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**Agricultural Comparative Assessment for the Extension of Validity of the Environmental Authorisation (EA) for the 100 Megawatt (MW) Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF) and Associated Infrastructure in the Northern Cape Province (DFFE Reference Number: 12/12/20/2321/2/1)**

**Submitted by TerraAfrica Consult cc**

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**10 January 2023**

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## 1. Introduction

South Africa Mainstream Renewable Power Loeriesfontein 3 (Pty) Ltd received the original Environmental Authorisation (EA) for the 100 megawatt (MW) Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF) and Grid Connection infrastructure on 29 October 2012 (DFFE Ref: 12/12/20/2321/2). Further to this, the original EA was amended on 10 July 2014 (DFFE Ref: 12/12/20/2321/2/A1), 27 October 2015 (DFFE Ref: 12/12/20/2321/2/AM2), 04 October 2017 (DFFE Ref: 12/12/20/2321/2/AM3) and 24 September 2019 (DFFE Ref: 12/12/20/2321/2/AM4). In addition, following the 2019 amendment, the EA was subsequently split into two separate EAs (1 for the 100MW PV SEF and 1 for the grid connection infrastructure), both dated 21 May 2021, as follows:

1) EA for the 100MW Loeriesfontein 3 PV SEF, 33/132kV Independent Power Producer (IPP) portion of the shared on-site substation (including Transformer) and associated infrastructure (DFFE Ref: 12/12/20/2321/2/1); and

2) EA for the 132kV Grid Alignment and 132kV Eskom Portion of the shared on-site substation to service the 100 MW Loeriesfontein 3 PV SEF (DFFE Ref: 12/12/20/2321/2/2).

It should be noted that the split EAs for the Loeriesfontein 3 PV SEF (DFFE Ref: 12/12/20/2321/2/1) and Grid Connection infrastructure (DFFE Ref: 12/12/20/2321/2/2) dated 21 May 2021 respectively replaced the original EA dated 29 October 2012, as well as the subsequent amendments. **This report however addresses the Loeriesfontein 3 PV SEF EA extension application specifically, and the EA extension application for the Grid Connection infrastructure has been assessed and reported on as part of a separate standalone report.**

The validity of the split EA for the 100MW Loeriesfontein 3 PV SEF and associated infrastructure lapsed on 29 October 2022, however, a Part 1 EA Amendment Application to extend the validity of the EA by 5 years (i.e., EA lapses on 29 October 2027) was submitted to the Department of Forestry, Fisheries and the Environment (DFFE) on 26 October 2022. It is important to note that according to Regulation 28(1B) of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014 (as amended), *“an environmental authorisation which is the subject of an amendment application contemplated in this Chapter remains valid pending the finalisation of such amendment application.”* The Part 1 EA Amendment Application was acknowledged by the DFFE on 07 November 2022 and additional information was requested to be submitted to the DFFE for consideration. Following this, comparative assessments are to be undertaken to motivate why the Department should extend the validity period of the EA for a further 5 years.

Terra-Africa Consult cc was appointed by Nala Environmental (Pty) Ltd (Nala) to conduct a comparative assessment of the previously authorised Loeriesfontein 3 PV SEF (including associated infrastructure). The development area of the project is located on the farm Aan De Karree Doorn Pan (namely Portion 1 and 2 of the Farm Aan De Karree Doorn Pan No.213), approximately 60 km north of Loeriesfontein (refer to **Figure 1**).

The 100MW Loeriesfontein 3 PV SEF and associated infrastructure will comprise the



following (as authorised as part of split EA dated 21 May 2021 with reference: 12/12/20/2321/2/1):

- PV array with a height of between 5-10m on approximately 405,77 hectares;
- Internal cabling network to connect the PV panels to the substation;
- A new substation of approximately 10 800m<sup>2</sup> and associated transformers (IPP portion of the shared on-site substation);
- Access roads of 6-10m wide which includes an internal road network;
- Temporary construction area; and
- Administration and warehouse building with a maximum area of up to 5000m<sup>2</sup>.

## **2. Details of the specialist**

Mariné is a scientist registered with the South African Council for Natural Scientific Professions (SACNASP) and is specialised in the fields of Agricultural Science and Soil Science. Her SACNASP Registration Number is 400274/10. Her full curriculum vitae and contact details is attached as Appendices 1 and 2.



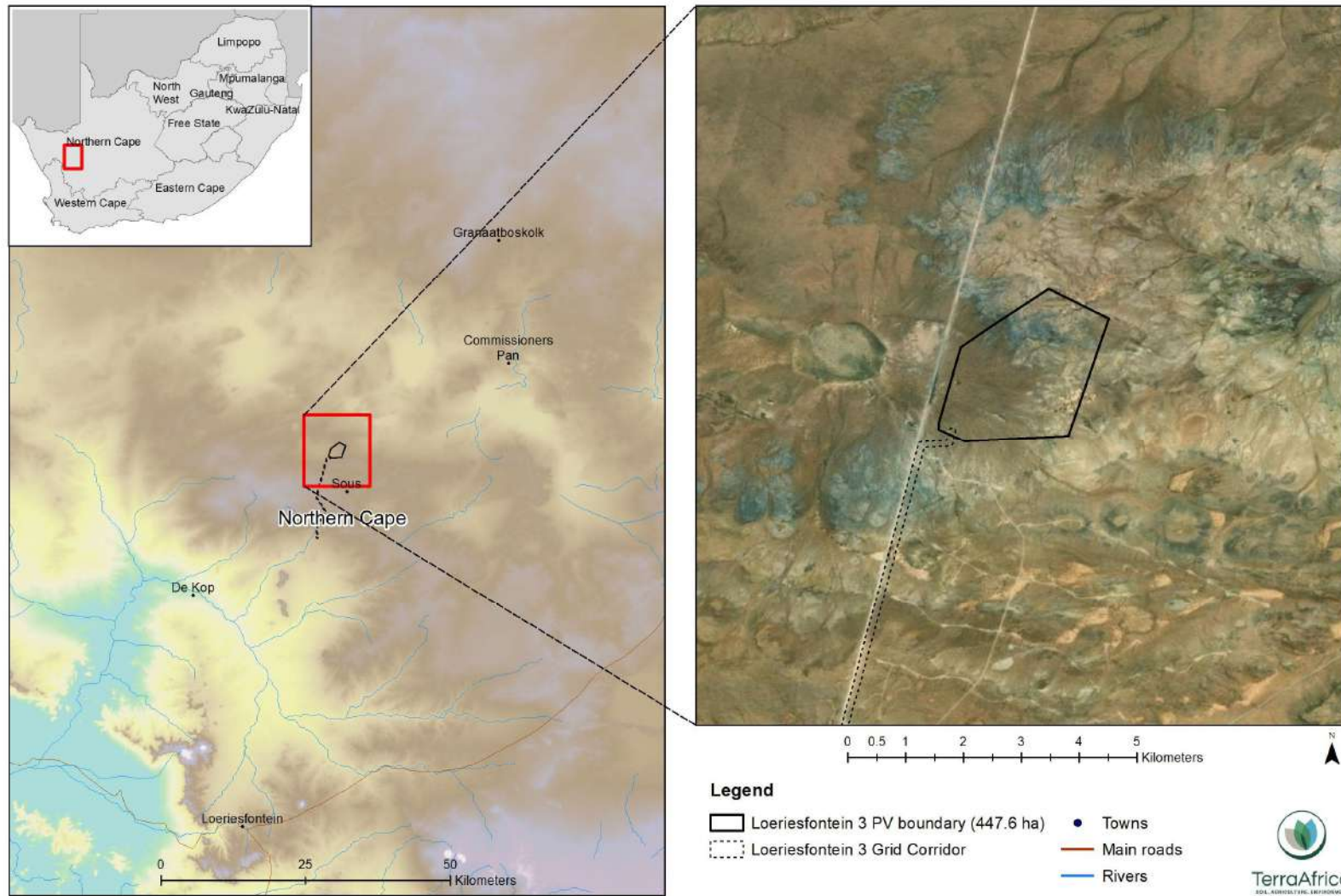


Figure 1: Locality of the Loeriesfontein 3 PV SEF development area and position of the associated grid (powerline) corridor



### **3. Purpose and objectives of the comparative assessment**

If granted, the extension of the validity period of the EA for the PV project will take the validity of the current Loeriesfontein 3 PV SEF EA (DFFE Ref: 12/12/20/2321/2/1) beyond 10 years. In order for the Competent Authority (namely the DFFE) to decide whether the validity of the EA can be extended without another EA application process, information regarding the current baseline conditions and impacts associated with the project are required. The purpose of the agricultural comparative assessment is to inform the authorities of any changes in the agricultural resources of the site since the EA was granted, and to confirm whether the project will result in impacts additional to those identified during the initial assessment undertaken in 2012 (SiVEST, 2012).

The objective of the agricultural comparative assessment therefore is:

- Provide a description of the agricultural resources (baseline) that was assessed during the initial assessment;
- Assess the current status of the agricultural resources;
- Provide a statement on whether or not the impact rating, as provided in the initial assessment, remains valid and whether the mitigation measures provided in the initial assessment are still applicable;
- Determine whether there are any new mitigation measures which need to be included into the EA, should the request to extend the validity period of the EA be granted by the Department;
- Indicate whether there are any new assessments/guidelines which are now relevant to the authorised development which were not undertaken as part of the initial assessment;
- Describe and assess any changes to the agricultural resources that has occurred since the initial EA was issued; and
- Provide a description and an assessment of the surrounding environment, in relation to new developments or changes in land use which might impact on the authorised project (cumulative impact assessment).

### **4. Environmental legislation and soil management guidelines applicable to study**

The report follows the protocols as stipulated for agricultural assessment in Government Notice 320 of 2020 (GN320). This Notice provides the procedures and minimum criteria for reporting in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (No. 107 of 1998) (from here onwards referred to as NEMA). It replaces the previous requirements of Appendix 6 of the Environmental Impact Assessment Regulations of NEMA.

Since the results of the environmental screening report indicated that the project site has Medium to Low sensitivity with regards to the combined agricultural theme, an Agricultural Compliance Statement is required as part of the Basic Assessment process. In addition to the specific requirements of GN320 for this study, the following South African legislation is also



considered applicable to the interpretation of the data and conclusions made with regards to environmental sensitivity and the conservation of soil resources of the project area:

- The Conservation of Agricultural Resources (Act 43 of 1983) states that the degradation of the agricultural potential of soil is illegal. This Act requires the protection of land against soil erosion and the prevention of water logging and salinisation of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.
- Section 3 of the Subdivision of Agricultural Land Act 70 of 1970 may also be relevant to the development since dominant land use of the land portion will change from agriculture to energy generation.
- In addition to this, the National Water Act (Act 36 of 1998) deals with the protection of water resources (i.e. wetlands and rivers) and may be relevant if wetland areas are identified within the project site.

## 5. Methodology

The different steps that were followed to gather the information used for the compilation of this report is outlined below.

### 5.1 Review of initial assessment and other specialist reports

The Soil and Agricultural Assessment Report that was compiled by Kurt Barichievy of SiVEST and submitted 20 February 2012, was reviewed. The agricultural report was part of the initial application for EA process that was approved in 2012 (DFFE Ref: 12/12/20/2321/2). The report contains information on a larger area around the Loeriesfontein 3 PV area, as the initial report included assessment for two wind energy facilities in addition to the solar PV facility which is the subject of this assessment.

A second report that was reviewed as part of this assessment is the Site Sensitivity Verification and Agricultural Compliance Statement for the Proposed Construction and Operation of the Battery Energy Storage System (BESS) and Associated Infrastructure and Inclusion of Additional Listed Activities for the Authorised Loeriesfontein 3 PV Solar Energy Facility, submitted by Johann Lanz on 2 November 2020. The data discussed in this report included a section of the Loeriesfontein 3 PV facility's development area.

### 5.2 Assessment of available desktop data

To consider data from the National Department of Agriculture, Land Reform and Rural Development (DALRRD) that became available after 2012, the project area boundaries was superimposed on four different raster data sets obtained from DALRRD. The data sets are as follows:

- The Refined Land Capability Evaluation Raster Data for South Africa that was





developed using a spatial evaluation modelling approach (DALRRD, 2016).

- The long-term grazing capacity for South Africa 2018 that present the long-term grazing capacity of an area with the understanding that the veld is in a relatively good condition (South Africa, 2018).
- The Northern Cape Field Crop Boundaries show crop production areas may be present within the development area. The field crop boundaries include rainfed annual crops, non-pivot and pivot irrigated annual crops, horticulture, viticulture, old fields, small holdings and subsistence farming (DALRRD, 2019).
- The High Potential Agricultural Areas for Cultivation: Northern Cape Province, 2021 are large, relatively homogeneous areas of land within the province regarded as having high potential and capability to contribute towards food production in both the province and the country (DALRRD, 2021).

In addition to the data obtained from DALRRD, the map of the Agricultural theme from the screening tool report was evaluated to determine the agricultural sensitivity of the PV site, according to the Environmental Screening Tool of the DFFE (<https://screening.environment.gov.za/screeningtool/#/pages/welcome>).

## 5.2 Inclusion of new assessment guidelines to meet regulatory requirements

The comparative assessment included a review of existing regulatory requirements for reporting to ensure the report meet the latest requirements. Since the submission of the initial Soil and Agricultural Assessment report by Baricievy (2012), Government Notice 320 of 2020 (GNR 320) was published. GNR 320 stipulates the protocols for agricultural assessment. It provides the procedures and minimum criteria for reporting in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (No. 107 of 1998) (NEMA). It replaces the previous requirements of Appendix 6 of the Environmental Impact Assessment Regulations of NEMA.

According to GNR 320, the agricultural assessment required for the Loeriesfontein 3 PV SEF, must meet the requirements of an agricultural compliance statement as it is on land with Medium and Low agricultural sensitivity. The assessment that is submitted must meet the following requirements, it must:

- be applicable to the preferred site and the proposed development footprint;
- confirm that the site is of “low” or “medium” sensitivity for agriculture; and
- indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site.

The following checklist is supplied as per the requirements of GNR 320, detailing where in the comparative assessment report the various requirements have been addressed:



**Table 1 GNR 320 requirements of an Agricultural Compliance Statement for renewable energy generation developments generating electricity of 20 MW or more**

<b>Requirement</b>	<b>Report reference</b>
3.1. The compliance statement must be prepared by a soil scientist or agricultural specialist registered with the SACNASP.	Section 2 & Appendices 1 & 2
3.2. The compliance statement must:	Section 6
3.2.1. be applicable to the preferred site and proposed development footprint;	
3.2.2. confirm that the site is of "low" or "medium" sensitivity for agriculture; and	Section 6.3
3.2.3. indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site.	Section 8
3.3. The compliance statement must contain, as a minimum, the following information:	Section 2 & Appendices 1 & 2
3.3.1. details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the assessment including a curriculum vitae;	
3.3.2. a signed statement of independence by the specialist;	Appendix 1
3.3.3. a map showing the proposed development footprint (including supporting infrastructure) with a 50m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool;	Figure 5
3.3.4 calculations of the physical development footprint area for each land parcel as well as the total physical development footprint area of the proposed development including supporting infrastructure;	Section 6.4
3.3.5 confirmation that the development footprint is in line with the allowable development limits;	Section 6.4
3.3.6. confirmation from the specialist that all reasonable measures have been taken through micro- siting to avoid or minimise fragmentation and disturbance of agricultural activities;	Section 9
3.3.7. a substantiated statement from the soil scientist or agricultural specialist on the acceptability, or not, of the proposed development and a recommendation on the approval, or not, of the proposed development;	Section 9
3.3.8. any conditions to which the statement is subjected;	Section 9
3.3.9. in the case of a linear activity, confirmation from the agricultural specialist or soil scientist, that in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;	Not applicable
3.3.10. where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr; and	Section 7
3.3.11. a description of the assumptions made as well as any uncertainties or gaps in knowledge or data.	Section 8
3.4. A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	Submitted as part of final report



### 5.3 Impact assessment methodology for cumulative impacts

Following the methodology prescribed by Nala, the cumulative impacts in relation to other renewable energy projects in the area have been assessed in terms of the following criteria:

- the **nature**, including a description of what causes the effect, what will be affected and how it will be affected;
- the **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional; and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high);
- the **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5;
- the **magnitude**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment; 2 is minor and will not result in an impact on processes; 4 is low and will cause a slight impact on processes; 6 is moderate and will result in processes continuing but in a modified way; 8 is high (processes are altered to the extent that they temporarily cease); and 10 is very high and results in complete destruction of patterns and permanent cessation of processes;
- the **probability of occurrence**, describing the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures);
- the **significance**, determined through a synthesis of the characteristics described above and can be assessed as low, medium or high;
- the **status**, described as either positive, negative or neutral;
- the degree to which the impact can be reversed;
- the degree to which the impact may cause irreplaceable loss of resources; and
- the *degree* to which the impact can be *mitigated*.

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

$$S=(E+D+M)P$$

where:

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

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



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

## 6. Baseline description

### 6.1 Initial assessment

According to the Soil and Agricultural Assessment by Barichievy (2012), the soil forms present within the development area consist mostly of shallow soils underlain by rock and hardpan carbonate that has severe limitations to rainfed crop production. These soils are of the Mispah and Coega forms and the effective depths of these soils are shallower than 300 mm. Other soil forms include that of the Prieska, Augrabies and Brandvlei forms. These profiles have effective depth between 300 mm and 600 mm, and although deeper, is still not suitable for rainfed agriculture in the arid climate of the development area. Two different soil forms are present at the study area (where infrastructure of the development will be placed) of the Loeriesfontein 3 PV site and the grid connection infrastructure. These soil forms are, Coega and Mispah.

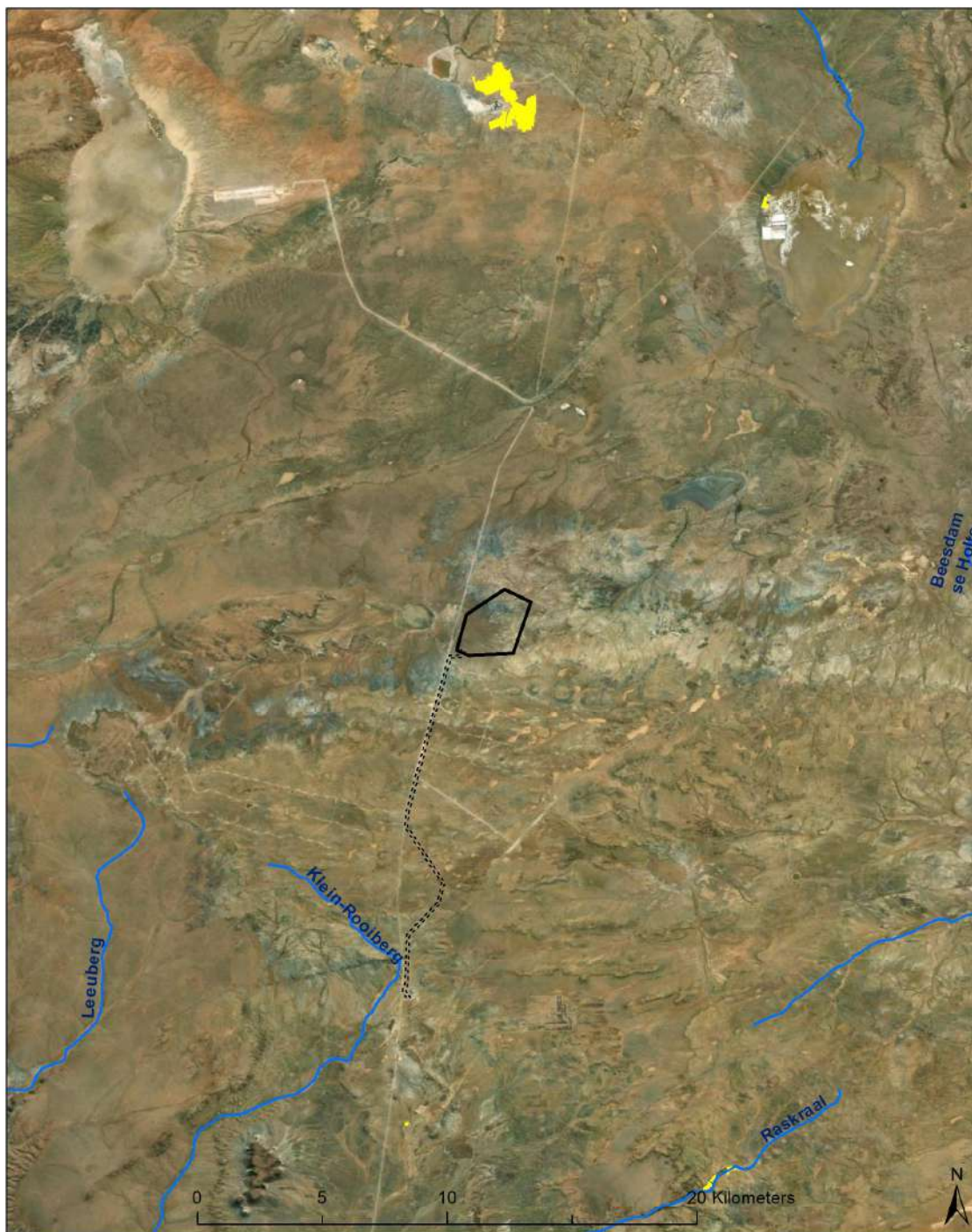
The report stated that the agricultural potential of the site is **low** over the largest area, because of the combination of shallow soils and low rainfall. The areas with deeper soil profiles (Prieska soils) were indicated as **low-moderate agricultural potential**. The site has no irrigation water available from surface water resources and no irrigated agriculture is practiced on site. No boreholes were used for irrigated agriculture. The land use of the area was indicated as extensive grazing by sheep. The stocking density reported by the landowners were 1 SSU (Small Stock Unit) per 10 hectares. The report stated that the seasonal pans have the highest grazing potential because of the presence of soil moisture and drinking water for the livestock originates from boreholes.

### 6.2 Results of the desktop assessment

The low agricultural potential of the soils within the project area is confirmed by the absence of crop field boundaries following the delineation of DALRRD (2019) (see Figure 2). The nearest crop fields are located between 22 to 25 km north and northeast of the PV development area. There are no irrigated crop fields within a 30 km radius from the development area.


The long-term grazing capacity of the area, according to DALRRD (2018), is 45 ha per Large Stock Unit (LSU). This can be converted to 11 ha per SSU. This is slightly lower than the 10 ha per SSU that was indicated by the farmers during the compilation of the initial Soil and Agricultural Potential Report by Barichievy (2012). **The data confirms that description of the area's livestock grazing potential as low-moderate.**






**Legend**

**Field crops**

 Rainfed Annual Crop Cultivation / Planted Pastures

 Loeriesfontein 3 PV boundary (447.6 ha)

 Loeriesfontein 3 Grid Corridor

 Rivers



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Figure 2: Location of field crop boundaries around the Loeriesfontein 3 PV SEF (data source: DALRRD, 2019)



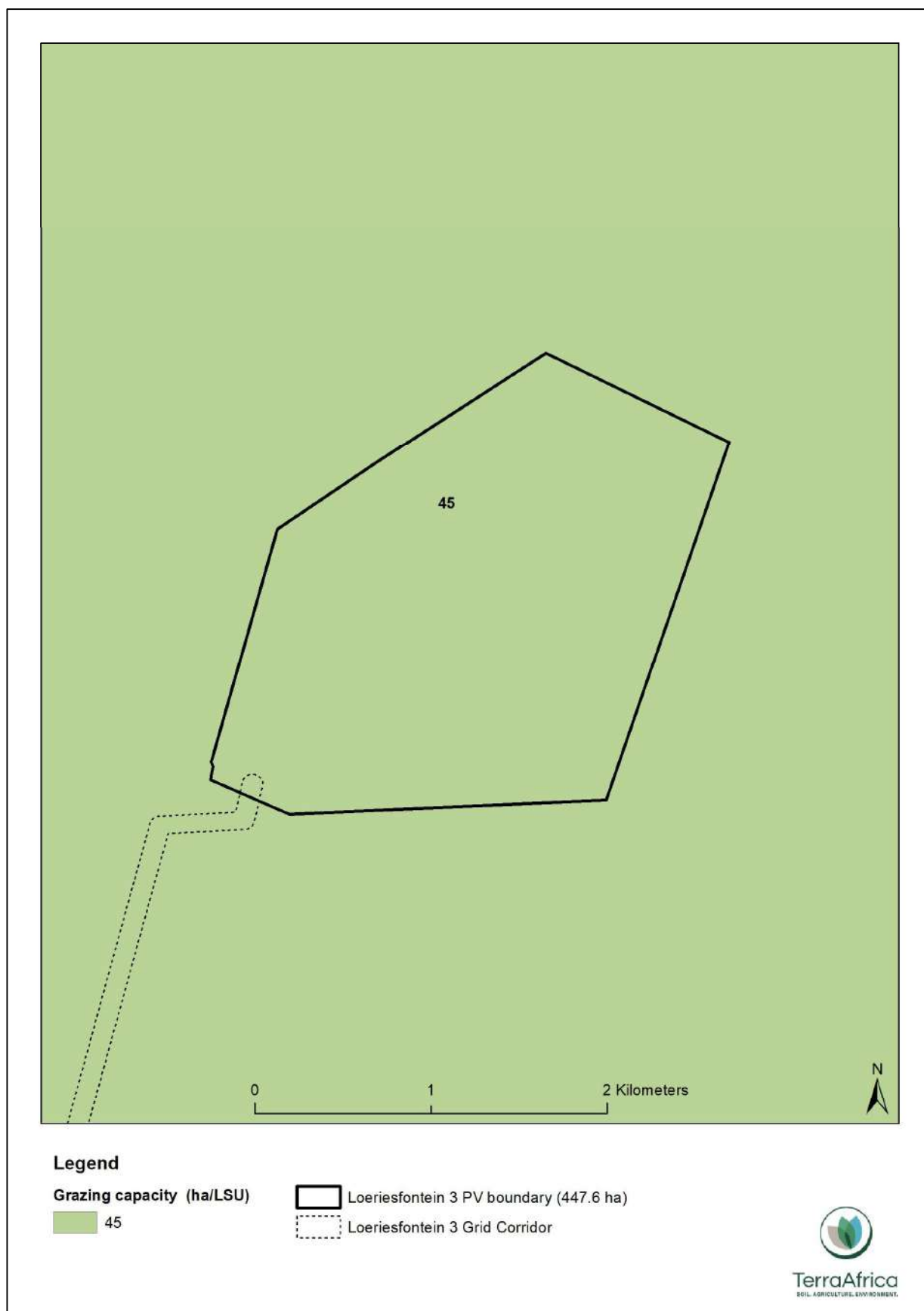


Figure 3: Grazing capacity of the Loeriesfontein 3 PV SEF development area



The land capability of the development area according to the system developed by DALRRD (2016) is shown in Figure 4.

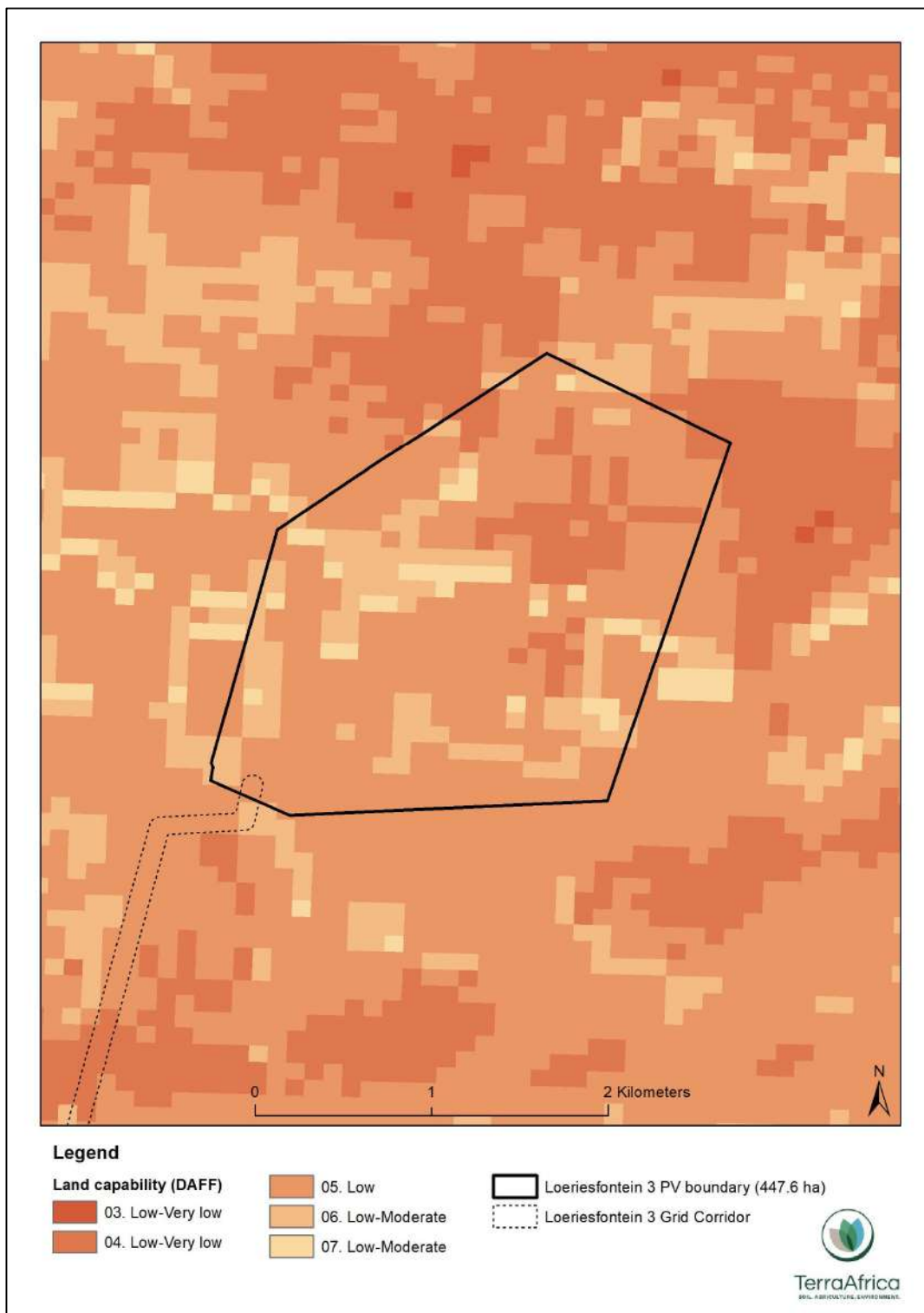


Figure 4: Land capability classification of the Loeriesfontein 3 PV SEF development area (data source: DALRRD, 2016)

The dominant land capability class of the development area is **Low (Class 05)**. Smaller areas with **Low-Moderate (Classes 06 and 07)** and **Very low (Class 04)** are interspersed between



the Low land capability. The development area is surrounded by land of the same combination of land capability classes. The substation consists of land with a Low-Very low (**Class 04**) land capability. The development area is surrounded by land of the same combination of land capability classes.

### 6.3 Sensitivity analysis and allowable development limits

The agricultural theme map of the sensitivity screening tool indicates that the development area assessed consists of **Low and Medium agricultural sensitivity** (Figure 5). The initial assessment of the agricultural potential of the area had a similar conclusion based on the presence of very shallow to shallow soils and an arid climate with low rainfall. The report concluded that there is **no suitability for rainfed agriculture and limited suitability for livestock farming** (Barichievy, 2012).

The desktop analysis conducted in 2022/2023 (current report) for the comparative assessment **agrees with the sensitivity rating of the screening tool report**, as all the data sets released by DALRRD since 2012 indicates that the agricultural potential and productivity of the area has not improved. It is **concluded that the agricultural sensitivity of the area is Low and there are no areas of High sensitivity** (see Figure 6).

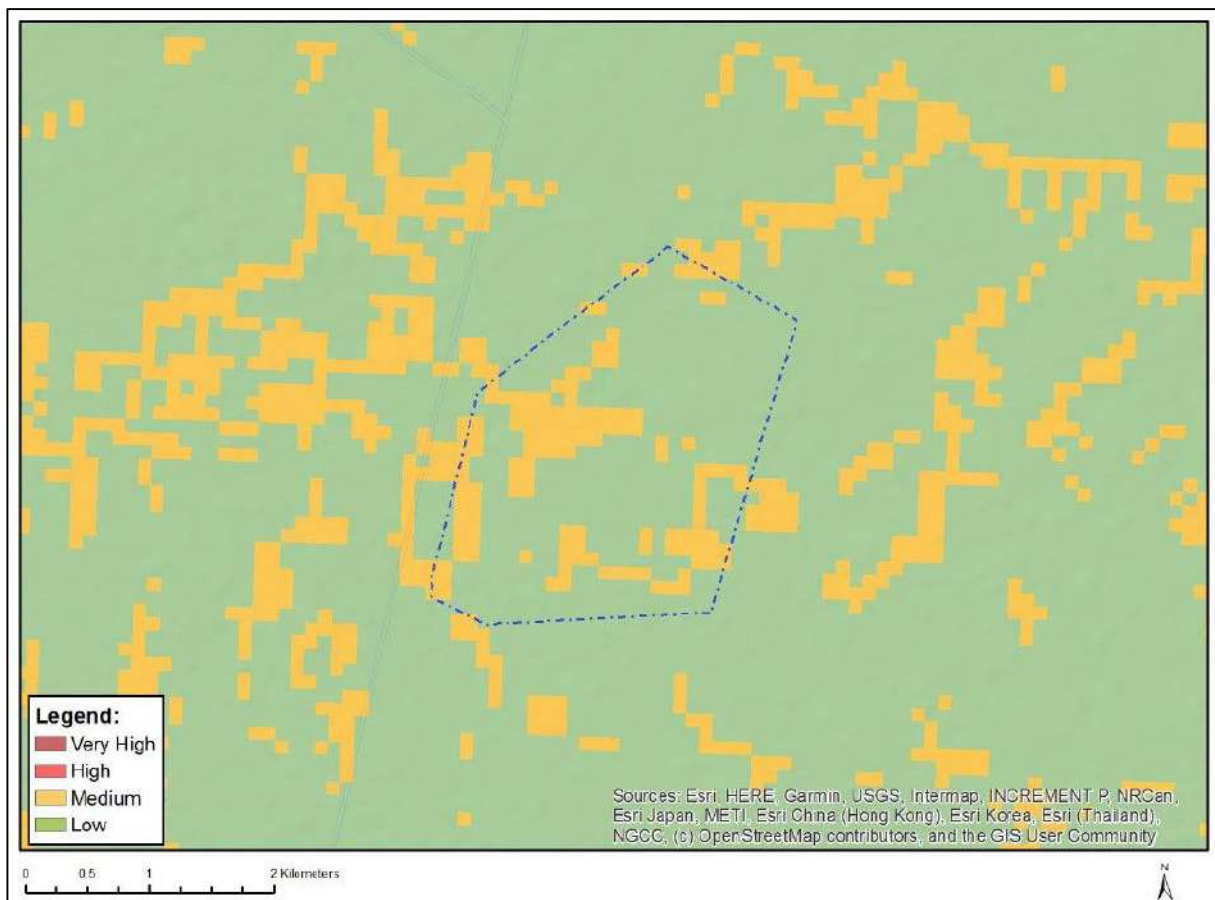
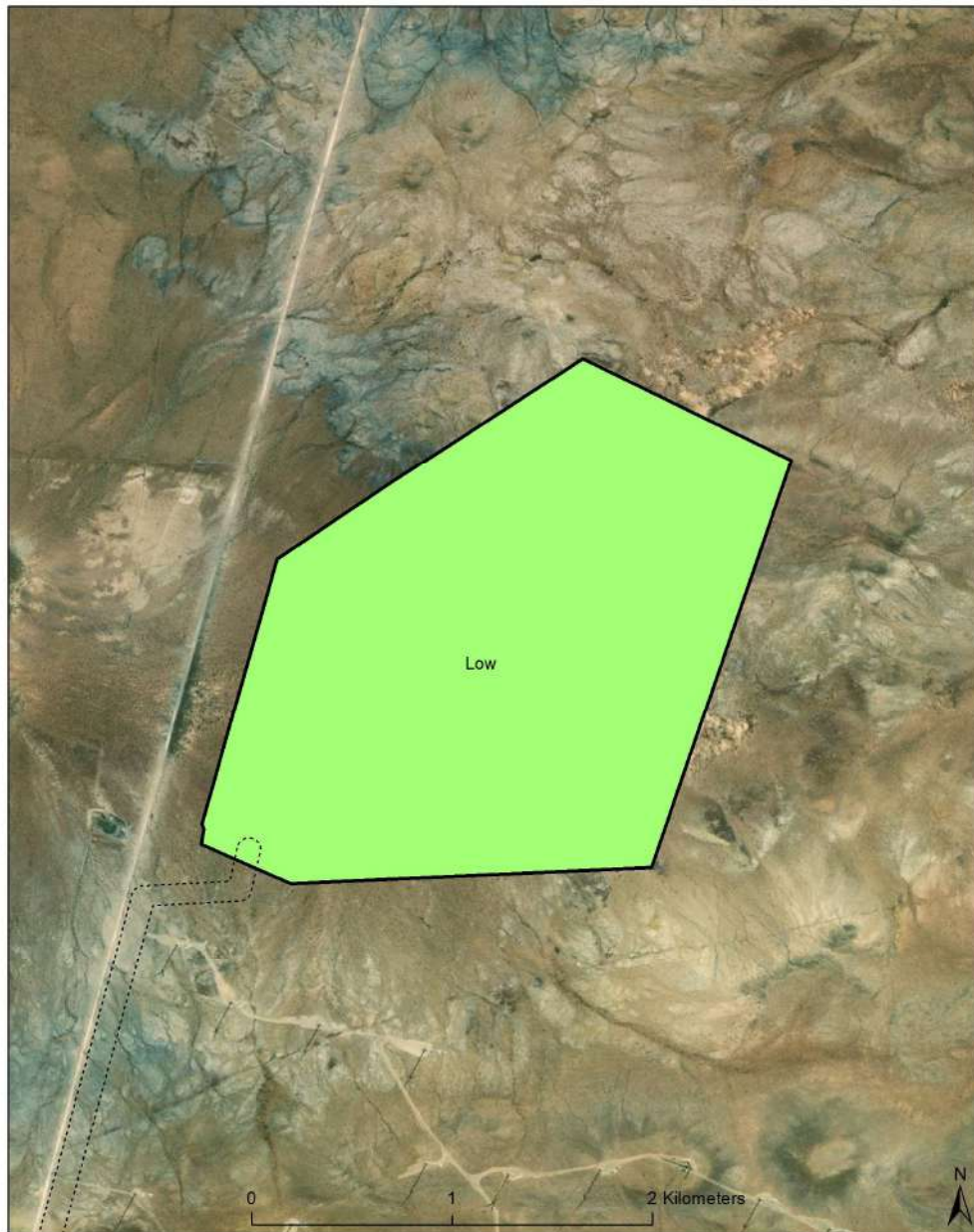


Figure 5: Agricultural theme from the screening tool report for the Loeriesfontein 3 PV SEF







**Legend**

**Sensitivity**

Low (447.6 ha)

Loeriesfontein 3 PV boundary (447.6 ha)

Loeriesfontein 3 Grid Corridor



Figure 6: Agricultural sensitivity of the Loeriesfontein 3 PV SEF (January 2023)

The project area was also superimposed on the High Potential Agricultural Areas of the Northern Cape Province (DALRDD, 2020), to determine whether the area falls within any of these areas. The result of the analysis is shown in Figure 7. The project area and substation **does not overlap with any High Potential Agricultural Areas** and the nearest areas are located 100 to 130 km southwest and southeast of the project area.



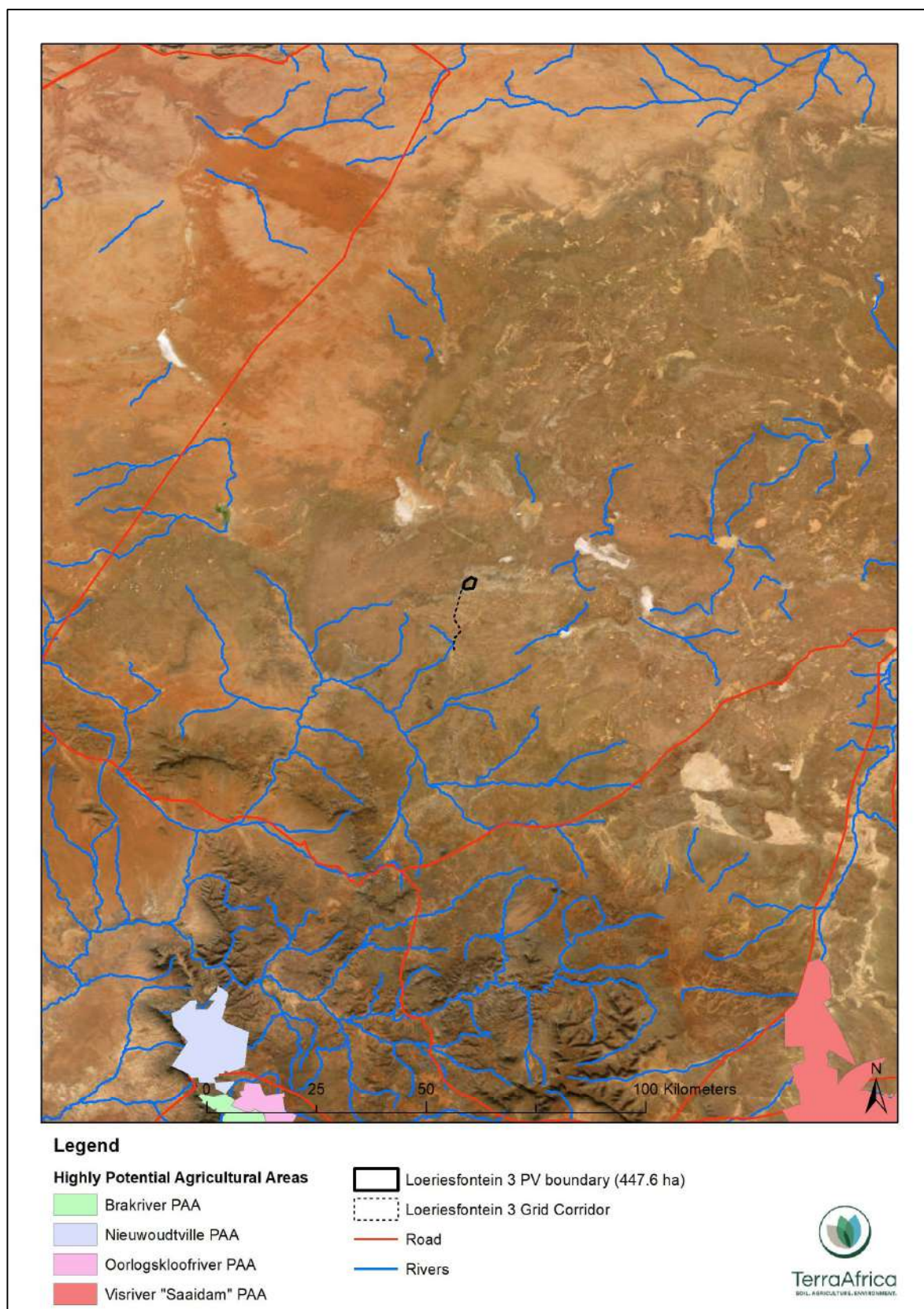


Figure 7: The project area in relation to High Potential Agricultural Areas of the Northern Cape Province (data source: DALRRD, 2020)



## 6.4 Allowable development limits

Following the sensitivity delineation of the development area, the allowable development limit for the development area of 447ha, was calculated. The allowable development limit for areas outside crop field boundaries were used. The results of the calculations are provided in Table 2 below. Even though the current development area of 447 ha exceeds the allowable development limit with 197 ha, it is anticipated that the final development footprint will be smaller than 447 ha. It is considered an acceptable exceedance as the area has no crop production and limited suitability for sheep farming as the grazing capacity is low-moderate and the area experiences frequent droughts.

Table 2 Calculated allowable development limits of the development footprint

Sensitivity class	Area that will be affected by development footprint (ha)	Allowable limit (ha/MW)	Area allowed for a 100MW development (ha)	Area that exceeds allowable limit (ha)
Low	447	2.50	250	197

## 7. Impact assessment

### 7.1 Direct and indirect impacts

Following the amendment request of the applicant (i.e., the request for extension of validity period of EA), all impacts identified within the original report compiled by Barichievy in 2012 **is still applicable for the requested extension of the validity period of the EA. No additional impacts or change in impact significance will occur as the agricultural conditions of the area remain unchanged. No additional mitigation measures are required** because of the proposed extension of the EA.

The impact assessment found in the Barichievy report (2012) only included impacts associated with **contamination of local soils and land use resources** and **briefly mentioned the risk of soil erosion** due to the arid climate of the development area. The current report included the following environmental impacts:

- Land use change from livestock grazing to PV facility.
- Soil erosion.
- Soil pollution.
- Soil compaction.

The environmental impact assessment for the soil pollution and contamination of local soils and land use resources did not differ.

Mitigation measures included in the Barichievy report (2012) included;

- Clearing activities should be kept to a minimum (Road and PV site footprint).



- In the unlikely event that heavy rains are expected activities should be put on hold to reduce the risk of erosion.
- If additional earthworks are required, any steep or large embankments that are expected to be exposed during the ‘rainy’ months should either be armoured with fascine like structures.

The mitigation measures from the Barichievy report (2012) differ from the mitigation measures in this report as seen in Table 3 to Table 6

## 7.2 Cumulative impacts

“Cumulative Impact”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities<sup>1</sup>.

The role of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact). This section should address whether the construction of the proposed project will result in:

- unacceptable risk;
- unacceptable loss;
- complete or whole-scale changes to the environment or sense of place; and
- unacceptable increase in impact.

The Loeriesfontein 3 PV SEF will be located within a 30km radius of 12 renewable energy project facilities that already are either operational, in process or authorised EA (see Figure 8). The cumulative impacts of the proposed project in addition to the authorised solar developments are rated and discussed below.

No cumulative impacts are found in the Barichievy report (2012).

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<sup>1</sup> Unless otherwise stated, all definitions are from the EIA Regulations 2014 (GNR 326).



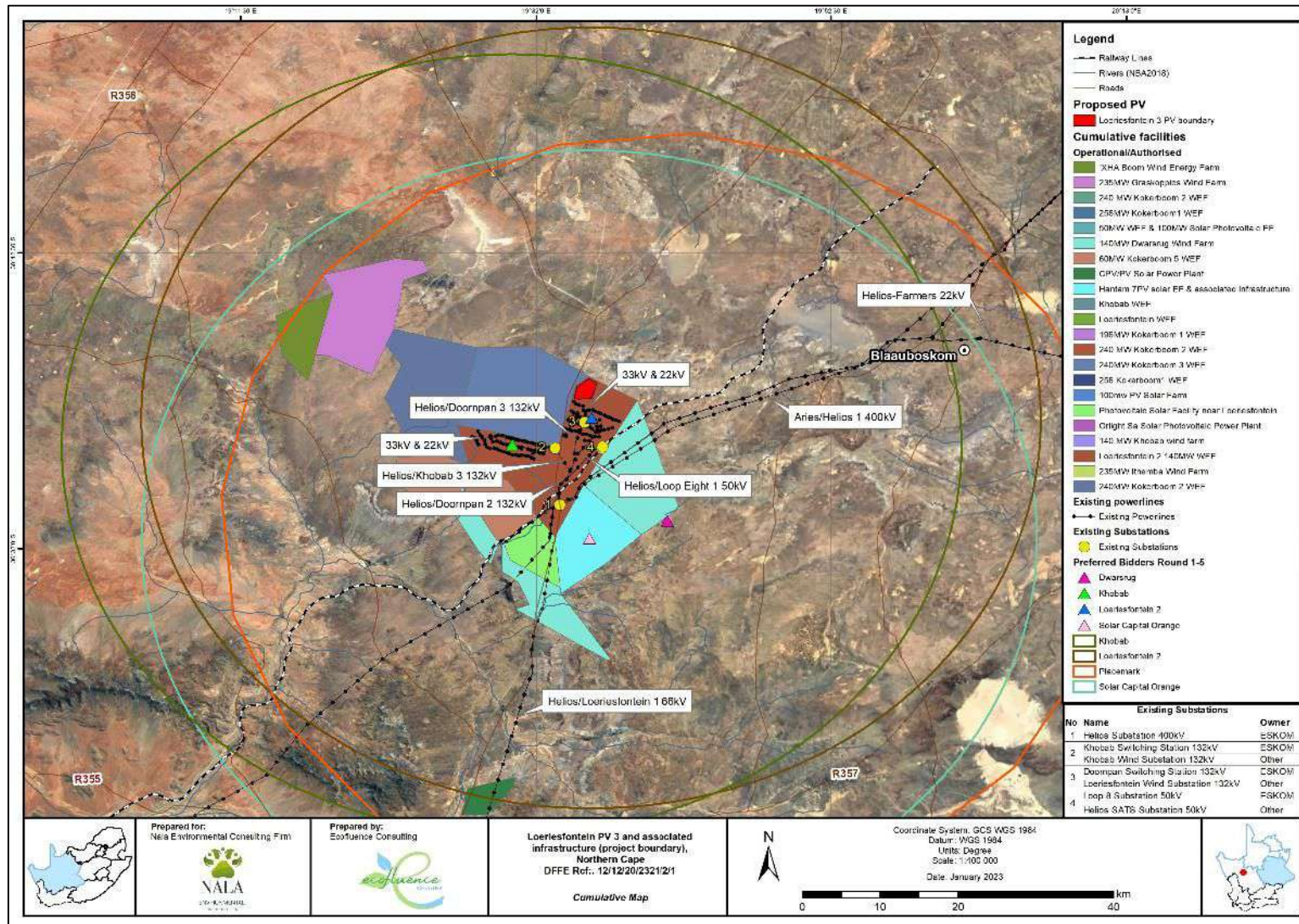


Figure 8. Renewable energy projects within a 30km radius around the Loeriesfontein 3 PV SEF



Table 3 Assessment of cumulative impact of decrease in areas available for livestock farming

<b>Nature:</b> Decrease in areas with suitable land capability for livestock (sheep) farming.		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Very short duration - 0-1 years (1)	Short duration – 2 – 5 years (2)
<b>Magnitude</b>	Minor (2)	Low (4)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low (12)</b>	Low (24)
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	High	Low
<b>Loss of resources?</b>	No	Yes
<b>Can impacts be mitigated?</b>	N/A	No
<b>Confidence in findings:</b> High.		
<b>Mitigation:</b> <ul style="list-style-type: none"> <li>• Vegetation clearance must be restricted to areas where infrastructure is constructed.</li> <li>• No materials removed from development area must be allowed to be dumped in nearby livestock farming areas.</li> <li>• Prior arrangements must be made with the landowners to ensure that livestock are moved to areas where they cannot be injured by vehicles traversing the area.</li> <li>• No boundary fence must be opened without the landowners' permission.</li> <li>• All left-over construction material must be removed from site once construction on a land portion is completed.</li> <li>• No open fires made by the construction teams are allowable during the construction phase.</li> </ul>		

Table 4 Assessment of cumulative impact of areas susceptible to soil erosion

<b>Nature:</b> Increase in areas susceptible to soil erosion		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Medium-term (3)	Medium-term (3)
<b>Magnitude</b>	Moderate (6)	Moderate (6)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Medium (30)</b>	<b>Medium (33)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes	No
<b>Confidence in findings:</b> High.		
<b>Mitigation:</b> <ul style="list-style-type: none"> <li>• Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint;</li> <li>• Unnecessary land clearance must be avoided;</li> <li>• Level any remaining soil removed from excavation pits (where the PV modules will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface;</li> <li>• Where possible, conduct the construction activities outside of the rainy season; and</li> <li>• Stormwater channels must be designed to minimise soil erosion risk resulting from surface water runoff.</li> </ul>		



Table 5 Assessment of cumulative impact of areas susceptible to soil compaction

<b>Nature:</b> Increase in areas susceptible to soil erosion		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Medium-term (3)	Medium-term (3)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Improbable (2)	Probable (3)
<b>Significance</b>	<b>Low (16)</b>	<b>Low (27)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	Yes
<b>Confidence in findings:</b> High.		
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• Vehicles and equipment must travel within demarcated areas and not outside of the construction footprint;</li> <li>• Unnecessary land clearance must be avoided;</li> <li>• Materials must be off-loaded and stored in designated laydown areas;</li> <li>• Where possible, conduct the construction activities outside of the rainy season; and</li> <li>• Vehicles and equipment must park in designated parking areas.</li> </ul>		

Table 6 Assessment of cumulative impact of increased risk of soil pollution

<b>Nature:</b> Increase in areas susceptible to soil pollution		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Moderate (6)	Moderate (6)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low (27)</b>	<b>Medium (30)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes	No
<b>Confidence in findings:</b> High.		
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills;</li> <li>• Any waste generated during construction must be stored into designated containers and removed from the site by the construction teams;</li> <li>• Any left-over construction materials must be removed from site;</li> <li>• The construction site must be monitored by the Environmental Control Officer (ECO) to detect any early signs of fuel and oil spills and waste dumping;</li> <li>• Ensure battery transport and installation by accredited staff / contractors; and</li> <li>• Compile (and adhere to) a procedure for the safe handling of battery cells during transport and installation.</li> </ul>		



Cumulative impacts will increase the significance rating compared to the overall impact of the proposed project considered in isolation.

## 8. Gaps and limitations

The following gaps and limitations are part of the data analysis and discussion:

- No site visit was conducted for the 2022/2023 assessment as desktop data indicated that there has been no sudden change in the agricultural conditions of the area since 2012.
- It is anticipated that the activities of the construction and operational phases will remain the same as was indicated in the 2012 Environmental Impact Assessment and the supporting specialist studies.
- It is assumed that the agricultural specialist studies reviewed for this report, are accurate.

## 9. Acceptability statement

Following the data analysis and results of the impact assessment above (including cumulative impact assessment), the previously authorised Loeriesfontein 3 PV SEF is **still considered an acceptable development** in the project area, even with the requested amendments now made by the applicant. The original 2012 environmental impact and mitigation measures are still considered applicable, but attention should be given to the current reports environmental impact and mitigation measures as additional environmental impact and mitigation measures are described (Table 1-4).

The soil forms present within the development area consist mostly of shallow soils underlain by rock and hardpan carbonate that has severe limitations to rainfed crop production. These soils are of the Mispah and Coega forms and the effective depths of these soils are shallower than 300 mm. Other soil forms include that of the Prieska, Augrabies and Brandvlei forms. These profiles have effective depth between 300 mm and 600 mm, and although deeper, is still not suitable for rainfed agriculture in the arid climate of the development area. Two different soil forms are present at the study area (where infrastructure of the development will be placed) of the Loeriesfontein 3 PV site and the grid connection infrastructure. These soil forms are, Coega and Mispah.

The entire project has never been used for rainfed or irrigated crop production before. There is also no irrigation infrastructure, such as centre pivots or drip irrigation, present within the project area and the area is considered suitable for livestock farming with limited grazing capacity (11 ha/SSU). The development area is located at least 100 km from any High Potential Agricultural Area. During the initial planning phases of the project (in 2012), micro-siting and layout optimisation has ensured that it does not fragment any crop fields.





It is my professional opinion that the **request for the extension of the validity period of the EA for an additional five year period be considered favorably, permitting that the mitigation measures of the initial assessment still be implemented. No additional mitigation measures are recommended, over and above those already provided as part of the original assessment (Barichiev, 2012).**



## 10. Reference list

Barichiev, K.R. (2012). Soil and agricultural assessment for the Proposed Construction of Photovoltaic (PV) Plant near Loeriesfontein, Northern Cape Province, South Africa. Cape Town: Sivest.

Crop Estimates Consortium, 2019. *Field crop boundary data layer (NC province)*, 2019. Pretoria. Department of Agriculture, Land Reform and Rural Development.

Department of Agriculture, Land Reform and Rural Development, 2019. *High potential agricultural areas 2019 – Spatial data layer, Northern Cape Province*, 2021. Pretoria.

Department of Agriculture, Land Reform and Rural Development, 2016. *National land capability evaluation raster data: Land capability data layer*, 2016. Pretoria.

Kalibbala, F. (2012). Proposed Construction of Photovoltaic (PV) Plant near Loeriesfontein, Northern Cape Province, South Africa. Cape Town: Sivest.

Lanz., J. (2020). Proposed construction and operation of the battery energy storage system (bess) and associated infrastructure and inclusion of additional listed activities for the authorised Loeriesfontein. Cape Town: Lanz., Johann.

South Africa (Republic) 2018. *Long-term grazing capacity for South Africa*: Data layer. Government Gazette Vol. 638, No. 41870. 31 August 2018. Regulation 10 of the Conservation of Agricultural Resources Act (CARA): Act 43 of 1983. Pretoria. Government Printing Works.



## APPENDIX 1 – SPECIALIST DECLARATION



### DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

#### PROJECT TITLE

**Part 1 Environmental Authorisation (EA) Amendment Application to extend the validity period of the EA for the authorised 100 MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF), 33/132kV IPP Portion of the Shared On-site Substation (including the Transformer) and associated infrastructure, near Loeriesfontein, Hantam Local Municipality, Northern Cape Province – DFFE Reference Number: 12/12/20/2321/2/1**

#### Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

#### Departmental Details

**Postal address:**  
 Department of Environmental Affairs  
 Attention: Chief Director: Integrated Environmental Authorisations  
 Private Bag X447  
 Pretoria  
 0001

**Physical address:**  
 Department of Environmental Affairs  
 Attention: Chief Director: Integrated Environmental Authorisations  
 Environment House  
 473 Steve Biko Road  
 Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:  
 Email: [EIAAdmin@environment.gov.za](mailto:EIAAdmin@environment.gov.za)



**1. SPECIALIST INFORMATION**

Specialist Company Name:	TerraAfrica Consult CC			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	Mariné Pienaar			
Specialist Qualifications:	MSc. Environmental Science (Wits) ; BSc. (Agric) Plant Production (UP)			
Professional affiliation/registration:	SACNASP Registration No:400274/10 Soil Science Society of South Africa ; IAIAAsa			
Physical address:	Farm Strydpoort 403, Ottosdal, 2610			
Postal address:	P.O. Box 433, Ottosdal			
Postal code:	2610	Cell:	082 828 3587	
Telephone:	082 828 3587	Fax:	N/A	
E-mail:	mpienaar@terraafrica.co.za			

**2. DECLARATION BY THE SPECIALIST**

I, Mariné Pienaar, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

TerraAfrica Consult

Name of Company:

2023-01-10

Date

Details of Specialist, Declaration and Undertaking Under Oath

Page 2 of 3



## APPENDIX 2 - CURRICULUM VITAE OF SPECIALIST

# MARINÉ PIENAAR

## Specialist Scientist



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mpienaar@terraafrica.co.za



linkedin.com/in/marinepienaar

Wolmaransstad,  
South Africa

### EXPERTISE

Soil Quality Assessment

Soil Policy and Guidelines

Agricultural Agro-Ecosystem Assessment

Sustainable Agriculture

Data Consolidation

Land Use Planning

Soil Pollution

Hydropedology

### EDUCATION

MASTER'S DEGREE  
Environmental Science  
University of Witwatersrand  
2010 – 2018

BACHELOR'S DEGREE  
Agricultural Science  
University of Pretoria  
2001 – 2004

### PROFESSIONAL PROFILE

I contribute specialist knowledge on agriculture and soil management to ensure long-term sustainability of projects in Africa. For the past thirteen years, it has been my calling and I have consulted on more than 200 projects. My clients include environmental and engineering companies, mining houses, and project developers. I enjoy the multi-disciplinary nature of the projects that I work on and I am fascinated by the evolving nature of my field of practice. The next section provide examples of the range of projects completed. A comprehensive project list is available on request.

### PROJECT EXPERIENCE

Global Assessment on Soil Pollution  
*Food and Agricultural Organisation (FAO) of the United Nations (UN)*

Author of the regional assessment of Soil in Sub-Saharan Africa. The report is due for release in February 2021. The different sections included:

- Analysis of soil and soil-related policies and guidelines for each of the 48 regional countries
- Description of the major sources of soil pollution in the region
- The extent of soil pollution in the region and as well as the nature and extent of soil monitoring
- Case study discussions of the impacts of soil pollution on human and environmental health in the region
- Recommendations and guidelines for policy development and capacitation to address soil pollution in Sub-Saharan Africa

Data Consolidation and Amendment  
*Range of projects: Mining Projects, Renewal Energy*

These projects included developments where previous agricultural and soil studies are available that are not aligned with the current legal and international best practice requirements such as the IFC Principles. Other projects are expansion projects or changes in the project infrastructure layout. Tasks on such projects include the incorporation of all relevant data, site verification, updated baseline reporting and alignment of management and monitoring measures.

Project examples:

- Northam Platinum's Booyendal Mine, South Africa
- Musonoi Mine, Kolwezi District, Democratic Republic of Congo
- Polihali Reservoir and Associated Infrastructure, Lesotho
- Kaiha 2 Hydropower Project, Liberia
- Aquarius Platinum's Kroondal and Marikana Mines



# MARINÉ PIENAAR

## Specialist Scientist

### PROFESSIONAL MEMBERSHIP

South African Council for  
Natural Scientific  
Professions (SACNASP)

Soil Science Society of  
South Africa (SSSA)

Soil Science Society of  
America (SSSA)

Network for Industrially  
Contaminated Land in  
Africa (NICOLA)

### LANGUAGES

English (Fluent)

Afrikaans (Native)

French (Basic)

### PRESENTATIONS

*There is spinach in my fish pond*  
TEDx Talk  
Available on YouTube



*Soil and the Extractive Industries*  
Session organiser and presenter  
Global Soil Week, Berlin (2015)



*How to dismantle an atomic bomb*  
Conference presentation (2014)  
Environmental Law Association (SA)

### PROJECT EXPERIENCE (Continued)

#### Agricultural Agro-Ecosystem Assessments

*Range of projects: Renewable Energy, Industrial and Residential Developments, Mining, Linear Developments (railways and power lines)*

The assessments were conducted as part of the Environmental and Social Impact Assessment processes. The assessment process includes the assessment of soil physical and chemical properties as well as other natural resources that contributes to the land capability of the area.

Project examples:

- Mocuba Solar PV Development, Mozambique
- Italtai Railway between Tete and Quelimane, Mozambique
- Lichtenburg PV Solar Developments, South Africa
- Manica Gold Mine Project, Mozambique
- Khunab Solar PV Developments near Upington, South Africa
- Bomi Hills and Mano River Mines, Liberia
- King City near Sekondi-Takoradi and Appolonia City near Accra, Ghana
- Limpopo-Lipadi Game Reserve, Botswana
- Namoya Gold Mine, Democratic Republic of Congo

#### Sustainable Agriculture

*Range of projects: Policy Development for Financial Institutions, Mine Closure Planning, Agricultural Project and Business Development Planning*

Each of the projects completed had a unique scope of works and the methodology was designed to answer the questions. While global indicators of sustainable agriculture are considered, the unique challenges to viable food production in Africa, especially climate change and a lack of infrastructure, in these analyses.

Project examples:

- Measurement of sustainability of agricultural practices of South African farmers – survey design and pilot testing for the LandBank of South Africa
- Analysis of the viability of avocado and mango large-scale farming developments in Angola for McKinsey & Company
- Closure options analysis for the Tshipi Borwa Mine to increase agricultural productivity in the area, consultation to SLR Consulting
- Analysis of risks and opportunities for farm feeds and supplement suppliers of the Southern African livestock and dairy farming industries
- Sustainable agricultural options development for mine closure planning of the Camutue Diamond Mine, Angola



# MARINÉ PIENAAR

## Specialist Scientist

### PROFESSIONAL DEVELOPMENT

Contaminated Land  
Management 101 Training  
Network for Industrially  
Contaminated Land in Africa  
2020

Intensive Agriculture in Arid &  
Semi-Arid Environments  
CINADCO/MASHAV R&D  
Course, Israel  
2015

World Soils and their  
Assessment Course  
ISRIC – World Soil Information  
Centre, Netherlands  
2015

Wetland Rehabilitation  
Course  
University of Pretoria  
2010

Course in Advanced  
Modelling of Water Flow and  
Solute Transport in the  
Vadose Zone with Hydrus  
University of Kwazulu-Natal  
2010

Environmental Law for  
Environmental Managers  
North-West University Centre  
for Environmental  
Management  
2009

### PROJECT EXPERIENCE (Continued)

#### Soil Quality Assessments

*Range of projects: Rehabilitated Land Audits, Mine Closure Applications, Mineral and Ore Processing Facilities, Human Resettlement Plans*

The soil quality assessments included physical and chemical analysis of soil quality parameters to determine the success of land rehabilitation towards productive landscapes. The assessments are also used to understand the suitability for areas for Human Resettlement Plans

Project examples:

- Closure Planning for Yoctolux Colliery
- Soil and vegetation monitoring at Kingston Vale Waste Facility
- Exxaro Belfast Resettlement Action Plan Soil Assessment
- Soil Quality Monitoring of Wastewater Irrigated Areas around Matimba Power Station
- Keaton Vanggatfontein Colliery Bi-Annual Soil Quality Monitoring

### REFERENCES



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**APPENDIX 3 – PROOF OF SACNASP REGISTRATION OF SPECIALIST**


  
**SACNASP**  
South African Council for Natural Scientific Professions


**herewith certifies that**  
**Mariné Pienaar**  
Registration Number: 400274/10  
**is a registered scientist**


in terms of section 20(3) of the Natural Scientific Professions Act, 2003  
(Act 27 of 2003)  
in the following field(s) of practice (Schedule 1 of the Act)


Soil Science (Professional Natural Scientist)  
Agricultural Science (Professional Natural Scientist)

Effective **20 October 2010** Expires **31 March 2023**



  
\_\_\_\_\_  
Chairperson

  
\_\_\_\_\_  
Chief Executive Officer



To verify this certificate scan this code

