

# Kleinfontein Solar PV1

on Portion 1 of the Farm Kleinfontein No 369, Free State Province

## EXECUTIVE SUMMARY

### BACKGROUND TO THE PROJECT

Landscape Dynamics Environmental Consultants (Pty) Ltd was appointed to apply for Environmental Authorisation for the **Kleinfontein Solar PV1** with the Department of Forestry, Fisheries & Environment (DFFE), which is the Competent Authority (CA) for this project. The applicant is **Kleinfontein Solar PV1 (Pty) Ltd** ('the Applicant'), a special purpose vehicle (SPV) fully owned by Mulilo Renewable Project Developments (Pty) Ltd ('the Developer').

It is the developer's intention to bid the proposed project under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme (or similar programme), with the aim of evacuating the generated power into the national grid. This will aid in the diversification and stabilisation of the country's electricity supply, in line with the objectives of the Integrated Resource Plan (IRP), with **Kleinfontein Solar PV1** set to inject up to 120 MW into the national grid.

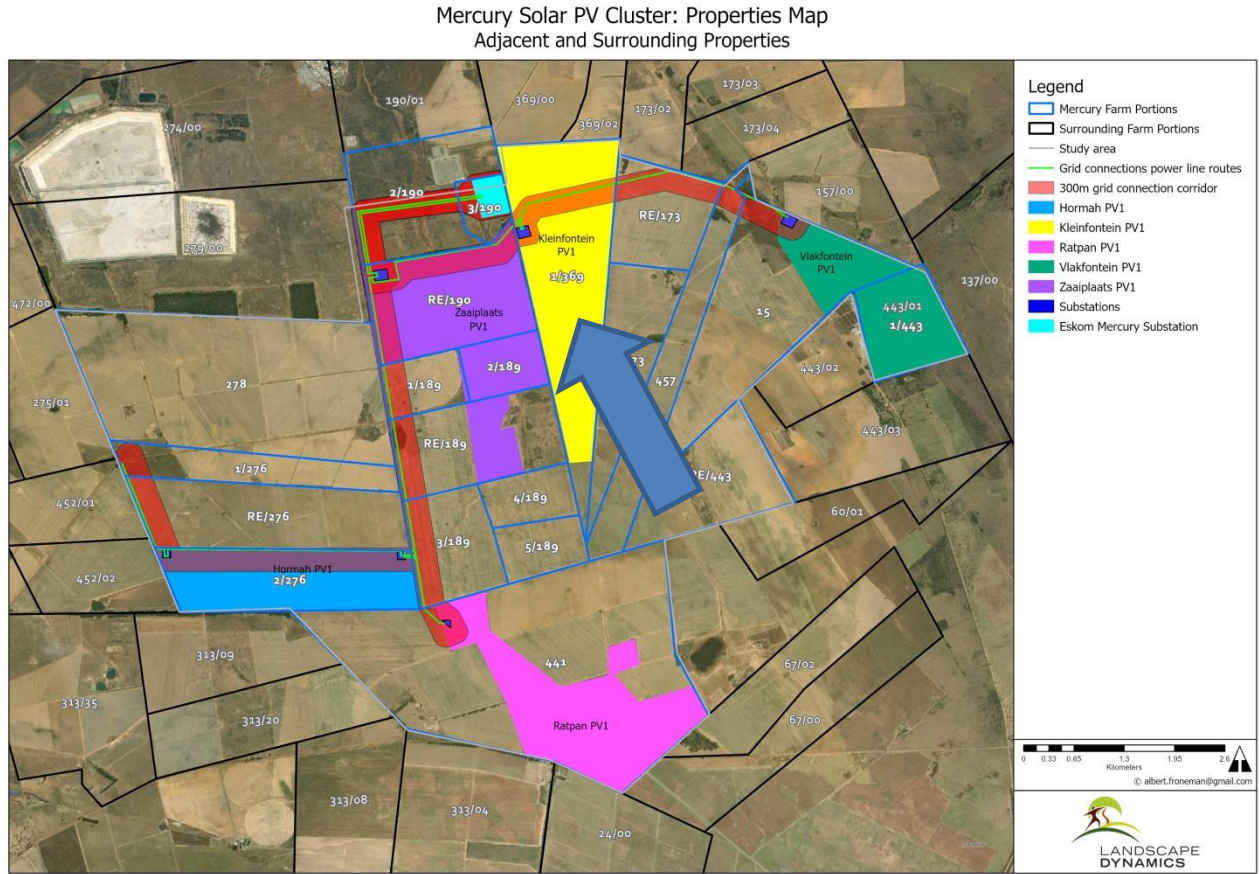
The project is planned as part of a cluster of renewable energy facilities known as the Mercury Solar PV Cluster, with associated grid connection infrastructure. The cluster is situated north of the R76 and south of the Vaal River close to the town of Viljoenskroon in the Free State Province. It falls within the jurisdiction of the Mqoqaka Local Municipality (MLM) in the Fezile Dabi District Municipality. The entire property is 354ha in extent of which the development footprint will affect 248 ha.

Name of PV facility	Farm Name
Ratpan Solar PV1	Remainder of Ratpan No 441
Hormah Solar PV1	Portion 2 of Hormah No 276
Zaaiplaats Solar PV1	Remainder of Zaaipaats No 190 Remainder of Fraai Uitzicht No 189 Portion 2 of Fraai Uitzicht No 189
Kleinfontein Solar PV1	Portion 1 of the Farm Kleinfontein No 369
Vlakfontein Solar PV1	Portion 1 of Jackalsfontein No 443 Remainder of Vlakfontein Nr 15

Each Photovoltaic (PV) solar facility will be treated as a standalone application and five separate applications for Environmental Authorisations have been made. The electrical grid infrastructure (connecting the facilities to the existing Mercury Substation or existing Eskom powerlines) for these five facilities will be dealt with in terms of Gazette Notice Nr 2313, 27 July 2022: *Standard for the*

*Development and Expansion of Power Lines and Substations within identified Geographical Areas.*

This Application for Environmental Authorisation refers only to the **Kleinfontein Solar PV1** facility of which the initial project area is indicated in yellow on the map below.



**PROJECT COMPONENTS**

Infrastructure associated with the Kleinfontein Solar PV Facility will include the following:

Infrastructure	Specifications
Solar PV Array	<p>The Solar PV Array includes the following components:</p> <ul style="list-style-type: none"> <li>• Bifacial PV Modules</li> <li>• Mounting structures using single axis tracking technology</li> <li>• Inverters</li> <li>• Combiner boxes</li> <li>• Transformers</li> <li>• Cabling between panels</li> <li>• The total development footprint area is approximately 248 ha of which the area available for PV modules is approximately 221,8ha</li> </ul>
Onsite 132 kV Independent Power Producer (IPP) Substation	<p>The IPP Substation includes the following components:</p> <ul style="list-style-type: none"> <li>• HV Step-up transformer</li> <li>• MV Interconnection building</li> <li>• Total area approximately 100m x 100m (1ha)</li> </ul>
Access and internal roads	<ul style="list-style-type: none"> <li>• Access is required for the purpose of the Kleinfontein Solar PV1 as follows: <u>Main access point for road to the IPP substation area</u></li> </ul>

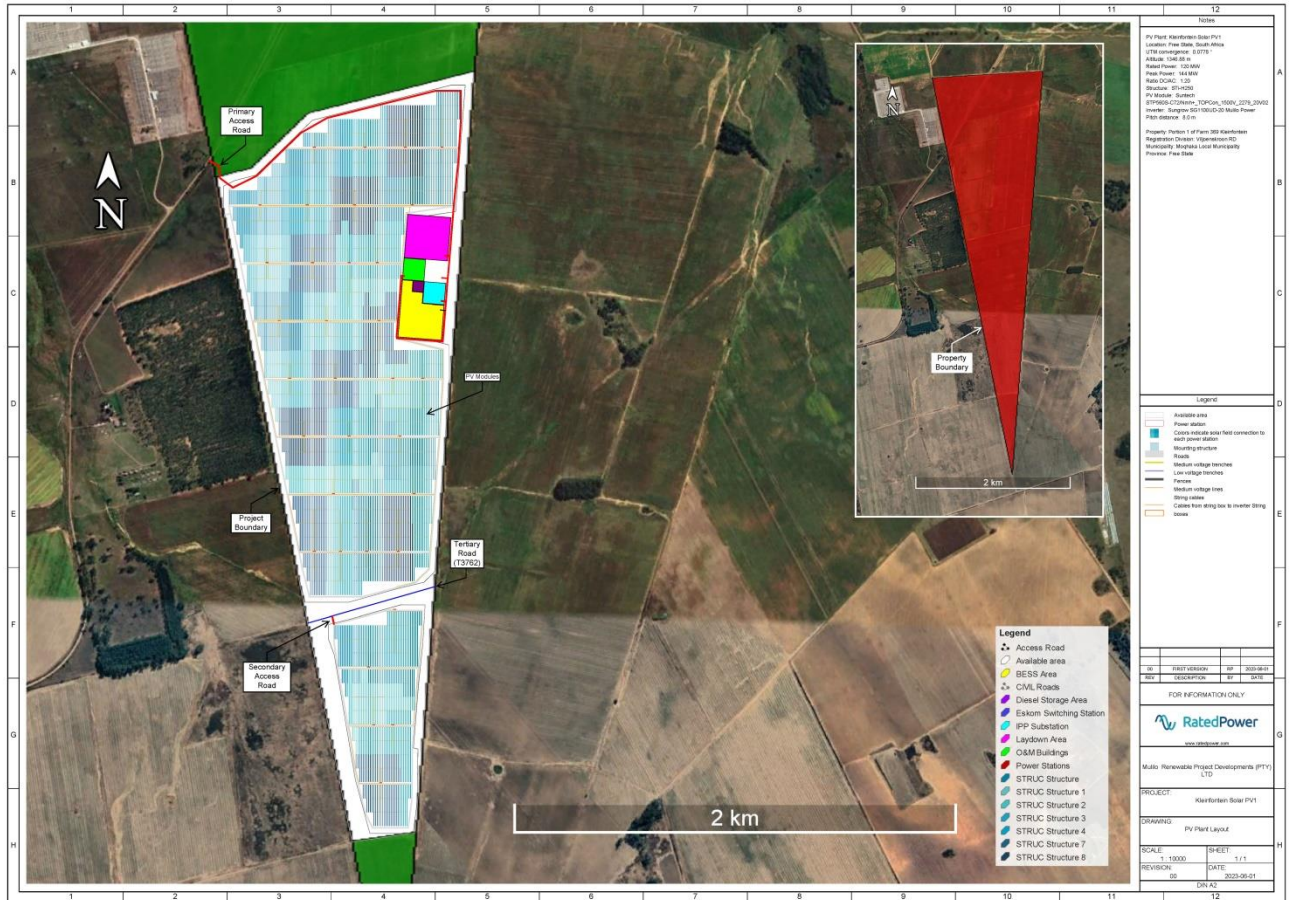
	<ul style="list-style-type: none"> <li>○ S729 Coordinates: 27° 0'18.43"S 26°49'20.92"E</li> <li><u>Construction &amp; maintenance access points</u></li> <li>○ T3762 – Coordinates: 27° 1'23.04"S 26°49'52.32"E</li> </ul> <ul style="list-style-type: none"> <li>● The main access road up to the IPP substation area will be approximately 3 000m (3km) long and approximately 8m wide.</li> <li>● All proposed access roads will be developed to approximately 8m wide.</li> <li>● All proposed access roads, including the main access point, will align with existing tracks and routes where possible.</li> <li>● Existing internal farm roads to be utilised where possible,</li> <li>● Internal roads to be constructed up to 6m wide.</li> <li>● Regraveling of roads to take place if required by the provincial roads authority.</li> </ul>
Laydown area	<ul style="list-style-type: none"> <li>● A temporary construction site area of approximately 4ha directly adjacent to the IPP and Eskom substation will be required.</li> <li>● All temporary infrastructure will be rehabilitated following the completion of the construction phase, where it is not required for the operation phase.</li> </ul>
Battery Energy Storage System (BESS)	<ul style="list-style-type: none"> <li>● Solid State Batteries (SSB) is the preferred battery technology.</li> <li>● It will be delivered to the site pre-assembled.</li> <li>● It will be constructed on approximately 4ha.</li> </ul>
Storage of Dangerous Goods	<ul style="list-style-type: none"> <li>● Storage of dangerous goods (Including lubrications, oils, paints, fuel/diesel, etc.) with a combined capacity less than 80 cubic metres on a site of 2 500m<sup>2</sup> (0,25ha).</li> <li>● Diesel/fuel is generally required for the following purposes: <ul style="list-style-type: none"> <li>▪ During construction for construction vehicles as well as generators for the construction camp and commissioning whilst waiting for the Eskom grid connection works to be completed</li> <li>▪ During operations required for Operations &amp; Maintenance vehicles at the PV plants but also required for backup diesel generators at the substation. The generators supply auxiliary power to the substation's protection and communications systems, should there be outages on the grid. This is an Eskom requirement together with a battery room at the substations to act as UPS for these critical systems.</li> </ul> </li> </ul>
Ancillary facilities	<ul style="list-style-type: none"> <li>● Operations and Maintenance (O&amp;M) Buildings 100m x 100m (1ha)</li> <li>● Site Offices</li> <li>● Construction camps</li> <li>● Storage Warehouse</li> <li>● Workshop</li> <li>● Guard House</li> <li>● Ablutions with conservancy tanks</li> <li>● During the construction phase, temporary sanitation facilities will be provided (i.e. chemical toilets) and these toilets will be regularly serviced by a licensed company.</li> </ul>

Note the following:

A separate application for registration in terms of Government Notice Nr 2313, 27 July 2022: *Standard for the Development and Expansion of Power Lines and Substations within identified Geographical Areas, promulgated on 27 July 2022* will be made to the DFFE as it would be handed over to Eskom (to be developed by the IPP under a self-build agreement with Eskom):

- An onsite 132kV Eskom switching station on 100m x 100m (1ha)
- A 132kV power line connecting the Kleinfontein Solar PV1 facility to the Mercury MTS

Refer to the map below and Appendix A(5) which indicates the project components applicable to this project.



## LEGAL REQUIREMENT

### ***National Environmental Management Act (Act 107 of 1998)***

This application is done in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations of December 2014, as amended in April 2017 (Government Notice Nr 326). Environmental Authorisation is requested for the following listed activities:

## Listing Notice 1

11	<p>The development of facilities or infrastructure for the transmission and distribution of electricity</p> <p>(i) <b>Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;</b> or</p> <p>(ii) Inside urban areas or industrial complexes with a capacity of 275 kilovolts or more,</p> <p>excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —</p> <p>a) temporarily required to allow for maintenance of existing infrastructure;</p> <p>b) 2 kilometres or shorter in length;</p> <p>c) within an existing transmission line servitude; and</p> <p>d) will be removed within 18 months of the commencement of development.</p>	<p>An onsite 132 kV Independent Power Producer (IPP) Substation forms part of the project components for which Environmental Authorisation is required with this application.</p>
12	<p><b>The development of</b></p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</p> <p>(ii) <b>infrastructure or structures with a physical footprint of 100 square metres or more;</b></p> <p><b>where such development occurs</b></p> <p><b>(a) within a watercourse;</b></p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p><u>excluding</u></p> <p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or</p>	<p>A farm dam / depression confirmed by the ecologist as having a low sensitivity will be developed to increase the foot-print area of the PV farm.</p> <p>The area of this farm dam / depression to be covered by the PV infrastructure is approximately 6 000m<sup>2</sup> (0,6ha) which will exceed 100 square metres.</p>

	<p>harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such development occurs within an urban area;</p> <p>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</p> <p>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</p>	
15	<p>The <b>clearance of an area of 1 ha or more but less than 20ha of indigenous vegetation</b>, except where such clearance of indigenous vegetation is required for</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan</p>	<ul style="list-style-type: none"> <li>• The total development footprint area is approximately 248ha.</li> <li>• Even though most of the land is used for agricultural purposes, land cover which contains small patches of indigenous vegetation of more than 1ha combined will be removed.</li> </ul>
19	<p><b>The infilling or depositing of any material of more than 10 cubic metres into</b>, or the dredging, excavation, removal or moving of soil, sand, shell grot, pebbles or rock of more than 10 cubic metres from <b>a watercourse</b>, but excluding where such infilling, depositing, dredging, excavation, removal or moving—</p> <p>a) will occur behind a development setback;</p> <p>b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p>	<p>A farm dam / depression confirmed by the ecologist as having a low sensitivity and could be filled up to expand the developable area of the PV farm.</p> <p>The area covered by this farm dam is approximately 6 000m<sup>2</sup> (0,6ha). The final calculations in terms of the infilling volumes can only be determined during the design phase of the project, but it will be more than 10 cubic metres considering the extent of the surface area (approximately 0,6ha) to be affected.</p>

	<p>d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	
24	<p><b>The development of a road—</b></p> <p>(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or</p> <p>(ii) with a reserve wider than 13,5 meters, or <b>where no reserve exists where the road is wider than 8 metres;</b></p> <p>but excluding a road—</p> <p>(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;</p> <p>(b) where the entire road falls within an urban area; or</p> <p>(c) which is 1 kilometre or shorter.</p>	<p>The main access road up to the IPP substation area will be approximately 3 000m (3km) long and approximately 8m wide for the entire length, but will be wider than 8m at the access points, bends and turning circles.</p> <p>Internal roads (except the main access road) will be constructed up to 6m wide.</p>
28	<p>Residential, mixed, retail, commercial, industrial or institutional <b>developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:</b></p> <p>(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or</p> <p>(ii) <b>will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;</b></p> <p>excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.</p>	<p>The total project footprint of the Kleinfontein Solar PV1 facility is 248ha on land of which almost the entire area is currently cropped (maize fields).</p>

## Listing Notice 2

*Even though Listing Notice 2 calls for a full Scoping and EIA to be undertaken, the project site falls within a*

*Renewable Energy Zone (Klerksdorp REDZ) which implies that a Basic Assessment process has to be undertaken regardless if Listing Notice 2 is triggered or not.*

- 1 **The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more,**  
excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs  
(a) within an urban area; or  
(b) on existing infrastructure.

A solar PV facility of up to 120MW will be constructed outside an urban area.

### Listing Notice 3

- 4 **The development of a road wider than 4 metres with a reserve less than 13,5 metres.**
- b. Free State**
- i. Outside urban areas:**
- (aa) A protected area identified in terms of NEMPAA, excluding disturbed areas;
- (bb) National Protected Area Expansion Strategy Focus areas;
- (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;
- (dd) Sites or areas identified in terms of an international convention;
- (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;
- (ff) Core areas in biosphere reserves; or
- (gg) Areas within 10 kilometres from national parks or world heritage sites or **5 kilometres from any other protected area identified in terms of NEMPAA** or from the core areas of a biosphere reserve, excluding disturbed areas; or
- ii. Inside urban areas:**
- (aa) Areas zoned for use as public open space;

Listing Notice 3 is applicable because the development site lies outside urban areas; and according to the Protected Areas Register the Mispah Game Farm (Nature Reserve) is situated approximately 2km north-west of the PV site.

The activity is applicable because:

- Access points off both the S729 and the T3762 will be developed to 8m wide.
- The main access road to the IPP will be approximately 8m wide.
- Internal roads of approximately 6m wide are required on the PV farm.



	<p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose; or</p> <p>(cc) Areas within urban protected areas.</p>	
10	<p><b>The development and related operation of facilities or infrastructure, for the storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.</b></p> <p><b>b. Free State</b></p> <p><b>i. Outside urban areas</b></p> <p><b>Outside urban areas:</b></p> <p>(aa) A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>(dd) Sites or areas identified in terms of an international convention;</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(ff) Core areas in biosphere reserves;</p> <p>(gg) Areas within 10 kilometres from national parks or world heritage sites <b>or 5 kilometres from any other protected area identified in terms of NEMPAA</b> or from the core areas of a biosphere reserve; or</p> <p>(hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland; or</p> <p>ii. Inside urban areas:</p> <p>(aa) Areas zoned for use as public open space; or</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a</p>	<p>Listing Notice 3 is applicable because the development site lies outside urban areas; and according to the Protected Areas Register the Mispah Game Farm (Nature Reserve) is situated approximately 2km north-west of the PV site</p> <p>Activity 10 is relevant because:</p> <ul style="list-style-type: none"> <li>• Storage of dangerous goods (Including lubrications, oils, paints, fuel/diesel. etc.) with a combined capacity not exceeding 80 cubic metres will be required. The exact storage capacity has not yet been determined, but it will be 30m<sup>3</sup> or more, but less than 80m<sup>3</sup>.</li> <li>• Diesel/fuel is generally required for the following purposes: <ul style="list-style-type: none"> <li>▪ During construction for construction vehicles as well as generators for the construction camp and commissioning whilst waiting for the Eskom grid connection works to be completed</li> </ul> </li> <li>• During operations required for Operations &amp; Maintenance vehicles at the PV plants but also required for backup diesel generators at the substation. The Generators supply auxiliary power to the substation's protection and communications systems, should there be outages on the grid. This is an Eskom requirement together with a battery room at the substations to act as UPS for these critical systems.</li> </ul>

	conservation purpose.	
12	<p><b>The clearance of an area of 300 square metres or more of indigenous vegetation</b> except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p><b>b. Free State</b></p> <p>i. Within any critically endangered or <b>endangered ecosystem</b> listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</p> <p>ii. Within critical biodiversity areas identified in bioregional plans.</p> <p>iii. On land, where at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation of had an equivalent zoning; or</p> <p><b>iv. Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.</b></p>	<p>Listing Notice 3 is applicable because</p> <ul style="list-style-type: none"> <li>• according to the DFFE Screening Tool Report, the entire site is situated within an Endangered Ecosystem (Vaal-Vet Sandy Grassland).</li> <li>• A farm dam / depression confirmed by the ecologist as having a low sensitivity and could be filled up to expand the developable area of the PV farm. The area covered by this farm dam / depression is approximately 6 000m<sup>2</sup> (0,6ha) and will contain indigenous vegetation.</li> </ul> <p>Activity 12 is applicable because</p> <ul style="list-style-type: none"> <li>○ The total development footprint area is approximately 248ha.</li> <li>○ Even though most of the land is used for agricultural purposes, land cover which contains indigenous vegetation patches of more than 300m<sup>2</sup> combined will be removed.</li> </ul>
14	<p><b>The development of</b></p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or</p> <p>(ii) <b>infrastructure or structures with a physical footprint of 10 square metres or more</b>; where such development occurs</p> <p>(a) <b>within a watercourse</b>;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p><u>excluding</u> the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p><b>b. Free State</b></p> <p><b>i. Outside urban areas</b></p>	<p>Listing Notice 3 is applicable because</p> <ul style="list-style-type: none"> <li>• the development site lies outside urban areas and according to the Protected Areas Register the Mispah Game Farm (Nature Reserve) is situated approximately 2km north-west of the PV site; and</li> <li>• a farm dam / depression confirmed by the ecologist as having a low sensitivity will be developed to increase the footprint area of the PV farm.</li> </ul> <p>Activity 14 is applicable because the area covered by this farm dam / depression (watercourse) is approximately 6 000m<sup>2</sup> (0,6ha) which will be developed with PV infrastructure.</p>

	<p>(aa) A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(cc) World Heritage Sites;</p> <p>(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>(ee) Sites or areas identified in terms of an international convention;</p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(gg) Core areas in biosphere reserves; or</p> <p>(hh) Areas within 10 kilometres from national parks or world heritage sites or <b>5 kilometres from any other protected area identified in terms of NEMPAA</b> or from the core area of a biosphere reserve; or</p> <p>ii. Inside urban areas:</p> <p>(aa) Areas zoned for use as public open space; or</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, zoned for a conservation purpose.</p>	
18	<p><b>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</b></p> <p><b>b. Free State</b></p> <p>i. <u>Outside urban areas:</u></p> <p>(gg) Areas within 10 kilometres from national parks or world heritage sites or <u>5 kilometres from any other protected area identified in terms of NEMPAA</u> or from the core area of a biosphere reserve; or</p> <p>(hh) Areas within a watercourse or wetland; <u>or within 100 metres from the edge of a watercourse or wetland;</u> or</p>	<p>Listing Notice 3 is applicable because the development site lies outside urban areas and according to the Protected Areas Register the Mispah Game Farm (Nature Reserve) is situated approximately 2km north-west of the PV site and the project development area includes areas within 100m from the edge of a watercourse and wetland.</p> <p>Activity 18 is applicable because</p> <ul style="list-style-type: none"> <li>existing roads will be widened by more than 4 metres and/or lengthened by more than 1km within a watercourse and/or within 100m from the edge of a watercourse.</li> <li>all proposed access roads, including the main access point, will align with existing tracks and</li> </ul>

ii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose.

routes where possible.

### ***Renewable Energy Development Zones (REDZ) and Strategic Transmission Corridors (STC)***

The **Kleinfontein Solar PV1** project falls within the Klerksdorp REDZ as well as the Central STC.

Even though Listing Notice 2 calls for a full Scoping and EIA to be undertaken, the project site falls within a Renewable Energy Development Zones (Klerksdorp REDZ) which means that a Basic Assessment process has to be undertaken regardless if Listing Notice 2 is being triggered or not.

*Gazette Notice Nr 2313, 27 July 2022: Standard for the Development and Expansion of Power Lines and Substations within identified Geographical Areas* is also applicable to electrical infrastructure that falls within the STCs. The Mercury Cluster PV Project falls within the Central Transmission Corridor (STC). In the case of the Kleinfontein PV facility, the onsite 132kV switching station and a 132kV power line which will be handed over to Eskom after construction will be dealt with according to the above-mentioned stipulations in a separate application. The substation however forms part of the project components of the Kleinfontein PV facility and will be dealt with under this application.

### ***The National Water Act (Act No 36 of 1998)***

The NWA aims to regulate the use of water and activities which may impact on water resources through the categorisation of 'listed water uses'. The Department of Water and Sanitation (DWS) is the administering body in this regard. Defined water use activities require the approval of DWS in the form of a General Authorisation (GA) or a Water Use Licence (WUL).

In the case of the Kleinfontein Solar PV1 site, the following is applicable:

- As some of the renewable infrastructure proposed activities are located near a delineated aquatic feature (within 500m from a wetland), they pose a risk of changing the bed, banks or characteristics of the watercourses or impeding or diverting flow in the watercourses. The filling of the farm dam as indicated on the Combined Environmental Sensitivities Map included as Appendix B(5) will also trigger this activity. Water Use Authorisation is therefore required in terms of Section 21 (c) and (i) of the NWA.
- A preliminary risk assessment was compiled as per DWS requirement and it was concluded that, provided the recommended mitigation measures are implemented, the risk of the activities degrading the adjacent aquatic features will be low such that the water use activities would fall within the ambit of the General Authorisations for Section 21 (c) and (i) water use activities.
- Additional water use activities could also require water use authorisation, i.e. groundwater abstraction and storage thereof. This will be determined during the design phase of the project and will be included in the application for water use authorisation.
- Note that an application for a GA / WUL can only be made once Preferred Bidder status for this project has been awarded.

### ***The National Heritage Resources Act (Act 25 of 1999)***

The proposed project falls within the scope of Section 38 of the National Heritage Resources Act and the applicable activities include:

- The construction of a road, wall, power line, pipeline, canal or similar form of linear development or barrier exceeding 300m in length;
- any development or other activity which will change the character of a site exceeding 5 000m<sup>2</sup> in extent

The authorisation process in terms of the NHRA forms part of the EIA process. A Heritage Impact Assessment was electronically submitted to the South Africa Heritage Resource Agency (SAHRA) via SAHRIS as well as to the Free State Provincial Heritage Resources Authority as part of the public participation programme. SAHRA provided their comment, supporting the project.

### **NEED & DESIRABILITY**

The need for this project relates directly to the need for renewable energy projects in South Africa. The proposed **Kleinfontein Solar PV1** will connect the generated electricity to the Eskom national grid, thereby assisting in alleviating the immense pressure on the current Eskom capacity.

The need for the project can also be justified when reviewing the South African **Integrated Resource Plan (IRP) 2019** which was gazetted by the Minister of Mineral Resources and Energy, Mr Gwede Mantashe, on 18 October 2019, updating the energy forecast for South Africa from the current period to the year 2030.

The project is furthermore desirable in terms of policy fit:

- The findings of the review of key policy and planning documents indicate that renewable energy is supported at a national, provincial, and local level. At a national level, the development of, and investment in, renewable energy is supported by the National Development Plan, New Growth Path Framework and National Infrastructure Plan, highlighting the importance of renewable energy. The proposed project also supports a number of objectives contained in the Free State Province Provincial Growth and Development Strategy and Free State Green Economy Strategy. At a district and local level, the Moqhaka Local Municipality IDP and SDF support the development of renewable energy. The site is also located within the Klerksdorp REDZ as well as the Central STC. The area has therefore been identified as suitable for renewable energy facilities.
- The **Kleinfontein Solar PV1** facility as proposed is in line and in support of applicable legislation on a national, provincial as well as local level.

### **ALTERNATIVES**

The key alternatives associated with solar farms are the following:

- Site Selection
- Technology

- Layout
- No Go

Alternatives for this project relates mostly to the site selection process undertaken for the Mercury Solar PV Cluster Project. Considerations in the choice of the initial assessment area were solar irradiation; existing road infrastructure; access to the Eskom grid; willingness of the landowner to lease the property; Renewable Energy Development Zones (REDZ); Strategic Transmission Corridors (STC's); Environmental constraints; as well as current land use and available land

The client originally planned to construct at least ten solar PV facilities within the identified assessment area. High agricultural potential of the study area would play a major role in the number of sites and areas available for development. Further restrictions on available land resulted from terrestrial biodiversity and aquatic constraints. The number of sites was then downscaled to seven and more detailed investigations and ground-truthing took place to determine the feasibility of these seven sites which were then further downscaled to five PV sites of which the proposed Kleinfontein Solar PV1 forms a part.

In terms of technology, Photovoltaic (PV) Technology was considered against Concentrated Solar Power (SCP) technology. PV technology has been confirmed by the developer as the preferred technology

The layout of the Kleinfontein Solar PV1 facility was influenced mainly by the following:

- There is one single environmental constraint that needs to be excluded from the development area. This is the buffer zone of the wetland on adjacent land on the Remainder of the Farm Fraai Uitzicht 189, to the west of the development site.
- The two access points provided from the S729 and T3762 respectively.
- The layout has also been guided by best practice and acceptable solar PV engineering principles.
- In order to accommodate the new Eskom policy of a 2km buffer in which their consent must be obtained, the initial layout was refined by removing the PV fields directly bordering and impacting the MTS and 765kV planned powerlines as well as future MTS expansion. Buffers were incorporated to allow future access to the MTS on top of the 765kV corridor.

As illustrated throughout the report, all indications are that the advantages of the provision of green energy from a renewable resource into the national grid outweigh the negative environmental impact associated with the project. It was also confirmed and supported by the relevant specialists that all expected negative impact can be mitigated to acceptable levels. The No Go alternative is therefore not considered viable.

## **DFFE SCREENING TOOL**

The DFFE Screening Tool was compiled and site verification was conducted by Landscape Dynamics as well as the appointed specialists. The following specialist studies were identified:

- Terrestrial Ecological (Fauna & Flora) Impact Assessment
- Aquatic Impact Assessment
- Avifauna Impact Assessment
- Cultural Heritage Impact Assessment

- Visual Impact Assessment
- Bat Screening (Desktop) Assessment
- Social Impact Assessment
- Agricultural Impact Assessment

## KEY FINDINGS OF THE SPECIALISTS STUDIES

### ***Terrestrial Ecological Specialist Assessment***

A Terrestrial Ecological Specialist Assessment was undertaken and concluded that the entire site is either covered by cultivated fields planted with maize crops (*Zea mays*) or comprising old, cultivated fields that have been left fallow. Because these areas have been transformed due to cultivation this vegetation unit has a low conservation value and ecosystem functioning.

According to the DFFE screening tool the **vegetation** of the study site has an overall low sensitivity, the **faunal** aspects a low sensitivity with smaller sections regarded as medium sensitivity for both plants and animals. Overall, the **terrestrial biodiversity** regarded as **high**. However, due to the past and current agricultural activities the only areas regarded as having a high biodiversity sensitivity are the water courses which do not occur on the Kleinfontein Solar PV1 site. All of the envisaged impacts identified were either Low or Negligible.

Based on the site verification and detailed survey visit, the ecological impacts of the proposed development of were assessed and is not thought that development of the Kleinfontein Solar PV1 site would have a significant negative impact on the environment provided that the mitigation measures as indicated in are incorporated into the management plan and adhered to.

### ***Aquatic Specialist Impact Assessment***

A small depression wetland has been identified as a natural FEPA wetland area, but has been verified through the field assessment to be an artificial wetland associated with a farm dam. This area may be developed. Also, the proposed buffer zone of a wetland on adjacent land on the Remainder of the Farm Fraai Uitzicht 189, along the southwest boundary of the development site affects the site. This area needs to be excluded from the development area.

### ***Avifauna Specialist Impact Assessment***

An Avifauna Compliance Statement was undertaken and concluded that the total assessment area contains no confirmed habitat for species of conservation concern (SCC) as defined in the Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (Government Gazette No 43855, 30 October 2020, namely listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable. The absence of SCC was confirmed during the site surveys. Based on these criteria, the study area is correctly classified as **Low** sensitivity for avifauna. No fatal flaws were discovered during the investigations at any of the proposed PV sites.

### ***Bat Screening Assessment***

It was concluded that the proposed Mercury Solar PV Cluster Project will not cause significant impact to bat populations in the area. Although very little literature exists on the impacts of solar farms on bats, the specialists believe that any impacts to bats due to construction, operation, and decommissioning of the proposed infrastructure will be relatively low. Provided that all 'High' sensitive areas are avoided during construction and operation of the facility, the specialists regard the development of the Mercury Solar PV Cluster as feasible from a bat impact perspective. With regards to the **Kleinfontein Solar PV1**, the high sensitive area coincides with the aquatic sensitive area (buffer zone of the adjacent wetland), and is therefore excluded from the development area.

### ***Heritage Impact Assessment***

A Heritage (including Archaeology and Palaeontology) Impact Assessment was undertaken and concluded that no heritage, archaeological or palaeontological findings that require specific mitigation was identified and the Kleinfontein Solar PV1 site and therefore has a '**Low**' sensitivity to heritage resources. General Mitigatory measures such as procedures to follow in the event that heritage resources such as graves are discovered, as well as a Chance Fossil Finds Procedure are included in the Environmental Management Programme.

### ***Social Impact Assessment***

Key issues are the following:

- The findings of the SIA concluded that the development of the proposed **Kleinfontein Solar PV1** will create employment and business opportunities for locals during both the construction and operational phases of the project.
- The establishment of Community Trusts associated with the proposed **Kleinfontein Solar PV1** facility will benefit the local community in the area..
- The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated a coal-based energy economy and the challenges created by climate change, represents a significant positive social benefit for society as a whole.
- The findings of the SIA also indicate that the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) has resulted in significant socio-economic benefits, both at a national level and at a local, community level. These benefits are linked to foreign Direct Investment, local employment and procurement and investment in local community initiatives.
- The site is also located within the Klerksdorp REDZ. The area has therefore been identified as suitable for the establishment of renewable energy facilities.

Recommendations are made to address the potential negative impacts include the following:

- The final design and layout should ensure that the loss of productive farmland is avoided and or minimised.
- Damage to local farm roads caused by construction traffic must be repaired on an on-going basis throughout and on completion of the construction phase.
- The proponent should prepare a Stakeholder Engagement Plan (SEP) and Community Health, Safety and Security Plan (CHSSP) prior to commencement of construction phase.



The establishment of the **Kleinfontein Solar PV1** is supported by the findings of the SIA. The enhancement measures listed in the report should be implemented in order to maximise the potential benefits. The findings of the SIA also indicated that all of the potential negative impacts can also be effectively mitigated.

### ***Visual Impact Assessment***

A Visual Impact Assessment was undertaken and it concluded as follows:

- It is the recommendation that the proposed development should commence with mitigation for the following key reasons:
  - The proposed development areas have background views of degraded mining landscapes or are within proximity of the Mercury Substation where the rural agricultural landscape is partially degraded.
  - Receptors are few and have partial visual screening of the proposed landscape change.
  - No tourist related activities are making use of the rural agricultural landscapes.
- Mitigation required to ensure that the landscape change remains congruent with the rural agricultural landscape character:
  - 30m development exclusion buffer of the farm roads as a non-development buffer outside of the 1.2km distance from the Mercury Substation where the landscape character is already degraded.
  - Retaining existing medium sized trees within the road buffer where possible.

### ***Agricultural Impact Assessment***

The conclusion of this assessment is that the proposed developments offer a win-win scenario. It will cause very little loss of future agricultural production potential. This is substantiated by the following points:

- The only agricultural land that will be used by the development has limited agricultural production potential. The layout of the facilities has deliberately avoided all higher potential land within the wider assessed area. It will only utilise land that was identified as having insufficient land capability for viable and sustainable crop production and is therefore only good enough for grazing. There is not a scarcity of such agricultural land in South Africa and it is therefore considered to be below the threshold for being prioritised for conservation as agricultural production land.
- The proposed developments offer positive impact on agriculture by way of improved financial security for farming operations, as well as security benefits against stock theft and other crime.
- The PV panels will not totally exclude agricultural production. The area can still be used to graze sheep that will, in addition, be protected against stock theft within the security area of each facility.
- The loss of agricultural potential by occupation of land is not permanent. The land will become fully available again for agricultural production once the proposed activity ceases.
- The proposed developments pose a low risk in terms of causing soil degradation, which can be adequately and fairly easily managed by standard, best practice mitigation management actions.

- The proposed developments are within a Renewable Energy Development Zone (REDZ), which is an area that has specifically been designated within South Africa for the prioritisation of renewable energy development. The designation of the REDZ has taken into account the country's need to balance renewable energy development against the need to ensure the conservation of land required for agricultural production and national food security.
- The proposed developments will have the wider societal benefits of generating additional income and employment in the local economy. In addition, they will contribute to the country's need for energy generation, particularly renewable energy that has lower environmental and agricultural impact, on a national scale, than existing, coal powered energy generation.

The whole of the **Kleinfontein Solar PV1** site has continued to be cropped but is becoming increasingly marginal and high risk. An investigation of the soils across the site shows them to be limited by poor drainage and shallower depths. A transition to higher potential, deeper and better drained soils was identified along what was then designated as the eastern boundary of the proposed solar site. This site sensitivity verification (as per the DFFE Screening Tool Report for Kleinfontein Solar PV1) verifies the entire site that is indicated as cropland as being of high agricultural sensitivity. The agricultural assessment however recommends its use for solar electricity generation because its potential for viable and sustainable crop production is limited.

Due to the factors listed above, the impact of the proposed developments on the agricultural production capability of the site is assessed as being acceptable. Therefore, from an agricultural impact point of view, it was recommended that the development be approved.

## PROJECT TEAM REPORTS

### ***High Level Safety, Health & Environmental Risk Assessment***

A High Level Safety, Health & Environmental Risk Assessment was undertaken for the BESS component of the Mercury Cluster Project. The key findings are as follows:

- This risk assessment has found that with suitable preventative and mitigation measures in place, none of the identified potential risks are excessively high, i.e., from a SHE perspective no fatal flaws were found with the proposed Solid-state BESS installations for the Mercury Solar Cluster Project.
- At a large facility, without installation of the state-of-the-art battery technology that includes protective features, there can be significant risks to employees and first responders. The latest battery designs include many preventative and mitigation measures to reduce these risks to tolerable levels. State-of-the-art technology should be used, i.e., not old technology as it presents higher risks.
- The design should be subject to a full Hazard and Operability Study (HAZOP) prior to commencement of procurement. A HAZOP is a detailed technical systematic study that looks at the intricacies of the design, the control system, the emergency system etc. and how these may fail under abnormal operating conditions. Additional safeguards may be suggested by the team doing the study.

### ***Traffic & Transport Management Plan***

The following main conclusions were made:

- The main access to the IPP Substation area is off the S729.
- The construction phase traffic, although significant, will be temporary and impacts are considered to have a medium significance without mitigation measures and low with mitigation measures.
- The Directorate Road Asset Management (Department of Police, Roads & Transport, Free State Province) supports the Mercury Cluster Solar PV Project subject to certain conditions. The relevant approvals must be obtained from the said department.
- The impacts associated with the **Kleinfontein Solar PV1** facility are acceptable with the implementation of the recommended mitigation measures as provided by the traffic engineers and the relevant roads authorities. The **Kleinfontein Solar PV1** facility is therefore recommended for authorisation from a traffic impact perspective.

### ***Radio Frequency Interference (RFI) Assessment***

A Radio Frequency Interference (RFI) Assessment was undertaken for the Mercury Solar PV Cluster Project and it concluded as follows:

- Both areas identified by the DFFE screening tool were identified to be more than 7km away from the nearest proposed PV site. Kopanang Gold Plant is 8 km away from Zaaiplaats PV1. The second EMI sensitive area cannot be identified using Google Earth and the location is situated on open farmland. No other EMI sensitive receivers inside the clearance zone could be identified using Google Maps.
- **Kleinfontein Solar PV1** is more than 8 km away with no direct line of sight.
- Pathloss over this distance is high enough for the PV farms to have no significant RFI or EMI impact on the electrical infrastructure at Kopanang Gold Plant.

### ***Application for the Change in Land Use***

A Motivational Report was compiled to motivate for a Change in Land Use for the construction and operation of the Kleinfontein Solar PV1 facility and associated infrastructure with a generating capacity of up to 120 MW; and to provide supporting documentation and supplementary information necessary for the Department of Agriculture, Land Reform & Rural Development (DALRRD) to process the application.

Site-specific motivation is provided as follows:

- The only land that will be used by the developments have limited agricultural production potential. The layout of the facility has deliberately avoided all higher potential land within the wider assessed area. It will only utilise land that was identified as having insufficient land capability for viable and sustainable crop production and is therefore only good enough for grazing. There is not a scarcity of such agricultural land in South Africa and it is therefore considered to be below the threshold for being prioritised for conservation as agricultural production land.
- The proposed solar energy facility is on land that belongs to an established agricultural family in the area, whom has large, diverse agricultural enterprises that cover multiple land holdings over and

above those considered for this development. The proposed sites are on those parts of their land that have the least agricultural production potential and are marginal for crop production. There is therefore no danger that the proposed developments will replace their farming activities or lead to any significant decrease in the future agricultural production potential of their farming enterprises.

- The proposed development offers some positive impact on agriculture by way of improved financial security for farming operations, as well as security benefits against stock theft and other crime.
- The proposed development will also have the wider societal benefits of generating additional income and employment in the local economy through the Enterprise Development and Socio-economic Development components of the project, which are ensured through minimum thresholds prescribed by the Department of Energy for Independent Power Producers.
- The PV panels will not totally exclude agricultural production. The area can still be used to graze sheep that will, in addition, be protected against stock theft within the security area of the facility.
- The loss of agricultural potential by occupation of land is not permanent. The land will become fully available again for agricultural production once the proposed activity ceases.
- The proposed development poses a low risk in terms of causing soil degradation, which can be adequately and fairly easily managed by standard, best practice mitigation management actions.
- The proposed development site offer the win-win situation of renewable energy development that is integrated with agricultural production in a way that provides benefits to agriculture - reliable additional income and security - and leads to very little loss of future agricultural production potential because it utilises only lower potential land that is marginal for crop production.
- The proposed development is located within the Klerksdorp REDZ 10 and in the Central Electricity Grid Infrastructure Corridor, suggesting that this area, when taking environmental considerations on a strategic level into consideration, is suitable for renewable energy development. The designation of the REDZ has taken into account the country's need to balance renewable energy development against the need to ensure the conservation of land required for agricultural production and national food security.
- The proposed developments will also have the wider societal benefits of generating additional income and employment in the local economy. In addition, it will contribute to the country's need for energy generation, particularly renewable energy that has lower environmental and agricultural impact, on a national scale, than existing, coal powered energy generation.
- The Agricultural Assessment determined that the site identified for the proposed **Kleinfontein Solar PV1** facility has limited crop potential and insufficient land capability for viable and sustainable crop production and is therefore only good enough for grazing. There is not a scarcity of such agricultural land in South Africa and it is therefore considered to be below the threshold for being prioritized for conservation as agricultural production land.

It was thus recommended that the DALRRD approves the application for the Change in Land Use to establish the Kleinfontein Solar PV1 facility. A No Objection letter was subsequently received from the Department.

## PUBLIC PARTICIPATION PROGRAMME

The Public Participation Programme (PPP) is conducted in terms of the Sections 39, 40, 41, 42, 43 & 44 of the NEMA EIA Regulations 2014, as amended. The newspaper advertisements, onsite notices and Background Information Document (BID) advertised the entire Mercury Solar PV Cluster (inclusive of the Hormah Solar PV1; Ratpan Solar PV1, Vlakfontein Solar PV1, Zaaiplaats Solar PV1 as well as the Kleinfontein Solar PV1).

All comments and responses received regarding this project are summarised and addressed in the Comments & Response Report of the Basic Assessment Report under the following headings:

- Communication during Focus Group Meetings
- Communication resulting from the Initial Advertising Period
- Communication on the Draft BAR, dated March 2023
- Communication on the Draft BAR dated July 2023 submitted as part of a new application

All reasonable steps were taken to inform the identified IAPs of the Mercury Solar PV Cluster development proposal. At this stage all comment received could be satisfactorily addressed. No objection to the development proposal was received up to date.

## IMPACT ASSESSMENT

The main potential negative impacts associated with the project are the following:

### ***Expected Negative Impacts***

#### *Design & Pre-Construction Phase*

- Risk of failure of structures during design phase
- Risk of failure of structures
- Impact on visual resources
- Risk of erosion
- Impact on terrestrial and aquatic biodiversity
- Impact on avifauna
- Human safety & environmental health impact resulting from the BESS

#### *Construction Phase*

- Impact on agricultural land
- Impact on terrestrial biodiversity
- Impact on aquatic habitat
- Impact on avifauna
- Impact on heritage, archaeology and palaeontology resources
- Risk of groundwater pollution
- Risk of erosion
- Social impact
- Traffic impact
- Human safety & environmental health impact resulting from the BESS

### *Post- Construction / Operational Phase*

- Impact on agriculture
- Continuous impact on natural habitat
- Impact on aquatic environment
- Impact on avifauna
- Risk of erosion
- Continuous risk for groundwater pollution
- Impact on visual resources
- Social Impact
- Traffic Impact
- Human safety & environmental health impact resulting from the BESS

Identified impacts and mitigation / management outcomes will be monitored through the application of the ***Environmental Management Programme (EMPr)*** that is included as an appendix to the Basic Assessment Report.

### ***Expected Positive Impacts***

- The establishment of renewable energy infrastructure should be viewed, firstly within the context of the South Africa's current reliance on coal powered energy to meet the majority of its energy needs, and secondly, within the context of the success of the REIPPPP. South Africa has one of the most carbon-intensive economies in the world, thus making the greening of the electricity mix a national imperative. The REIPPPP had contributed significantly towards meeting South Africa's emission targets and, at the same time, supporting energy security, economic stability, and environmental sustainability.
- The proposed solar PV facility will be able to evacuate the solar generated electricity and all the advantages of additional, clean, renewable electrical supply to the national Eskom grid will be realised. This will also assist in alleviating load shedding.
- Creation of employment and business opportunities and the opportunity for skills development and on-site training during the construction phase:
  - The construction phase is expected to extend over a period of  $\pm 18$  months and create approximately 250-300 employment opportunities, depending on the final design for the entire Mercury Cluster Solar Project. The total wage bill for the construction phase is estimated to be in the region of R30 million (2022 Rand value). A percentage of the wage bill will also be spent in the local economy which will create opportunities for local businesses in the area.
  - The majority of the employment opportunities, specifically the low and semi-skilled opportunities, are likely to be available to local residents and the majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. This would represent a significant positive social benefit in an area with limited employment opportunities.
- The total number of permanent employment opportunities associated with the Kleinfontein Solar PV1 facility would be approximately 20 and the majority of low and semi-skilled beneficiaries are likely to be members of the community.

- Procurement during the operational phase will also create opportunities for the local economy and businesses.
- The establishment of a community benefit structure (typically, a Community Trust) also creates an opportunity to support local economic development in the area. The requirement for the project to allocate funds to socio-economic contributions (through structures such as Community Trusts) provides an opportunity to advance local community projects, which is guaranteed for a ±20-30 year period (the project lifespan).
- The income from the PV facility received by the landowner reduces the risks to the farmer's livelihood posed by droughts and fluctuating market prices for farming outputs and inputs, such as fuel, feed etc. The additional income would therefore improve economic security of farming operations, which in turn would improve job security for farm workers and benefit the local economy.
- The provision of security for the proposed PV facility can create an opportunity to improve security for local landowners in the area.

## CONCLUSION & RECOMMENDATION

The application can be summarised as follows:

- The proposed **Kleinfontein Solar PV1** is planned in a legal, pro-active and structured manner taking all development components, potential and restrictions into account.
- All relevant legal requirement in terms of the Environmental Impact Assessment Regulations published in 2014 as amended, were complied with. This Basic Assessment Report includes all relevant proceedings, findings and recommendations which resulted from this study.
- The specialist input obtained is comprehensive and effective in providing an assessment of the status quo of the study area, identifying potentially sensitive areas and issues of concern as well as identifying impact that require re-consideration of alternatives.
- Significant and reasonable actions were taken to identify and notify all Interested & Affected Parties that include government departments, relevant authorities, general stakeholders and potentially affected landowners of the project. No objections had been received regarding this project.
- The proposed project components and layout as motivated and recommended for authorisation in this document will, after the application of mitigation measures, have a minimal and acceptable impact on the environment. This will be accomplished through the implementation of the mitigation measures specified in the Environmental Management Programme (EMPr) that is included as Appendix H of the Basic Assessment Report.
- The EAPs are confident that the infrastructure presented is acceptable and viable. The assessment of additional alternatives is not justified.
- There is no reason from a technical, environmental and social perspective why the **Kleinfontein Solar PV1** could not be authorised.