet the electricity demand in South Africa. The

IRP 2010-2030 objectives align with Government's in terms of reliable electricity supply, as well as environmental and social responsibilities and economic policies. The study horizon for the IRP was the period from 2010 to 2030.

The short to medium term intentions of the IRP 2010 -2030 are to ascertain the most cost-effective electricity supply option for the country, speak to the opportunities for investment into new power generation projects and determine security of electricity supply.

The IRP's long-term electricity planning goal is to consider social, technical, environmental and economic constraints, as well as other externalities while ensuring sustainable development in the country.

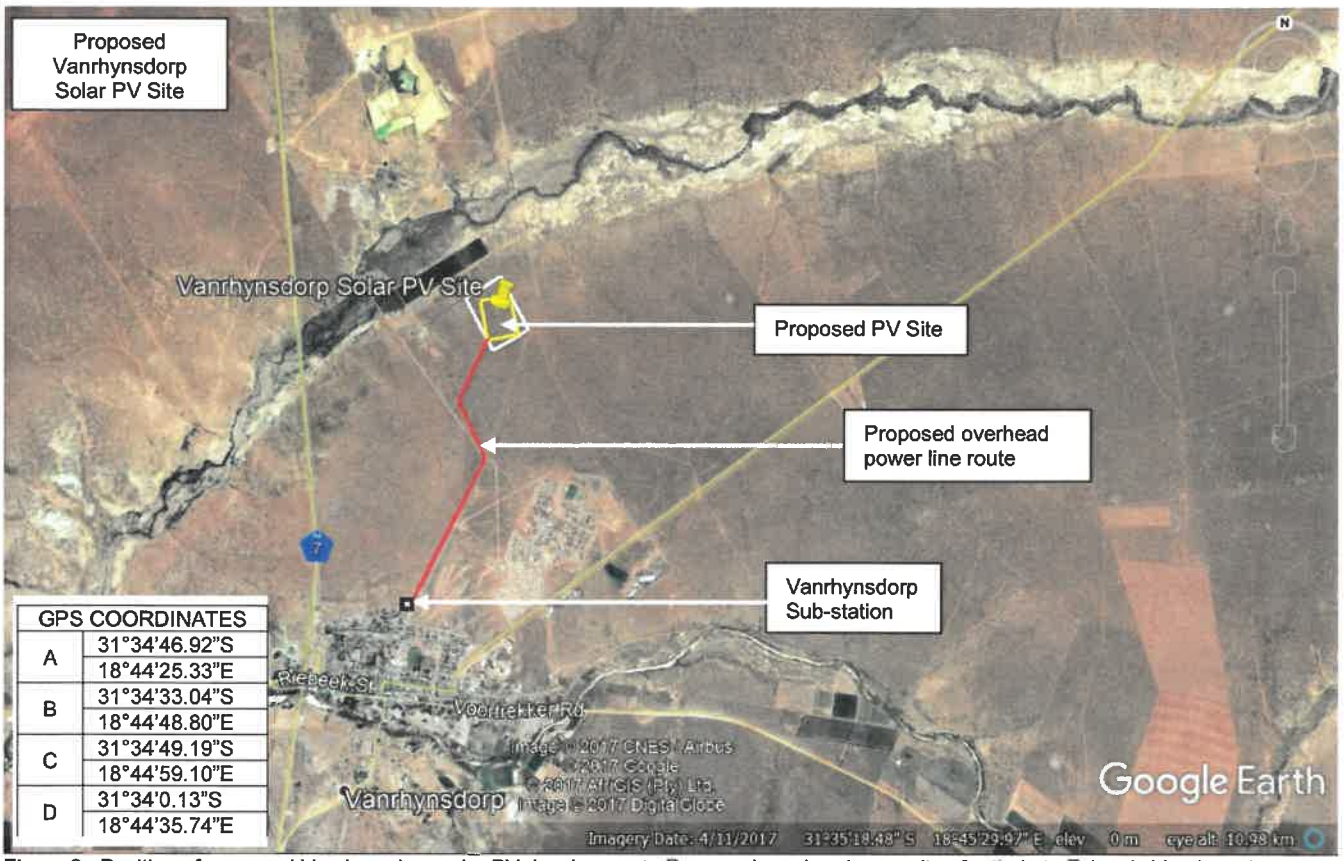

Figure 2: Position of proposed Vanrhynsdorp solar PV development. Proposed overhead power line for tie-in to Eskom's Vanrhynsdorp substation indicated in red. Total 20ha proposed site indicated with white outline. Actual 10ha of solar PV panel layout area, within total 20ha site, indicated with yellow outline.

To this end, within the IRP, the DoE set a target electricity supply of 17.8 GW from renewable energy sources by 2030. This target renewable energy capacity would be produced primarily by solar, wind, biomass and small-scale hydro electricity generation (with the bulk being met by wind and solar energy supplies). In addition, the 2030 target ensures that approximately 42% of the country's total estimated electricity generation capacity would be met by renewable energy sources. This application is in response to the DoE's target and IRP 2010-2030 strategy to expand the South African renewable energy electricity generation capacity.

Activity Description

The proponent, Roma Energy Vanrhynsdorp (Pty) Ltd, plans to establish a 'solar farm' which harvests light energy from the sun using solar PV panels and converts the light energy into electrical energy to be fed into the national (Eskom's) electricity grid. The development footprint is an area not exceeding 20ha on the remainder of the Farm De Duinen No. 258, Vanrhynsdorp, Matzikama Local Municipality, Western Cape Province. This solar farm is, in essence, a solar power station which will form part of the country's renewable energy electricity generation capacity. The solar PV farm is proposed to be established on a site located 31°34'46.02"S, 18°44'46.91"E, near Vanrhynsdorp.

After considering a large portion of the remainder of the Farm De Duinen No. 258, the most suitable 20ha portion in terms of solar energy harvest potential, topography, accessibility, tie-in to the Eskom grid and minimisation of environmental impact, was chosen on which to establish the facility. The proposed development is an array of 18540 poly-crystalline solar photovoltaic (PV) modules grouped into tables or panels of 20 modules each. The PV panels form an array within the total footprint area of 20ha, surrounded by a perimeter fire access road and fence. The actual array of PV panels will not completely fill the 20ha footprint which also needs to cater for infrastructural requirements.

As per Figure 1 above, the PV tables will be raised approximately 500mm above ground level and will have single axis tracking systems allowing the generation of approximately $5MW_{AC}$ of direct current which will be alternating current. Proposed associated infrastructure to be built on the 20ha footprint site includes a fenced construction staging area, a 3m x 6m maintenance shed, three inverter-transformer stations on concrete pads, a switch panel for connection to the power grid and an office with septic tank ablutions, as well as a 22kV powerline from the development site to connect to Eskom's Vanrhynsdorp substation about south of the proposed development site.

The powerline feeding into Eskom's Vanrhynsdorp substation will be a three-phase overhead powerline which will have a sub-surface component within the proposed site before it leads from the development site to tie-in to the substation. The maximum generation capacity of the facility is approximately $5MW_{AC}$. Solar PV farms produce electricity in direct current which must be converted into alternating current and transformed into the correct voltage before it can be fed into the national grid. This conversion is done by inverters and transformers which are part of the abovementioned infrastructural development of the project.

Description of Development Phases

Equipment and Material Delivery; Site Preparation:
The proposed development site is accessible from existing roads. PV modules and steel structures will be transported to site using four interlink trucks. The main transformer, one grader and a 20 ton roller will be delivered to site using abnormal load vehicles. In addition to these vehicles, two drill rigs, two $10m^3$ tipper trucks, six tractors and trailers, one waste transport truck, 8 site bakkies, one water tanker truck, a TLB and a trenching machine will also be used on site.
The area will be graded and levelled using a 20 ton roller. Water spray from the water tanker truck will be used to control excessive dust blow off. About three to four temporary access roads will have to be established on site in addition to the long term perimeter fire and main access road. The main access road will enable vehicular access to each solar panel system within the site. All roads created as part of the solar facility will be untarred / unpaved.

Construction:
Each drilling machine which will be used for drilling the substructure post holes is equipped with a dust control system. The system extracts the dust away from the hole while drilling using vacuum. The
collected dust can then be removed in a controlled manner from the back end of the machine once a certain amount is reached.
Concrete transformer pads for each row of solar panels, a switch panel for connection to the power grid, and a 3m x 6m control shed would be constructed on site
Development of the electrical systems would take place in conjunction with installation of the rest of the structures. In brief terms, it includes all electrical cabling and trenching (field trenching in and around the entire site where the units will be installed should take place after the installing the pedestals) that connects all solar units, collects the energy from them, and then routes it to a point of connection with the utility infrastructure system.
Approximately 30 people are envisaged to be required during the construction phase, which is expected to last for 6-8 months. Positions will be filled by mostly local labour from the area where possible and are not to be housed onsite.

Operation:
The 5MW solar facility is based on the single axis tracking system for adjustment of the panels or tables carrying the solar PV modules. One of the reasons for selecting this tracking system is the configuration flexibility which facilitates good utilisation of the available land and maximises the "pitch" or distance between tables. This

minimises the shading effects tables have on each other. Each table is equipped with a bow or curved component which carries a ring gear. The horizontal shafts have short worm gears which run against the ring gears to effect table adjustment. Tracking of the sun in a single axis solar PV system is usually aligned roughly along the north to south axes. The PV farm tracking system can be operated either automatically or remotely. The tracker adjustment range is -50 to +50 degrees. The pitch between tables would be 6m. The tracker controllers are an integral part of the tracking system and they provide backtracking functionality in order to minimise the effects of shadowing.
Twenty solar polycrystalline PV modules will be grouped together in a panel or table. Each table would carry 20 modules, which would be mounted with the long edges perpendicular to the tracking axis. All 20 modules of a table would be electrically interconnected to form a string.
An array of 309 such tables would be connected to 2 x 1000kVA, 1000V Inverters, the rating being selected to allow for the Reactive Power requirements of the South African Grid Code. The two inverters of each array would be connected to the Low Voltage windings of a common inverter transformer, and the medium voltage windings of these transformers would be rated at 22kV. Grid connection would also be at 22kV, so that no further stepping-up of the voltage is required.
During periods of high wind or when undergoing maintenance, the solar arrays would be shifted to a stand-by mode, where the panels are placed in a horizontal position (facing upward and parallel to the ground).
Approximately 10 workers (7 direct and 3 indirect) are envisaged to be required during the operational phase of the proposed solar development. The lifespan of the development is expected to last for +-25 years. Positions will be filled by mostly local labour from the area and are not to be housed onsite.

Maintenance:
Periodic maintenance activities involve replacing non-functioning cells or other mechanical parts essential to the operation of the arrays. Trips to the solar PV farm to undertake maintenance would occur on an as-needed basis. Maintenance visits may not occur immediately after a module ceases to function or a part becomes damaged – the Project Applicant would determine whether the benefit of the maintenance trip outweighs the cost of that additional trip. It is assumed, however, that maintenance visits would occur four to six times per year. Individuals responsible for maintenance activities would most likely commute from regional offices or nearby operating facilities.
Since sunlight can be absorbed by dust and other impurities on the surface of the photovoltaic panels, washings would periodically be needed. An estimated 1850m^3 of water will be used during construction and during operation and maintenance about twice that amount per year would be required for cleaning the photovoltaic panels.
Under the original 2012 approved environmental application, this water allocation/availability was confirmed in writing by the Matzikama Local Municipality for both construction and operation/maintenance and the DBAR mentioned that potable water would not be required for cleasning/maintenance. However, at the time of the current application, the Western Cape is experiencing severe drought and has been designated a disaster area due to these conditions.
Therefore, after due consideration of specifically, the West Coast District Municipality (WCDM), the Western Cape Department of Environmental Affairs and Development Planning (DEADP) and the Matzikama Local Municipality comments on the DBAR related to water use and supply/sources, it was mentioned in the DBAR that alternative water sources would also be investigated.
It is, therefore, proposed that one of the original water source alternatives investigated in 2012 which uses significantly less water for cleaning the panels be adopted i.e. that non-potable groundwater from an existing registered borehole owned by the farmer and governed by General Authorisation (GA) number 399, dated 26 March 2004, be utilised. Refer to letter from Department of Water and Sanitation (DWS) dated 20 October 2014 as included as Annexure J8 of final BAR. An estimated 651m^3 of non-potable water will be required during the approximately 6 month construction period. During operation and maintenance about 970m^3 per year would be required for cleaning the photovoltaic panels. It should be noted that in an attempt to reduce water consumption as much as possible, the amount of water required is significantly less than was proposed in the DBAR.

During maintenance waste separation and recycling will take place as per the facility's environmental management programme.

Decommissioning:
The solar energy facility is expected to have a lifespan of +-25 years. The facility would only be decommissioned and the site rehabilitated once it has reached the end of its economic life. It would most likely be due to the enhancement of technology/infrastructure in the future of renewable energy.

Note: Throughout all phases of the development lifecycle i.e. site preparation, plant construction, operation, maintenance and final decommissioning, waste management in line with the project's environmental management programme includes waste separation, timely periodic waste removal to registered waste sites and recycling where possible.

b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN 327, 325 and 324	Description of project activity
GN. R. 327 Item 1(ii): The development of facilities or infrastructure for the generation of electricity from a renewable resource where the output is 10 megawatts (MW) or less but the total extent of the facility covers an area in excess of 1 hectare (ha) excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area	The development of a solar photovoltaic array with an electricity output of less than 10MW and with a footprint not exceeding 20ha will be developed on the remainder of the Farm De Duinen No. 258, near Vanrhynsdorp in the Western Cape. The development's actual maximum contracted electricity generation capacity is 5MW with a nameplate electricity generation capacity of 5.75MW.
GN. R. 327 Item 27: The clearance of an area of 1ha or more, but less than 20ha of indigenous vegetation	Clearance of most of the 20ha site will be required.

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 as required by Appendix 1 (3)(h), Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) 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.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	
The development footprint is an area not exceeding 20ha on the remainder of the Farm De Duinen No. 258, Vanrhynsdorp, Matzikama Local Municipality, Western Cape Province. This is also the preferred development site for which landowner consent use has been granted.	31°34'46.02"S	18°44'46.91"E

The property belongs to the Jimmy Wiese Family Trust (Mr A H Wiese) and comprises of 245.1214ha (286.1228 Morgen) in total. The nature of the site required for renewable energy generation projects often means that assessment of site alternatives is not possible. The whole farm De Duinen was taken into account and the most suitable portion of 20ha was identified with regards to the following specifications:

- **Size**: 20ha
- **Landowner consent**: The Jimmy Wiese Family Trust has provided consent
- **Available access**: The site can be accessed from an existing road leading north from Vanrhynsdorp, additional temporary access roads will have to be established within the 20ha site.
- **Locality to nearest electricity grid for power evacuation**: Vanrhynsdorp substation is located approximately 2.4km south of the site.
- **Topography**: The proposed site is located on a flat plain.
- **Agricultural Potential:** The site was specifically chosen due to an area with low agricultural potential.
- **Biodiversity:** The proposed development site was chosen for least environmental impact – based on the original (2012) Biodiversity Assessment, the proposed site avoids a Critical Biodiversity Area Corridor. In addition, based on the revised (2017) Biodiversity Assessment, the proposed site avoids encroachment on any aquatic ecological support areas (ESAs) in the region. Although the entire region within which the site falls is indicated as a terrestrial ESA in the sensitivity maps (as per Appendix A3), it appears that the ecological support nature of the area will not be compromised or diminished by the proposed development since ecological processes will be able to continue in and around the area/site.
- **Heritage:** Heritage Western Cape has confirmed specialist studies that the site will not have a significant archaeological or paleontological impact and has indicated that it has not objection to the proposed project.
- **Visual:** According to specialist studies, the potential visual impact is rated within acceptable levels of change which requires no mitigation. In addition, the proposed route for the 9m high overhead power lines will follow the route already impacted by existing Eskom power line for more than two thirds of the proposed overhead power line route.

Alternative 2

Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

In the case of linear activities: **Not Applicable**

Alternative:	**Latitude (S):**	**Longitude (E):**
Alternative S1 (preferred)		
• Starting point of the activity		
• Middle/Additional point of the activity		
• End point of the activity		
Alternative S2 (if any)		
• Starting point of the activity		
• Middle/Additional point of the activity		
• End point of the activity		
Alternative S3 (if any)		
• Starting point of the activity		
• Middle/Additional point of the activity		
• End point of the activity		

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

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A-1 of this form.

b) Lay-out alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
This post application BAR addresses the reapplication process for an EA granted by the Department but which expired before construction could commence. The preferred 20ha site originally authorised and currently being applied for, allows some variation in the layout of the solar PV array but this is also largely constrained by proximity to the substation and accessibility parameters in terms of the return on investment. The current and preferred layout of the proposed solar farm avoids sensitive biodiversity areas as was highlighted in the original (2012) application process and 2012 specialist biodiversity report.	Northern corner: 31°34'33.76"S Western corner: 31°34'40.32"S Southern corner: 31°34'55.51"S Eastern corner: 31°34'49.53"S	Northern corner: 18°44'48.65"E Western corner: 18°44'36.86"E Southern corner: 18°44'46.37"E Eastern corner: 18°44'58.35"E
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Within the 20ha site, the layout of the PV panels could be moved slightly since this application is for a solar PV farm with a maximum output capacity of 5MW. An estimate of the area needed to produce one MW of electricity from a solar PV array	Northern corner: 31°34'33.76"S Western corner: 31°34'40.32"S	Northern corner: 18°44'48.65"E Western corner: 18°44'36.86"E

in South Africa i.e. the ha/MW, may be found below in Table 1 – Comparison of Alternate Solar PV technologies (Space efficiency comparison). With the preferred technology alternative proposed in this DBAR, approximately 2ha/MW are required. Thus, for a 5MW plant, 10ha will be required excluding infrastructure spatial needs within the site. In addition, the single axis tracking, ground mounted solar PV arrays proposed in this application, require a fairly flat terrain which further limits layout alternatives unless major earthworks are undertaken which is not ideal.	Southern corner: 31°34'55.51"S Eastern corner: 31°34'49.53"S	Southern corner: 18°44'46.37"E Eastern corner: 18°44'58.35"E
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

c) Technology alternatives

Alternative 1 (preferred alternative)
The preferred technology in this application is the solar poly-crystalline PV module, on a ground mounted, single axis tracking system. The crystalline PV module technology was also the preferred option in the initial application as amended and authorised. Refer to Table 1 – Comparison of Alternate Solar PV technologies
Alternative 2
The solar PV technology initially assessed due to its high output during direct normal irradiation (DNI) was the concentrated PV system (CPV). While this was the original preferred technology in the initial application and was assessed in detail, the amended application for which authorisation was granted, proposed the solar crystalline PV system primarily due to a reduction in the cost of PV when compared to CPV. In addition, the proponent's experience was that financiers were more comfortable with investing in the more established solar poly-crystalline PV system than in CPV. Refer to Table 1 – Comparison of Alternate Solar PV technologies
Alternative 3
The least preferred technology considered was thin film PV cells. Refer to Table 1 – Comparison of Alternate Solar PV technologies

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)		
No alternatives other than those discussed above, apply.		
Alternative 2		
Alternative 3		

e) No-go alternative

The No-Go alternative always exists and would result in the purpose and need of the proposed activity not being met i.e. the generation of renewable energy electricity and provision of electricity in terms of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) would not take place.

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

Due to the information required in paragraphs 3 – 13 being identical for each alternative mentioned above (except the no-go alternative) and only the visual impact of CPV being medium instead of low

as it is for the crystalline PV system and thin film PV cells, paragraphs 3 – 13 have been completed only for the preferred alternative. However, an analysis of the three alternate technologies is presented below and is further summarised in details in Table 1 - Comparison of Alternate Solar PV technologies:

Analysis of solar PV technology alternatives for Roma Energy Vanrhynsdorp (Pty) Ltd.

Solar PV systems and solar CPV systems differ only in the mechanics by which the cells making up the respective systems, capture and convert sunlight into direct current (DC) electricity.
PV systems come in three broad categories of cell type: mono-crystalline, poly-crystalline and thin film. The active panels are large and virtually the whole surface area is made up of PV cells.
In contrast, in CPV systems, the so-called 'multi-junction' cells are small (10mm x 10mm or smaller) and sunlight is focused onto these cells by some form of lens. The active 'multi-junction' cell material thus only constitutes a small fraction of the surface area of the CPV system.

Mono- and ploy-crystalline systems differ only in the manufacture of the silicon wafers used as the basic building blocks of the PV cell. In the case of mono-crystalline cells, as the name suggests, large single crystals of quartz are grown and then cut into thin quartz wafers. In the case of poly-crystalline cells, multiple interlocking quartz crystals are grown and then cut into thin wafers, with each wafer having multiple (poly = many) quartz crystals.

The performance of both mono- and poly-crystalline PV panels is very similar with actual performance output linked more to the quality of the quartz and the manufacturing process than to whether they are mono- or poly-crystalline. Both versions of crystalline PV are currently the most widely deployed and tested PV systems, globally.

There are a number of different varieties of thin film PV cells available. In all cases, various thin layers of material are coated on an appropriate substrate that is often glass. The main variants include amorphous silica (a-Si), Cadmium telluride (CdTe) or Copper Indium Gallium Selenide (CIGS). Thin film PV is generally less efficient at converting sunlight into electricity than crystalline PV but is it also generally less expensive to manufacture. In addition, it has a lower temperature degradation efficiency than crystalline PV.

In both PV and CPV systems, once sunlight has been converted into dc electricity, the so-called 'balance-of-systems' are essentially identical. Inverters convert the electricity from DC to alternating current (AC) and step-up transformers increase the voltage to the appropriate level to facilitate connection, or tie-in, to the national grid (typically, 11-22kVA).

In choosing which solar PV technology is most appropriate for a particular site or project, a number of factors come into play, many of which have as much to do with external socio-economic benefits, as they do with technical efficiencies. EIA studies on potential solar sites should, as a matter of course, look at the impacts of all variants of solar PV technologies as the eventual choice of technology is very often driven by the external factor of funder risk-preference/perception.

Table 1 below, outlines some of the factors that must be considered when making the final decision as to which of the solar PV technologies to use on a specific site, for a specific project.

Factor	Thin film PV	Crystalline PV	CPV	Comments
Direct Normal Irradiation (DNI)	Less appropriate	Less appropriate	More appropriate	CPV systems rely on DNI. There is a requirement for the system to be at right angles to the incoming radiation in order to focus the energy on the multi-junction cell.
Global Horizontal	More appropriate	More appropriate	Not appropriate	GHI is more appropriate to PV systems as they are able to make use of both direct, as well as scattered

Irradiation (GHI)				and reflected sunlight (no focussing is required).
Cloud Cover	Reduced output	Reduced output	Major reduction in output	CPV systems are far more sensitive to cloud cover than PV systems and output is severely reduced.
Temperature	Lower drop-off in performance with increasing temperature than crystalline PV	Significant drop-off in performance with increasing temperature	Lowest drop-off in performance with increasing temperature than crystalline PV	Electricity output may decrease by as much as 10% in high temperature environments for PV systems. Thin film systems perform better than crystalline systems at high temperature and CPV systems perform the best (least reduction in output).
Space Efficiency	> 2ha/MW	+- 2ha/MW	< 2ha/MW	Space requirements per MW are thin film PV > crystalline PV > CPV.
Fixed Tilt Possible	Yes	Yes	Yes	PV systems are most commonly installed as fixed-tilt systems, with the optimum tilt angle a function of latitude. CPV systems have to have two-axis tracking in order to remain at right angles to the incident radiation.
Single Axis Tracking Possible	Yes	Yes	No	PV systems are frequently installed on single axis tracking systems, particularly when space is at a premium. As above, CPV cannot operate other than with a dual axis tracking system.
Dual Axis Tracking Possible	Yes	Yes	Yes, essential	Dual axis tracking is essential for CPV systems. It is also available for PV systems but is not essential and is not as common as fixed-tilt or single axis tracking. When used for PV systems, the economics of the added efficiency need to be weighed up against the additional cost and the increased operating and maintenance costs and complexity.
Output per Installed MW	Function of cell efficiency and GHI	Function of cell efficiency and GHI	Function of cell efficiency and DNI	Output for CPV in high DNI areas (i.e. few cloudy days) is generally much higher (+ 30%) than for fixed-tilt PV. This difference is obviously less pronounced when comparing CPV to dual axis tracking PV. However, dual axis tracking PV is not common and is often an 'add-on', whereas in CPV systems it is integral to the system
Cost per Installed MW (AC)	$1.60-$2.10	$1.80-$2.10	$2.40-$3.00	These are indicative prices for full turnkey costs including grid connections costs in the current South African market. These prices are for AC MW delivered to the national grid buzz bars.
Solar Market Share	< 5%	> 95%	> 0.1%	PV, with CPV representing about 0.1%, dominates the current world market share. This is likely to change in the future and the figure to watch is the new-market share, rather than basing figures on the existing installed base.
Ease of Financing	Less easy	Easy	Difficult	PV is extremely well established and has a proven track record. It is thus easy to finance, both from a debt and equity perspective. CPV, on the other hand, is an emerging technology, with a shorter track record and is accordingly generally more difficult to

				finance.
Job Creation	Reasonable during construction, low during operation	Reasonable during construction, low during operation	Reasonable during construction, low during operation	Both PV and CPV will create a fair number of jobs during the construction phase, with PV most likely creating more jobs than CPV, albeit of a lower-skilled nature. Neither PV nor CPV will create many operational jobs, with the jobs created by CPV exceeding those created by PV (more complex systems requiring more maintenance).
Local Manufacturing Job Creation	Limited, unless large pipeline of MW available to single manufacturer	Limited, unless large pipeline of MW available to single manufacturer	Good potential	The nature of CPV systems more or less dictate a large component of local manufacture. The lenses that focus the sunlight are located some distance from the multi-junction cells and are installed in a metallic box-like structure that is neither practical nor economic to transport long distances. CPV manufacturing facilities can be economically justified on modest production pipelines that are an order of magnitude less than the equivalent PV pipelines required to localise manufacture.
Ground Cover and Shading	Extensive, fixed	Extensive, fixed	Minimum, variable	Fixed-tilt, ground-mounted PV systems feature blanket ground cover and shading with some relief from spacing between rows of panels. CPV systems are generally pedestal-mounted and have moving shading patterns as they track the sun. CPV systems thus have a very small ground footprint.
Topographic Conditions	Flat ground preferred	Flat ground preferred	Flat ground preferred	Both PV and CPV systems are most easily constructed on flat ground. CPV systems are, however, more easily adapted to gently undulating topography than PV systems due to their pedestal versus rack mounting.
Visual Impacts	Low	Low	Medium	Ground-mounted fixed-tilt PV systems have a low visual impact and if necessary can be hidden by suitable screens or walls. Most CPV systems are visually more conspicuous (generally much higher structures).

Table 1 – Comparison of Alternative Solar PV technologies

3. PHYSICAL SIZE OF THE ACTIVITY

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

Alternative:	**Size of the activity:**
Alternative A1[1] (preferred activity alternative)	200 000 m²
Alternative A2 (if any)	m²
Alternative A3 (if any)	m²

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

or, for linear activities: **N/A**

Alternative:	**Length of the activity:**
Alternative A1 (preferred activity alternative)	m
Alternative A2 (if any)	m
Alternative A3 (if any)	m

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

Alternative:	**Size of the site/servitude:**
Alternative A1 (preferred activity alternative)	200 000 m²
Alternative A2 (if any)	m²
Alternative A3 (if any)	m²

4. SITE ACCESS

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

Describe the type of access road planned:

The main access roads to the site are existing dirt roads. The main gate to the proposed site is just off one of these dirt roads and it is proposed that a gravel/dirt road not more than 4m in width and be graded to allow access to the proposed area for the solar PV farm. Within the site there will be graded dirt/gravel fire service and access roads to the panels for maintenance (approximately 3m to 4m in width).

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.

5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A-1. 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 accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s;)
- 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).

6. LAYOUT/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:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

Refer to Appendix A, as well as specific specialist reports as attached in Appendix D for relevant sensitivity maps. Note: The sensitivity map in Appendix A indicates the entire area assessed for the current application. After a site visit with the Department of Water and Sanitation in September 2017, it was decided to confine the preferred site for the 20ha to the most eastern part of the assessed area (away from any significant CBAs and the aquatic ESA located to the west of the assessed area). Although the entire region within which the site falls is indicated as a terrestrial ESA in the sensitivity maps (as per Appendix A3), it appears that the ecological support nature of the area will not be compromised or diminished by the proposed development since ecological processes will be able to continue in and around the area/site.

8. 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 report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 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.

Refer to Appendix A for facility illustration as depicted in the layout plan.

10. ACTIVITY MOTIVATION

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

1. Is the activity permitted in terms of the property's existing land use rights?	YES	NO ✓	Please explain
The property's current zoning is deemed to be zoned as Agricultural Zone 1. The proposed site is on privately owned land and is surrounded by mixed land uses. A consent use application for the land is currently in the Matzikama Municipality land use system (and is being undertaken by a separate town planning consultancy). EnviroAfrica has been informed that said application has not yet been finalised and that the consent use application must be amended to include the latest Environmental Authorisation when it becomes available.			

2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES ✓	NO	Please explain
According to the Western Cape (WC) 2014 PSDF: i. point 1.4.1.2 (Improving Infrastructure) makes reference to the National Development Plan's (NDP's) identification of infrastructure as essential for development and prioritisation of diversifying the energy mix towards gas (i.e. imported liquid natural gas and finding domestic gas reserves) and renewables; ii. point 1.4.3 refers to the 2013 WC Infrastructure Framework (WCIF) as "a long-term strategic framework that aligns with the OneCape 2040 vision and timeframe. The WCIF sets out the required changes and development agendas relating to infrastructure provision to optimally achieve the OneCape 2040 transitions. Table 4 of the WCIF further sets out high-level transitions, per sector, required to achieve the optimised development agenda. One of the proposed transitions in the 'Energy' sector is to "Promote the development of renewable energy plants in the Province and associated manufacturing capability"; iii. under the heading 'Energy' in point 3.1.6.2 (Provincial Spatial Policies) the WC 2014 PSDF states that the province must – "Pursue energy diversification and energy efficiency in order for the Western Cape to transition to a low carbon, sustainable energy future, and delink economic growth from energy use", "Support emergent Independent Power Producers (IPPs) and sustainable energy producers (wind, solar, biomass and waste conversion initiatives) in suitable rural locations (as per recommendations of the Strategic Environmental Assessments for wind energy (DEADP) and renewable energy (DEA))"; iv. also in point 3.1.6.2, under 'Climate Change Mitigation', it states that the province must "Encourage and support renewable energy generation at scale". Further to the above, the 2014 PSDF states in point: 3.2.1.4 that the WC's "economic prospects lie in the urban space-economy, with public infrastructure investment forecast to be the leading driver of growth, hence one of the economic sectors/specific areas targeted for support is renewable energy (low job creation potential) on farms, subject to consistency with biodiversity, heritage, scenic, and agricultural requirements" and 3.2.2 (Regional Economic Infrastructure) sub-point 3.2.2.2 that the 2013 WCIF advocates a new approach to infrastructure - one that satisfies current needs and backlogs, maintains existing infrastructure, and plans proactively for a desired future outcome leading to resilient and inclusive growth *en* route to a vibrant, equitable and low-carbon society. To this end the following infrastructure transition strategy is being followed - Energy Systems: Develop the renewable energy sector.			
(b) Urban edge / Edge of Built environment for the area	YES ✓	NO	Please explain
The site is located on privately owned land outside the urban edge of Vanrhynsdorp. It is situated near other industrial and agricultural land uses such as vineyards and Eskom powerlines and the Eskom Vanrhynsdorp substation/HV yard about 2,400m away from the proposed site. Agricultural and industrial land uses are typically found on the edge of built environment areas.			
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES ✓	NO	Please explain
The proposed development is in line with the Matzikama IDP and SDP in that it enhances local economic development (LED) and promotes sustainable industry which is part of the local Municipality's LED strategy. This application would add to the integrity of the existing IDP and SDF.			

(d) Approved Structure Plan of the Municipality	YES ✓	NO	Please explain
The proposed development site is outside the "urban edge" and the site was previously approved for a renewable energy development (solar PV farm) before the authorisation expired prompting this reapplication.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES ✓	NO	Please explain
The proposed development does not compromise existing environmental management priorities. The proposed renewable energy farm actually enhances provincial and local municipality achievement of priority objectives.			
(f) Any other Plans (e.g. Guide Plan)	YES ✓	NO	Please explain
Besides the WC 2014 PSDF and Matzikama IDP and SDF, the proposed development is in line with the national DoE's IRP 2010-2030 which was promulgated with the aim of providing a long-term, cost-effective strategy to meet the electricity demand in South Africa. The IRP 2010-2030 objectives align with Government's in terms of reliable electricity supply, as well as environmental and social responsibilities and economic policies. Furthermore, the proposed renewable energy development is in line with the national REIPPPP strategy.			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	YES ✓	NO	Please explain
The planning horizon for the DoE's IRP 2010-2030 comes to an end in 2030 and the proposed development falls within this timeframe. In addition, it is in line with the Matzikama IDP and SDP which are part of the WC 2014 PSDF. The original EA was granted for the project which has an estimated lifespan of approximately 25 years.			
4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	YES ✓	NO	Please explain
The promotion of renewable energy developments in the WC province is a priority for the local Municipality.			
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	YES ✓	NO	Please explain
The main service required is an access road to the site which already exists and the provision of non-potable water for controlled manual cleaning of the panels four to six time a year which it is proposed will be obtained from an appropriately registered borehole(as per Appendix J8).			

6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	YES	NO ✓	Please explain
This development was not provided for in the Municipality's infrastructure planning but the proposed solar PV farm does not require provision of infrastructure services by the Municipality except for the possible occasional emptying of solids from the on-site septic tank.			
7. Is this project part of a national programme to address an issue of national concern or importance?	YES ✓	NO	Please explain
The issue of long term electricity supply from renewable source is of national concern and forms part of the DoE's IRP 2010-2030 which was promulgated with the aim of providing a long-term, cost-effective strategy to meet the electricity demand in South Africa. The IRP 2010-2030 objectives align with Government's in terms of reliable electricity supply, as well as environmental and social responsibilities and economic policies. The proposed renewable energy development also aligns with the national REIPPPP strategy.			
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YES ✓	NO	Please explain
Location factors favour this land use since the Northern part of the Western Cape is well suited for solar based renewable energy harvesting. The area is currently zoned as Agriculture 1. In addition, the proposed site is easily accessible using existing roads (primarily the N7, R27 and existing secondary roads). The site's relatively close proximity to the point of tie-in with the national electricity grid at the local Eskom (Vanrhynsdorp) substation and cognisance of Critical Biodiversity Areas (CBAs) and aquatic Ecological Support Areas (ESAs) in the area, also makes the proposed land use the best practicable environmental option suited for this development. Although the entire region within which the site falls is indicated as a terrestrial ESA in the sensitivity map (as per Appendix A3), it appears that the ecological support nature of the area will not be compromised or diminished by the proposed development since ecological processes will be able to continue in and around the area/site.			
9. Is the development the best practicable environmental option for this land/site?	YES ✓	NO	Please explain
The proposed development site avoids critical biodiversity areas/corridors and is zoned as Agriculture 1. In addition, due to the site's accessibility on existing roads, as well as its proximity to the point of tie-in with the national electricity grid, actual and potential environmental impacts from the possible provision of these infrastructure requirements will be minimal. The site, therefore, is the best practicable environmental option suited for this development.			

10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES ✓	NO	Please explain
When the practical environmental benefits of increasing national renewable energy generation capacity and meeting the Western Cape Provincial Spatial Development Strategy are considered against the option of the no-go alternative, then the benefits of the proposed development outweigh the negative impacts from the development which can be mitigated.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	NO ✓	Please explain
The original application and other similar renewable energy sites have been authorised by the local municipality already and several exist within the district municipal areas. This post application BAR is a reapplication since the original application had been authorised in 2013 but the proponent did not commence construction before the original authorisation lapsed.			
12. Will any person's rights be negatively affected by the proposed activity/ies?	YES	NO ✓	Please explain
Previous socio-economic and recently re-examined preliminary socio-economic assessments for the proposed development did not indicate that any person's rights would be negatively affected by the development. There were no rights related issues from the previous public participation process (PPP). The first round of recent PPP was concluded for the pre-application draft BAR and issues raised have been captured in the comments and response trail as per Appendix E3.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	YES	NO ✓	Please explain
Developments of this nature usually fall outside the urban edge as is the case in this application.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES ✓	NO	Please explain
The proposed renewable energy solar PV development will contribute directly to SIPS 8 and 9 i.e. Green Energy in support of the South African economy and Electricity Generation to support socio-economic development, respectively.			
15. What will the benefits be to society in general and to the local communities?			Please explain
This application is in response to the DoE's target and IRP 2010-2030 strategy to expand the South African renewable energy electricity generation capacity. The issue of long term electricity supply from renewable sources is of national concern and forms part of the DoE's IRP 2010-2030 which was promulgated with the aim of providing a long-term, cost-effective strategy to meet the electricity demand in South Africa. The IRP 2010-2030 objectives align with Government's in terms of reliable electricity supply, as well as environmental and social responsibilities and economic policies. There will also be benefits, albeit to a much lesser degree, to local communities in the form of: i. limited local businesses will benefit when construction and maintenance teams visit the Solar PV farm site ii. a local business will supply security services for the site iii. a small amount of training/skills transfer for operational and maintenance staff.			

16. Any other need and desirability considerations related to the proposed activity?	Please explain

The proposed solar PV development is in direct response to the DoE's target and IRP 2010-2030 strategy to expand the South African renewable energy electricity generation capacity. The issue of long term electricity supply from renewable sources is of national concern and forms part of the DoE's IRP 2010-2030 which was promulgated with the aim of providing a long-term, cost-effective strategy to meet the electricity demand in South Africa.

The IRP 2010-2030 objectives align with Government's in terms of reliable electricity supply, as well as with the national REIPPPP strategy, increasing public-private partnership.

The proposed renewable energy solar PV development will contribute directly to SIPS 8 and 9 i.e. Green Energy in support of the South African economy and Electricity Generation to support socio-economic development, respectively.

17. How does the project fit into the National Development Plan for 2030?	Please explain

The proposed solar PV farm development fits into the National Development Plan (NDP) for 2030 to greater or lesser degrees, depending on the specific NDP goal. A summary of the directly relevant NDP commitments and goals are provided below with the specific project 'fit' indicated in brackets:

Some of the NDP milestones for the area are to:

i. increase employment (to a small extent, employment opportunities for the local community will exist during construction and operation/maintenance of the proposed development),
ii. ensure skilled posts reflect the country's racial, gender and disability makeup (socio-economic input will involve training and development of operational employees albeit at a lower skill-set level),
iii. broaden ownership of assets to historically disadvantaged groups (where possible, community share-holding in the development will be established),
iv. produce sufficient energy to support industry at competitive prices and ensuring access for poor households while reducing carbon emissions per unit of power by about one-third (the solar PV farm's production of electricity has significantly less carbon emissions implications than the conventional coal-fired electricity supply currently dominating the South African economy.

Several critical actions related to the NDP milestones have been identified such as:

i. a strategy to address poverty and its impacts by broadening access to employment strengthening the social wage, improving public transport and raising rural incomes (The proposed development falls out of the urban edge area and is positioned in a more rural environment. Provision of employment opportunities, albeit small, will thus contribute to raising rural incomes),
ii. public infrastructure development at 10% of the gross domestic product financed through tariffs, public-private partnerships, taxes and loans and focussed on transport, energy and water (The IRP 2010-2030 objectives align with Government's in terms of reliable electricity supply, as well as with the national REIPPPP strategy, increasing public-private partnerships. Electricity produced by the solar PV farm will be fed into the national electricity grid and contribute towards the country's total electrical energy supply),
iii. interventions to ensure environmental sustainability and resilience to future shocks (The proposed solar PV development is in direct response to the DoE's target and IRP 2010-2030 strategy to expand the South African renewable energy electricity generation capacity. The issue of long term electricity supply from renewable sources is of national concern and forms part of the DoE's IRP 2010-2030 which was promulgated with the aim of providing a long-term, cost-effective strategy to meet the electricity demand in South Africa. The IRP 2010-2030 objectives align with Government's in terms of reliable electricity supply, environmental and social responsibilities, as well as economic policies and contribute directly to SIPS 8 and 9 i.e. Green Energy in support of the South African economy and Electricity Generation to support socio-economic development, respectively

18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.
Even though this post application BAR is a reapplication for an EA which was granted in 2012, the precautionary principle and a risk adverse approach has been adopted. In line with NEMA s.23, two public participation interventions will take place before submission of the final BAR to the Authorities. All specialists have been reappointed to reassess and verify socio-economic, heritage, biodiversity, visual and land related impacts and opportunities which could result from this project. Additional potential impacts and opportunities from this activity have also been reassessed (with site revisits conducted in 2017). Reassessed specialist inputs and 2017 BAR site visit information will be presented for scrutiny in the post application BAR during the second round of public participation. Environmental Management plans/programmes for site establishment, as well as the construction, operation, maintenance and decommissioning phases of the project will be redeveloped to ensure that the objectives of integrated environmental management set out in NEMA s.23 are taken into account.
19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.
Please refer to answer in point 18 above.

11. 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	Applicability to the project	Administering authority	Date
The National Environmental Management Act, No. 107 of 1998, as amended (NEMA)	Section 2 – precautionary principle and risk adverse approach to development; EIA Regulations No. 983 and 984 under respective Listing Notices 1 and 2, of 2014	Department (Dept.) of Environmental Affairs (National)	1998
The National Heritage Resources Act No. 25 of 1999	Section 35 dealing with archaeological or palaeontological objects or material, as well as meteorites	SA Heritage Resources Agency (SAHRA)	1999
Spatial Planning and Land Use Management Act, No. 16 of 2013	Spatial Planning and Land Use Development	Dept. of Rural Development and Land Reform (National); Dept. of Environmental Affairs and Development Planning(DEADP)	2013
The Western Cape Land Use Planning Act No. 3 of 2014	Western Cape Provincial Spatial Development Framework, 2014	Dept. of Environmental Affairs and Development Planning(DEADP)	2014
The Matzikama Municipality: Land Use Planning By-Law, 2015	Change in land use from Agriculture 1 to Industrial	Matzikama Municipality	2015
The National Environmental Management Biodiversity Act No. 10 of 2004	Section 53 (1) – potential for critical biodiversity areas as identified by the Minister	Dept. Environmental Affairs (National)	2004
National Forests Act No. 84 of	List of protected trees	Dept. Environmental	1998

1998 (as amended)		Affairs (National)	
The National Environmental Management Waste Act No. 59 of 2008	Domestic (and potentially hazardous) waste generation and removal from site to applicably registered waste disposal site.	Matzikama Local Municipality	2008

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	YES ✓	NO
If YES, what estimated quantity will be produced per month?	5 -10m³	

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

General construction waste such as packaging, paper and domestic waste will be transported off site to a registered municipal waste disposal facility. Electrical waste will be separated from the general domestic waste and where possible, other waste separation will also take place prior to disposal. The engineering, procurement and construction (EPC) contractor will request a permit from the local municipality 90 days before construction starts to ensure correct permission to dispose waste at the registered municipal facility. The EPC contractor has also mentioned that a disposal slip will be obtained from the municipality each time waste is disposed to ensure safe disposal and for our records and auditing purposes.

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

The nearest available registered municipal solid waste disposal facility.

Will the activity produce solid waste during its operational phase?	YES	NO✓
If YES, what estimated quantity will be produced per month?		m³

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

N/A

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

N/A

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

Note no solid waste will be produced as part of the regular operational phase but there may be small amounts of solid waste (primarily electrical and domestic) during the four to six times that cleaning/maintenance will take place in a year. Maintenance periods are on average, a maximum of one week long (if even) and if solid waste is produced during these maintenance times, it will be disposed of at the nearest local registered municipal solid waste site. It is expected that unless solar PV panels are damaged, most of the waste generated during maintenance periods will be domestic waste (paper, plastic and food) from the work team cleaning the panels.

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 NEM:WA?	YES	NO✓

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility?	YES	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. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	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	NO✓

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

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

Non-potable water will be brought to site in water tanker trucks which will be checked regularly so that the tanker valve does not leak. There is not much opportunity for reuse of water used for washing dust off the solar PV panels when this takes place during maintenance (four to six times a year) since the water is judiciously applied (using manual labour and buckets) as the panels are individually cleaned.

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other that exhaust emissions and dust associated with construction phase activities?	YES	NO✓
If YES, is it controlled by any legislation of any sphere of government?	YES	NO✓

If YES, the applicant must 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:

Fugitive dust emission from site preparation will occur (e.g. dust blow off during grading of service roads and excavation to lay underground cables). The drilling machines used to drill substructure post holes will be equipped with a dust extraction vacuum system. There will be several diesel and some petrol vehicles on site: 2x drill rigs, 2x10m³ tipper trucks, 6x tractor and trailers; 1 x waste transport truck; 8 x site bakkies; 1x grader, 1x 20 ton roller; 1x water truck; 1 x TLB; 1 x 20 ton excavator; 1 x trenching machine; 4x Interlinks trucks transporting modules and steel structures to site. Vehicle emissions will be managed by ensuring that vehicles undergo regular maintenance. The use of vehicles that are no longer needed will be reduced. Stationary/unused vehicles will be turned off and not left to idle. Daily inspections will be carried out and spot checks will also be carried out by the EPC's Health, Safety, Sustainability and Environmental Department to ensure compliance to site emission control. Generators used during construction and will be well maintained and switched off when not in use.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?	YES	NO✓

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

Will the activity generate noise?	YES✓	NO
If YES, is it controlled by any legislation of any sphere of government?	YES	NO✓

Describe the noise in terms of type and level:

Initial vehicle noise from grader/earth moving equipment, trucks and vehicles delivering equipment to site during site preparation and construction. Generators used during construction will also generate noise. The area is deemed to be zoned for agricultural use. The period and duration of noise generated is therefore, relatively low. Actual operational activity does not generate noise.

13. WATER USE

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

Municipal	Water board	Groundwater ✓	River, stream, dam or lake	Other	The activity will not use water

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:	109000 litres (construction) 80833 litres (operation)
Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs? **Refer to Appendix J8 – General Authorisation already exists.**	YES / NO✓

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

14. ENERGY EFFICIENCY

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

The activity is the harvesting of solar energy to provide electrical energy to the National grid. As such design energy efficiency is in terms of how well the plant harvests energy from the sun. The design uses Global Horizontal Irradiation (GHI) which is more appropriate to PV systems as they are able to make use of both direct, as well as scattered and reflected sunlight (no focussing is required). In addition, a single axis tracking system enables maximum utilisation of sunlight.

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

N/A

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

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

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

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

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

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

See individual declarations for each specialist in respective specialist reports found in Appendix D.

Property description/physical address:

Province	Western Cape Province
District Municipality	West Coast District Municipality
Local Municipality	Matzikama Local Municipality
Ward Number(s)	N/A
Farm name and number	Remainder of the Farm De Duinen No. 258
Portion number	N/A
SG Code	C07800000000025800000

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:	Agricultural 1

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✓	NO

Note: For purposes of this DBAR, original site assessment information will be presented. Information from revisited site assessments as conducted in February March 2017, will be presented in the final BAR.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

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

Alternative S2 (if any):

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

Alternative S3 (if any):

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

2. LOCATION IN LANDSCAPE

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

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

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

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

	Alternative S1:		**Alternative S2 (if any):**		**Alternative S3 (if any):**	
Shallow water table (less than 1.5m deep)	YES	NO✓	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	NO✓	YES	NO	YES	NO

Seasonally wet soils (often close to water bodies)	YES	NO✓		YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO✓		YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	YES	NO✓		YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES	NO✓		YES	NO	YES	NO
Any other unstable soil or geological feature	YES	NO✓		YES	NO	YES	NO
An area sensitive to erosion	YES	NO✓		YES	NO	YES	NO

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

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

The agricultural potential of the site is determined mainly by the climate in that the rainfall effectively excludes any form of crop production. Additionally, the site specific soils are not suited to crop production under irrigation in their current state and will require significant physical preparation before irrigated land uses are considered. The costs of these physical measures vary between R 150 000 and R 250 000 per hectare depending the extent of blasting required to break large boulders and rock derived from the calcrete and dorbank. The site is therefore only suited to extensive grazing with a very low carrying capacity.
Due to the low agricultural potential of the site as well as the low rainfall the impacts on soils and agriculture is expected to be low – provided that adequate storm water management and erosion prevention measures are implemented.

Refer to Specialist reports in Appendix D1 attached.

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 infestation[E]	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.

See Biodiversity Assessments and Botanical Scans in Appendix D2

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES	NO✓	UNSURE
Non-Perennial River	YES	NO✓	UNSURE
Permanent Wetland	YES	NO✓	UNSURE
Seasonal Wetland	YES	NO✓	UNSURE
Artificial Wetland	YES	NO✓	UNSURE
Estuarine / Lagoonal wetland	YES	NO✓	UNSURE

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

6. LAND USE CHARACTER OF SURROUNDING AREA

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

Natural area ✓	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station [H]
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential[A]	Church	Agriculture ✓ (Farm – some grazing takes place)
Retail commercial & warehousing	Old age home	River, stream or wetland
Light industrial ✓ (Vanrhynsdorp substation to the South)	Sewage treatment plant[A]	Nature conservation area
Medium industrial [AN]	Train station or shunting yard [N]	Mountain, koppie or ridge
Heavy industrial [AN]	Railway line [N]	Museum
Power station	Major road (4 lanes or more) [N]	Historical building
Office/consulting room	Airport [N]✓ (airstrips near Vanrhynsdorp substation to the South)	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam[A]	Sport facilities	Archaeological site
Quarry, sand or borrow pit	Golf course	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? Specify and explain:

No negative impact is anticipated from the proposed development. **Refer to Specialist reports attached.**

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

N/A

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES ✓	NO
Core area of a protected area?	YES	NO✓
Buffer area of a protected area?	YES	NO✓
Planned expansion area of an existing protected area?	YES	NO✓
Existing offset area associated with a previous Environmental Authorisation?	YES	NO✓
Buffer area of the SKA?	YES	NO✓

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A. **Refer to sensitivity map as per Appendix A3.**

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:	YES	NO✓
	Uncertain	
N/A		

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

Refer to Appendix D3a: Archaeological Impact Assessment; D3b: Paleontological Impact Assessment and D4: Visual Impact Assessment.

Archaeological and Paleontological Impact Assessments (D3a and D3b)

Heritage Western Cape (HWC), the delegated Provincial Heritage Authority, reviewed the HIA and indicated in its final comment that it has 'no objections to the proposed development'.

In addition the actual plant layout within the 20ha site of the current proposed 5MW development, covers a much smaller area (i.e. half the size) than the 2012 10MW application area which was approved in 2012.

ACRM therefore confirms the findings of the 2012 study, and has no objections to the new development proceeding.

Visual Impact Assessments (D4)

Receiving Environment:
The site is situated in an area with a rural character. The surrounding area, however, does host an electrical substation and HV lines. The solar farm will thus not significantly change the character of the immediate environment. The view catchment is however small due to topographical variations. The landscape has a medium absorption rate which reduces the significance of land use change.

Findings:
The site is situated outside the urban edge but within visual context of the urban environment. The character of the immediate surrounds will be changed by the development, but it should be within acceptable levels of change.
The N7 southbound presents the only receptor which poses a potential visual impact of significance but due to the short duration it is regarded as of lesser significance and within acceptable levels.
Overall the visual impact of the development is of low significance.
The visual impacts are low and rated within acceptable levels of change, requiring no mitigation measures.
The proposed development does not present an unacceptable level of change to the visual environment and does not pose any significant cumulative visual impacts. Therefore, the specialist study deems the development can be recommended.

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

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

Refer to Appendix D4: Socio-economic Impact Assessment – more jobs and job opportunities will be created.

Economic profile of local municipality:

Refer to Appendix D4: Socio-economic Impact Assessment – the local economy will improve (increased sales and contribution to the GDP).

Level of education:

Refer to Appendix D4: Socio-economic Impact Assessment – skills levels will increase due to the proposed project.

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R 308.8 million	
What is the expected yearly income that will be generated by or as a result of the activity?	R 65 million	
Will the activity contribute to service infrastructure?	YES	NO✓
Is the activity a public amenity?	YES	NO✓
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	30 (over 6 to 8 months)	
What is the expected value of the employment opportunities during the development and construction phase?	Approximately R 3 million (R 2 million over 8 months)	
What percentage of this will accrue to previously disadvantaged individuals?	40 - 45%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	10 (7 direct and 3 indirect)	
What is the expected current value of the employment opportunities during the first 10 years?	R 8.7 million	
What percentage of this will accrue to previously disadvantaged individuals?	56% (R 4.9 million)	

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult http://bgis.sanbi.org or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category	If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan

Critical Biodiversity Area (CBA)	Ecological Support Area (ESA) ✓	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	Although the entire region within which the site falls is indicated as a terrestrial ESA in the sensitivity map (as per Appendix A3), it appears that the ecological support nature of the area will not be compromised or diminished by the proposed development since ecological processes will be able to continue in and around the area/site.

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	%	
Near Natural (includes areas with low to moderate level of alien invasive plants)	60-70%	Refer to point 'd' below and specialist report attached.
Degraded (includes areas heavily invaded by alien plants)	%	
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	%	

c) Complete the table to indicate:

(i) the type of vegetation, including its ecosystem status, present on the site; and

(ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems						
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline	
	Endangered							
	Vulnerable							
	Least Threatened	YES	NO✓	UNSURE	YES	NO✓	YES	NO✓

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

MAIN VEGETATION TYPE(S)	**Vanrhynsdorp Gannabosveld** **Least Threatened:** But conservation targets not yet achieved (it is however, unclear what impact the recently established Knersvlakte Nature Reserve has had on conservation targets for this vegetation type).
CRITICAL BIODIVERSITY AREAS	According to the Western Cape Biodiversity Spatial Plan (Figure 4) the proposed site will be located within an ecological support area (ESA 1), identified as a water recharge area. The larger area is not essential for meeting biodiversity targets, but can play an important role in supporting the functioning of protected areas or critical biodiversity area. The objective for CBA 1 areas is to maintain these areas in a functional near natural state. Some habitat loss may be acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised. It should be noted that the actual site 20ha site as indicated in Figure 2 of this BAR has been shifted away to avoid these significant CBA and ESA areas. The site is still covered by natural veld dominated by Gannabos. Although it is difficult to ascertain, it is likely that the veld has been impacted by domestic livestock grazing (a possible reason for the low species diversity – apart from the recent drought). However, because of its small size (±10 ha) and its location next to transformed land (vineyards), it is unlikely to result in a significant impact on the ecological support area. Although the entire region within which the site falls is indicated as a terrestrial ESA in the sensitivity map (as per Appendix A3), it appears that the ecological support nature of the area will not be compromised or diminished by the proposed development since ecological processes will be able to continue in and around the area/site.
CENTRES OF ENDEMISM	According to Van Wyk & Smith (2001) the site falls within the Knersvlakte Centre of Endemism. However, the proposed development is located on the sandy soils to the south of the true quarts-field flora and although it is likely that the veld will support a number of annual and geophyte flora (which can result in spectacular flower displays in spring after good rains), it is unlikely that the proposed development (given its relative small size and location) will result in any significant impact on the true Knersvlakte vegetation.
LAND USE AND COVER	The proposed development will impact on a small area used for grazing by the landowner. Loss of grazing will be barely perceptible within the larger property.
SIGNIFICANT PLANT SPECIES	No red list plant species were encountered No species protected in terms of NEM: BA were encountered No species protected in terms of the NFA were encountered
IMPACT ASSESSMENT	**Significance before mitigation:** The impact assessment suggests that the proposed Vanrhynsdorp development is expected to have a **Low cumulative** impact, with the most significant aspect being the low potential impacts on vegetation type, corridor and conservation priority areas, flora and accidental veld fires. The evaluation takes into account on the relative small size of the proposed development and its location adjacent to existing agricultural land (transformed land). **Significance after mitigation:** Since the proposed development footprint needs only be approximately 50% of the 20ha, there is great potential for micro-adjustment of the final layout plans. Even though the impact is already considered low it will still be possible to reduce direct impacts on other features of significance through layout adjustments, search & rescue and topsoil management. The potential impact on the regional status of the vegetation type and associated biodiversity features (e.g. corridor function or special habitats) is considered low. No irreversible species-loss, habitat-loss, connectivity or associated impact can be foreseen from locating and operating the solar facility on the proposed site. With mitigation the impact on biodiversity features can be reduced but will stay **Low**.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	Ons Kontrei	
Date published	18 August 2017	
Site notice position (approximate)	**Latitude**	**Longitude**
	31°35'57.39"S	18°44'28.66"E
Date placed	16 August 2017	

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733

See Appendix E for I&AP list (including key stakeholders) as identified during original and current pre-application processes.

Title, Name and Surname	Affiliation/Key stakeholder status	Contact details (Tel number or e-mail address)

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP

No issues raised by I&APs during original application process. Proof of I&APS issue trail for re-application process will be included Appendix E3.

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR 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 the Final BAR as Appendix E3.

This is a re-application process for an expired authorisation which was granted in 2012. Comments received from I&APs during this pre-application public participation process and the required responses, included in Appendix E3.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

See Appendix E1 for I&AP list (including authorities and Organs of State).

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation 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. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. 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

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts 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. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

Alternative S1 (preferred alternative):

DIRECT IMPACTS:

SOIL DEGRADATION – APPENDIX D1

Construction related activities:

Physical degradation of the surface area due to:

- Solar Panel stands – **LOW** – Mitigation: Keep footprint to minimum
- Buildings and infrastructure – **LOW** – Mitigation: Keep footprint to minimum
- Roads – **LOW** – Mitigation: Keep footprint to minimum and stay on designated roads
- Erosion – **LOW** – Mitigation: Plan and implement adequate erosion control measures, with adequate soil stabilization
- Mismanagement of removed topsoil – LOW – Mitigation: Ensure a plan for the sound management of topsoil (should the site be cleared using grading) is included in the EMP and implemented.

Operational related activities:

Physical degradation of the surface due to:

- Vehicle operations onsite – **LOW** – Mitigation: Stay on designated roads, prevent and contain spills
- Dust – **LOW** – Mitigation: Stay on designated roads and construct proper access roads

BIODIVERSITY IMPACTS – APPENDIX D2

Due to construction and operational activities there will be:

- Direct loss of vegetation type and associated habitat

- Loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species
- Loss of ecosystem connectivity

Even if the entire 20ha site is transformed (such as for intensive cultivation), the impact on the specific vegetation type would most probably only be **medium-low** as a result of the status of the vegetation and the location of the final proposed solar location. However, with mitigation the impact can be much reduced to an **INSIGNIFICANT** rating. Development without mitigation = 40% Significance rating and Development with mitigation = 16% Significance (Where values of ≤15% indicate an insignificant environmental impact and values >15% constitute ever increasing environmental impact).

Mitigation measures:

- A botanist or suitably experienced ECO must be appointed to oversee the initial layout of the construction site, with the aim to identify and minimise the impact on healthy individuals of the above protected trees. Wherever possible the placement of roads and solar structures should endeavour to avoid any of the protected tree species.
- In the case that some of these trees must be removed, permit approval must be obtained beforehand.
- It is also proposed that at least two plants of the same species be replanted for every single tree removed.
- Only existing access roads should be used for access to the terrain (solar site).
- The internal network of service roads (if needed) must be carefully planned to minimise the impact on the remaining natural veld on the site. The number of roads should be kept to the minimum and should be only two-track/twee spoor roads (if possible). The construction of hard surfaces should be minimised or avoided.
- Access roads and the internal road system must be clearly demarcated and access must be tightly controlled (deviations may not be allowed).
- Indiscriminate clearing of areas must be avoided, only pylon sites and sites where associated infrastructure needs to be placed must be cleared (all remaining areas to remain as natural as possible).
- All topsoil (at all excavation sites) must be removed and stored separately for re-use for rehabilitation purposes. The topsoil and vegetation should be replaced over the disturbed soil to provide a source of seed and a seed bed to encourage re-growth of the species removed during construction.
- Once the construction is completed all further movement must be confined to the access tracks to allow the vegetation to re-establish over the excavated areas.
- An additional biodiversity comment with specific reference to avifaunal impact of the proposed development (as per Appendices D2 and J9), indicates that impact will be minimal, if at all, but that, as a precautionary approach, bird flappers could be added to the power lines to make them more visible. The possibility of running an underground tie-in power cable for evacuation of the electricity to the local Eskom sub-station also exists.

  Note: According to the BirdLife South Africa Birds and Solar energy Best Practice Guidelines, the proposed development area is considered of low avifaunal sensitivity since it does not contain 1) avifaunal habitat (e.g. a wetlands, nesting or roost sites) of regional or national significance, 2) a population of a priority species that is of regional or national significance, and/or 3) a bird movement corridor that of regional or national significance 4) a protected area and/or Important Bird and Biodiversity Area.

ARCHAEOLOGICAL IMPACTS – APPENDIX D3a

Indications are that in terms of the archaeological heritage the proposed activity is viable.

Mitigation measures:

- The footprint area across the northern portion of the site should be re-surveyed once the vegetation has been cleared from the site. Archaeological visibility will be much higher and many more stone tools are likely to be encountered on the ironstone gravels which overlie this portion of the farm. These should be documented before any physical construction takes place on the site, so as to record a more representative sample of the archaeological remains.
- Should any unmarked human burials/remains or ostrich eggshell water flask caches be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 258 0172), or the South African Heritage Resources Agency (SAHRA 021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.

PALEONTOLOGICAL IMPACT ASSESSMENT – APPENDIX D3b

The overall fossil heritage impact significance of the proposed Vanrhynsdorp Roma Solar Plant development is considered to be **LOW** because:

Mitigation measures:

- It is therefore recommended that exemption from further specialist palaeontological studies and mitigation be granted for this solar plant development.
- Should any substantial fossil remains (e.g. vertebrate bones and teeth, shells, petrified wood) be encountered during excavation, however, these should be reported to SAHRA for possible mitigation by a professional palaeontologist.

VISUAL IMPACT ASSESSMENTS – APPENDIX D3c

Construction Phase:

During construction, various large earth moving equipment and equipment will be transported to the site and work on the site. This will impact on the general experience of viewers. This impact is however temporary and not uncommon during construction of infrastructure. Communities have fairly high tolerance levels for such activities if it contribute to the infrastructure of the area. Rating: **LOW**

Operational Phase:

The site is situated in an area with a rural character. The immediate area however does host an electrical substation and HV lines. The solar farm will thus change the character of the immediate environment. The view catchment is however small due to topographical variations. The landscape has a medium absorption rate which reduces the significance of land use change.

Mitigation measures:

- The nature of the development is such that very little mitigation measures is possible.
- It is however recommended that the transmission lines follow the alignment of the existing power lines as to reduce additional intrusion of infrastructure into the area.
- The operational management program should include a monitoring mechanism of potential glare issues and should such issues occur, the positioning of panels during the problematic period should be changed. This may impact slightly on the energy output sufficiency.

SOCIO-ECONOMIC IMPACTS (APPENDIX D4)

Impacts that may cause changes to the economic and material wellbeing of the community are:

- Job creation
- Skills development
- Increase in Sales volume
- Increase in GGP
- Growth in Tourism

All the above impacts are **positive**, but because of their positive result these impacts causes secondary impacts that may be negative. The significance of these impacts and how the secondary impacts can be mitigated to amplify the significance of these impacts should be assessed in the socio-economic impact assessment.

Impacts that may cause changes in the living environment of the community are:

- Increased traffic
- Increased demand for Health, Safety
- Increase demand for Housing and Municipal services
- Changing the sense of place

All the above impacts are **negative**, but mitigation can turn these impacts and their secondary impact to be **positive** as most of the impacts appear to be of **low or negligible significance**. These impacts and secondary impacts and how they can be mitigated have to be assessed particularly in the operational phase as the other impact of the other phases are short term.

Impacts that may cause changes in the health and social wellbeing of the community are:

- Increased dust and noise
- Deterioration of bio-physical environment
- Trespassing & crime
- Ceasing of farming activities

All the above impacts are negative however **negligible**. However, as these impacts have long term effects, they should be assessed in the socio-economic impact assessment.

INDIRECT IMPACTS:

Very few indirect impacts are associated with the establishment of the solar facility (e.g. little water will be used, no waste material or pollution will be produced through the operation of the facility).

The only indirect impact resulting from the construction and use of the facility is a loss of movement from small game and other mammals, since the property will be fenced. However, it is not considered to result in any major or significant impact on the area as a whole. Rating: **LOW**

CUMULATIVE IMPACTS:

Biodiversity Impacts – Appendix D2
Refer to comprehensive Biodiversity specialist reports.

NO-GO ALTERNATIVE

There will be none of the activity based impacts for the No-Go alternative, but neither any of the benefits. The overall impact will, in fact, be negative since the country's renewable energy power producing pool will no increase by the proposed development.

A complete impact assessment in terms of Regulation 19(3) of GN 733 must be included as Appendix F.

2. ENVIRONMENTAL IMPACT STATEMENT

Alternative B

N/A

Alternative C

N/A

No-go alternative (compulsory)

In this scenario, the potential positive and negative environmental and social impacts as described in this Basic Assessment Report will not occur and the status quo will be maintained

Should the project not proceed, the contribution of up to 5MW from this project towards the Government target for renewable energy will not be realised. As a result, the potential local and regional socio-economic and environmental benefits expected to be associated with the proposed project would not be realised. These include:

- *Increased energy security:* The recent electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of power supplementation. In addition, given that renewables can often be deployed in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality, while reducing expensive transmission and distribution losses. In addition, the proposed facility will increase electricity security for the local Vanrhynsdorp town during the day.
- *Exploitation of our significant renewable energy resource:* At present, valuable national resources including biomass by-products, solar radiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio.
- *Pollution reduction:* The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation.
- *Support for international agreements:* The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol, and for cementing its status as a leading player within the international community
- *Employment creation:* The sale, development, installation, maintenance, and management of renewable energy facilities have significant potential for job creation in South Africa.
- *Acceptability to society:* Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human, and ecosystem health.
- *Support to a new industry sector:* The development of renewable energy offers the opportunity to establish a new industry within the South African economy

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✓	NO

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.

Is an EMPr attached?	YES✓	NO

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

VIVIENNE THOMSON
NAME OF EAP

SIGNATURE OF EAP

18/12/2017
DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information