FINAL BASIC ASSESSMENT REPORT

Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 2 (i.e., Padloper PV 2), as well as the proposed development of a 132 kV Overhead Power Line between the Padloper PV 2 and the proposed authorised Ishwati Emoyeni Collector Substation (i.e., Padloper EGI 2), and their associated infrastructure, near Murraysburg in the Western Cape Province



APPENDIX D: Specialist Reports

Appendix D.1: Agriculture and Soils – Padloper PV 1-4
Appendix D.1: Agriculture and Soils – Padloper EGI 1-4
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APPENDIX D.1:

Agriculture and Soils – Padloper EGI 1-4

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SITE SENSITIVITY VERIFICATION AND AGRICULTURAL COMPLIANCE STATEMENT FOR THE PADLOPER SOLAR PHOTOVOLTAIC FACILITIES 1 TO 4 IN THE NORTHERN CAPE AND WESTERN CAPE PROVINCES NEAR MURRAYSBURG

Report by
Johann Lanz

9 January 2024

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EXECUTIVE SUMMARY

The Project Applicant, Padloper PV (Pty) Ltd (hereinafter referred to as "Padloper PV)" or "the Applicant"), is proposing to develop seven Solar Photovoltaic (PV) Facilities (PV Projects 1-7) with a capacity between 100 and 250 MW each and associated infrastructure, and seven associated 132 kV overhead power lines, and Electrical Grid Infrastructure (EGI), near Murraysburg in the Western Cape and Northern Cape provinces. Padloper PV Facility 1, Padloper EGI 1 and Padloper EGI 4 will be located in the Ubuntu Local Municipality and Pixley Ka Seme District Municipality in the Northern Cape province, whilst Padloper PV Facilities 2-7 and Padloper EGI 2-3 and 5-7 will be located in the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape province. The proposed projects will make use of solar PV technology to generate electricity from energy derived from the sun. Each solar PV facility will have a range of associated infrastructure, as discussed below. The proposed projects are intended to address the current energy shortages in South Africa and assist in meeting the need for additional renewable energy generation capacity, as required by the Integrated Resource Plan (IRP) of 2019.

This report applies only to the Padloper Solar Photovoltaic Facilities 1 to 4.

South Africa needs agricultural production for food security. It also urgently needs renewable energy development. To achieve its renewable energy generation goals, agriculturally zoned land will inevitably need to be used for renewable energy generation.

The classified land capability of the PV 1-4 facility footprints is 4 (low-very low) to 6 (low-moderate). This assessment verifies that the facility footprints are not within crop boundaries. It further verifies the classified land capability, based on the assessment of the lack of cropping potential of the facility footprints, and confirms the low to medium sensitivity rating by the screening tool.

The cropping potential of the area is completely limited by the combination of climate (arid climate with low moisture availability) and soil constraints (limited soil depth) so that it is totally unsuitable for rain-fed crop production. The very low agricultural potential of the facility footprints limits their viable agricultural use to grazing only.

An agricultural impact is a change to the future agricultural production potential of land. This is primarily caused by the exclusion of agriculture from the footprint of the development. The significance of an agricultural impact is a direct function of the following three factors:

1. the size of the footprint of land from which agriculture will be excluded (or the footprint that will have its potential decreased)
2. the baseline production potential (particularly cropping potential) of that land

3. the length of time for which agriculture will be excluded (or for which potential will be decreased).

In this case, the total footprint of land that will be lost following the proposed construction of the proposed Padloper Solar 1-4, which will be lost for the lifetime of the development, is approximately 1204 hectares (ha). The production potential of that land is limited to only being suitable as fairly low carrying capacity grazing land. The loss of such land, of which there is no scarcity in the country, represents a minimal loss of agricultural production potential in terms of national food security and for the affected farm. Since no viable cropland is lost as a result of this development, its negative agricultural impact is therefore assessed as being of low significance and as acceptable.

Its acceptability is substantiated by the following points:

- The amount of agricultural land use by the development is within the allowable development limits prescribed by the agricultural protocol. These limits reflect the national need to conserve valuable agricultural land and therefore to steer, particularly renewable energy developments, onto land with low agricultural production potential.
- The proposed development poses a low risk in terms of causing soil degradation because degradation can be effectively prevented by standard, generic, best practice mitigation actions that are inherent in the project engineering.
- The proposed development offers a positive impact on agriculture by way of improved financial security for farming operations.
- The PV panels for the proposed Padloper Solar 1-4 will not necessarily 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 proposed development will also have the wider societal benefits of generating additional income and employment in the local economy.
- In addition, the proposed development will contribute to the country's urgent need for energy generation, particularly renewable energy that has much lower environmental and agricultural impact than existing, coal powered energy generation.
- All renewable energy development in South Africa decreases the need for coal power and thereby contributes to reducing the large agricultural impact that open cast coal mining has on highly productive agricultural land throughout the coal mining areas of the country.

From an agricultural impact point of view, it is recommended that the proposed Padloper Solar Photovoltaic Facilities 1 to 4 be approved.

1 INTRODUCTION

Separate Environmental Authorisations (EA) are being sought for the Padloper Solar Photovoltaic (PV) Facilities 1 to 4 in the Northern Cape and Western Cape provinces near Murraysburg (see location in Figure 1). In terms of the National Environmental Management Act (Act No 107 of 1998 - NEMA), an application for EA requires an agricultural assessment. In this case, based on the verified low to medium agricultural sensitivity of the facility footprints (see Section 7), the level of agricultural assessment required is an Agricultural Compliance Statement.

Johann Lanz was appointed as an independent agricultural specialist to conduct this agricultural assessment. The objective of an agricultural assessment is to assess whether the agricultural impact of the proposed development will be acceptable, and based on this, to make a recommendation on whether EA should be granted for the proposed Padloper PV 1-4 projects.

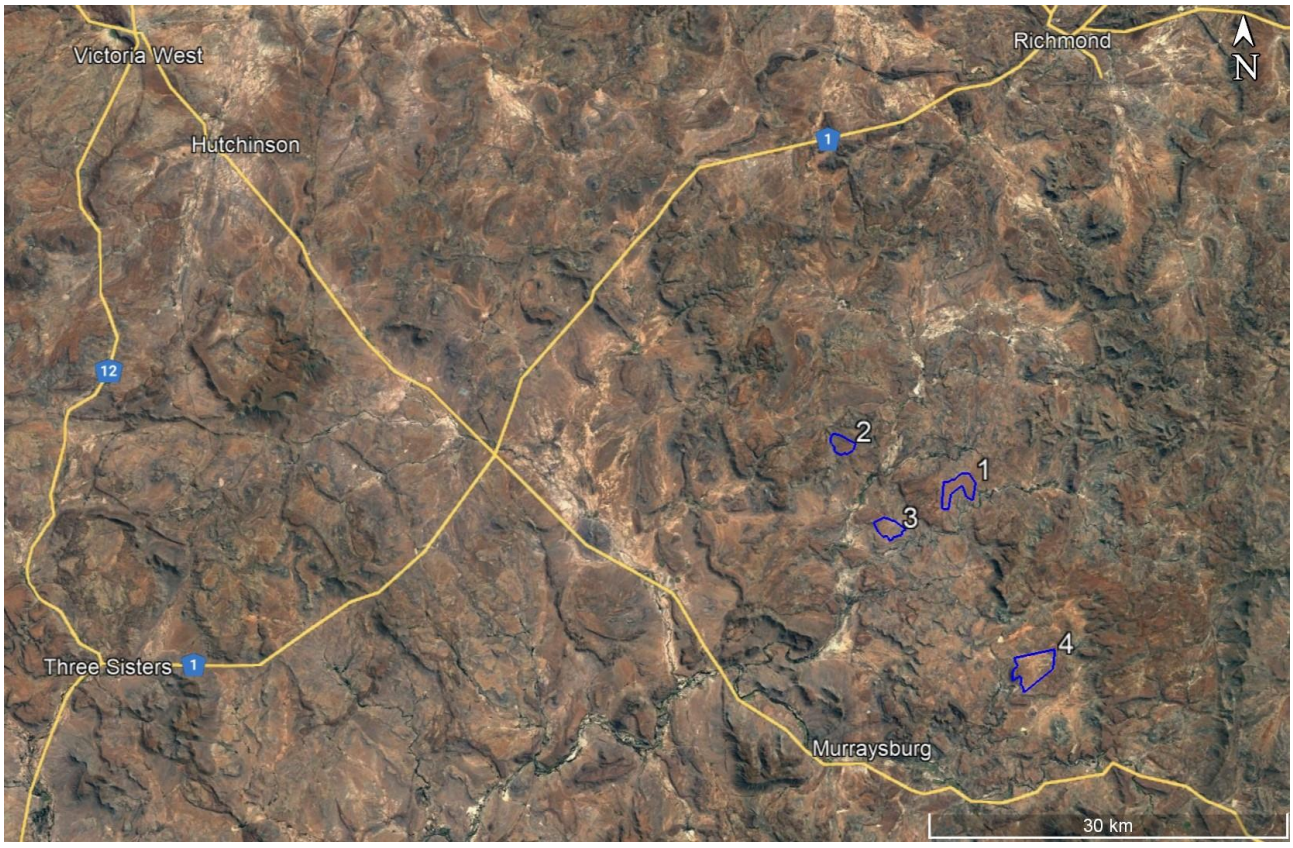


Figure 1. *Locality map of the assessed areas of the proposed Padloper solar facilities 1-4 (numbered, dark blue outlines) north of the town of Murraysburg.*

The purpose of the agricultural component in the environmental assessment process is to preserve agricultural production potential by ensuring that development does not unnecessarily exclude existing or potential agricultural production from land, or unnecessarily impact agricultural land to the extent that its production potential is reduced. The primary concern is the preservation of the agricultural production potential of scarce, arable land. The focus of an agricultural assessment

must therefore be to determine whether the proposed development will result in a significant loss of land that has economically viable future cropping potential (for more details see Section 9). This project poses minimal threat to agricultural production potential because of the lack of cropping potential of the impacted land.

2 PROJECT DESCRIPTION

The proposed facilities will consist of the standard infrastructure of a PV energy facility including PV arrays; inverters; cabling; battery energy storage system; auxiliary buildings; access and internal roads; on-site substation hub; temporary construction laydown areas; and perimeter fencing. They will have up to the following total generating capacities: Padloper PV 1, 250 MW; Padloper PV 2, 150 MW; Padloper PV 3, 150 MW; Padloper PV 4, 150 MW.

The exact nature and layout of the different infrastructure within the boundary fence of a solar energy facility has absolutely no bearing on the significance of agricultural impacts. It is therefore not necessary to detail this design and layout of the facility any further in this assessment. All that is of relevance is simply the total footprint of the facility that excludes agricultural land use or impacts agricultural land, referred to as the agricultural footprint. This is the area within the facility fence. Whether that footprint comprises, for example, a solar array, a road or a BESS is irrelevant to agricultural impact. The total agricultural footprint (fenced off area) of the facilities will be approximately: Padloper PV 1, 420 ha; Padloper PV 2, 222 ha; Padloper PV 3, 233 ha; Padloper PV 4, 329 ha.

3 TERMS OF REFERENCE

The terms of reference for this study is to fulfill the requirements of the *Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources by onshore wind and/or solar photovoltaic energy generation facilities where the electricity output is 20 megawatts or more*, gazetted on 20 March 2020 in GN 320 (in terms of Sections 24(5)(A) and (H) and 44 of NEMA, 1998).

The terms of reference for an Agricultural Compliance Statement hereafter referred to as “the Statement'), as stipulated in the agricultural protocol, are listed below, and the appendix/ section/ figure number of this report which fulfils each stipulation is given after it in bold and brackets.

1. The Statement must be prepared by a soil scientist or agricultural specialist registered with the South African Council for Natural Scientific Professions (SACNASP) **(Appendix 3)**.
2. The Statement must:
   2.1. be applicable to the preferred site and proposed development footprint **(Figures 2 and 3)**;
   2.2. confirm that the site is of “low” or “medium” sensitivity for agriculture **(Appendix 6)**; and

2.3. indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site **(Section 9)**.

3. The Statement must contain, as a minimum, the following information:
   3.1. details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the statement including a curriculum vitae **(Appendix 1)**;
   3.2. a signed statement of independence by the specialist **(Appendix 2)**;
   3.3. a map showing the proposed development footprint (including supporting infrastructure) with a 50 m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool **(Figure 2)**;
   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 8.4)**;
   3.5. confirmation that the development footprint is in line with the allowable development limits contained in Table 1 of the protocol **(Section 8.4)**;
   3.6. confirmation from the specialist that all reasonable measures have been taken through micro-siting to avoid or minimize fragmentation and disturbance of agricultural activities **(Section 8.6)**;
   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)**;
   3.8. any conditions to which this statement is subjected **(Section 9)**;
   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)**;
   3.10. where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr **(Section 8.3)**; and
   3.11. a description of the assumptions made and any uncertainties or gaps in knowledge or data **(Section 5)**.

4 STUDY METHODOLOGY

The assessment was based on a verification of current agricultural land use on the facility footprints and was informed by existing soil and agricultural potential data for the facility footprints. The following sources of existing data were used:

- Soil data was sourced from the land type data set, of the Department of Agriculture, Forestry and Fisheries (DAFF). This data set originates from the land type survey that was

conducted from the 1970s until 2002. It is the most reliable and comprehensive national database of soil information in South Africa and although the data was collected some time ago, it is still entirely relevant as the soil characteristics included in the land type data do not change within time scales of hundreds of years.

- Land capability data was sourced from the 2017 National land capability evaluation raster data layer produced by the DAFF, Pretoria.
- The spatial demarcation of Protected Agricultural Areas was obtained from the National Department of Agriculture, Land Reform and Rural Development (DALRRD).
- Field crop boundaries were sourced from Crop Estimates Consortium, 2019. Field Crop Boundary data layer, 2019. Pretoria. Department of Agriculture, Forestry and Fisheries.
- Rainfall and evaporation data was sourced from the SA Atlas of Climatology and Agrohydrology (2009, R.E. Schulze) available on Cape Farm Mapper. Note that Cape Farm Mapper includes national coverage of climate, grazing and certain other data.
- Grazing capacity data was sourced from the 2018 DAFF long-term grazing capacity map for South Africa, available on Cape Farm Mapper.
- Current and historical satellite imagery of the facility footprints and surrounds was sourced from Google Earth.

This level of agricultural assessment is considered entirely adequate for an understanding of on-site agricultural production potential for the purposes of this assessment.

5 ASSUMPTIONS, UNCERTAINTIES OR GAPS IN KNOWLEDGE OR DATA

There are no specific assumptions, uncertainties or gaps in knowledge or data that affect the findings of this study.

6 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

This section identifies all applicable legislation and permit requirements over and above what is required in terms of NEMA.

The proposed Padloper Solar 1-4 developments require approval from the National Department of Agriculture, Land Reform and Rural Development (DALRRD) because it is on agriculturally zoned land. There are two approvals that apply to all four proposed Solar facilities. The first is a No Objection Letter for the change in land use. This letter is one of the requirements for receiving municipal rezoning. This application requires a motivation backed by good evidence that the development is acceptable in terms of its impact on the agricultural production potential of the facility footprints. This combined Agricultural Compliance Statement Report for Padloper Solar 1-4 will serve that purpose. Note that this letter is not a requirement in terms of NEMA and so would

be carried out by the Applicant through a separate process.

The second approval is a consent for long-term lease required in terms of the Subdivision of Agricultural Land Act (Act No. 70 of 1970) (SALA). SALA approval is not required if the lease is over the entire farm portion. If DALRRD approval for the development has already been obtained in the form of the No Objection Letter, then SALA approval is likely to be readily forthcoming. SALA approval (if required) can only be applied for once the relevant approval in terms of Municipal By-Laws and EA has been obtained. As above, this would also be conducted through a process outside that of the NEMA/ BA processes.

Rehabilitation after disturbance to agricultural land is managed by the Conservation of Agricultural Resources Act (Act 43 of 1983 - CARA). A consent in terms of CARA is required for the cultivation of virgin land. Cultivation is defined in CARA as "any act by means of which the topsoil is disturbed mechanically". The purpose of this consent for the cultivation of virgin land is to ensure that only land that is suitable as arable land is cultivated. Therefore, despite the above definition of cultivation, disturbance to the topsoil that results from construction of infrastructure does not constitute cultivation as it is understood in CARA. This has been corroborated by Anneliza Collett (Acting Scientific Manager: Natural Resources Inventories and Assessments in the Directorate: Land and Soil Management of the Department of Agriculture, Land Reform and Rural Development (DALRRD)). The construction and operation of the facility will therefore not require consent from the Department of Agriculture, Land Reform and Rural Development in terms of this provision of CARA.

7 BASELINE DESCRIPTION OF THE AGRO-ECOSYSTEM FOR THE PROPOSED PADLOPER SOLAR 1-4 PROJECTS

The purpose of this section of an agricultural assessment report is to present the baseline information that controls the agricultural production potential of each of the facility footprints so that assessments of production potentials can be made. Agricultural production potential is one of the three factors that determines the significance of the agricultural impact (see Section 8).

All-important parameters that control the agricultural production potential of the facility footprints are given in Table 1. The land type soil data is given in Appendix 5. A satellite image map of the facility footprints for the proposed Padloper Solar 1-4 is given in Figure 2.

The facility footprints of the proposed Padloper Solar 1-4 falls outside of an area that is classified as a Protected Agricultural Area. A Protected Agricultural Area is a demarcated area in which the climate, terrain, and soil are generally conducive for agricultural production and which, historically, has made important contributions to the production of the various crops that are grown across South Africa. Within Protected Agricultural Areas, the protection, particularly of arable land, is

considered a priority for the protection of food security in South Africa, but the protection of land outside of these areas is generally not considered a food security priority.

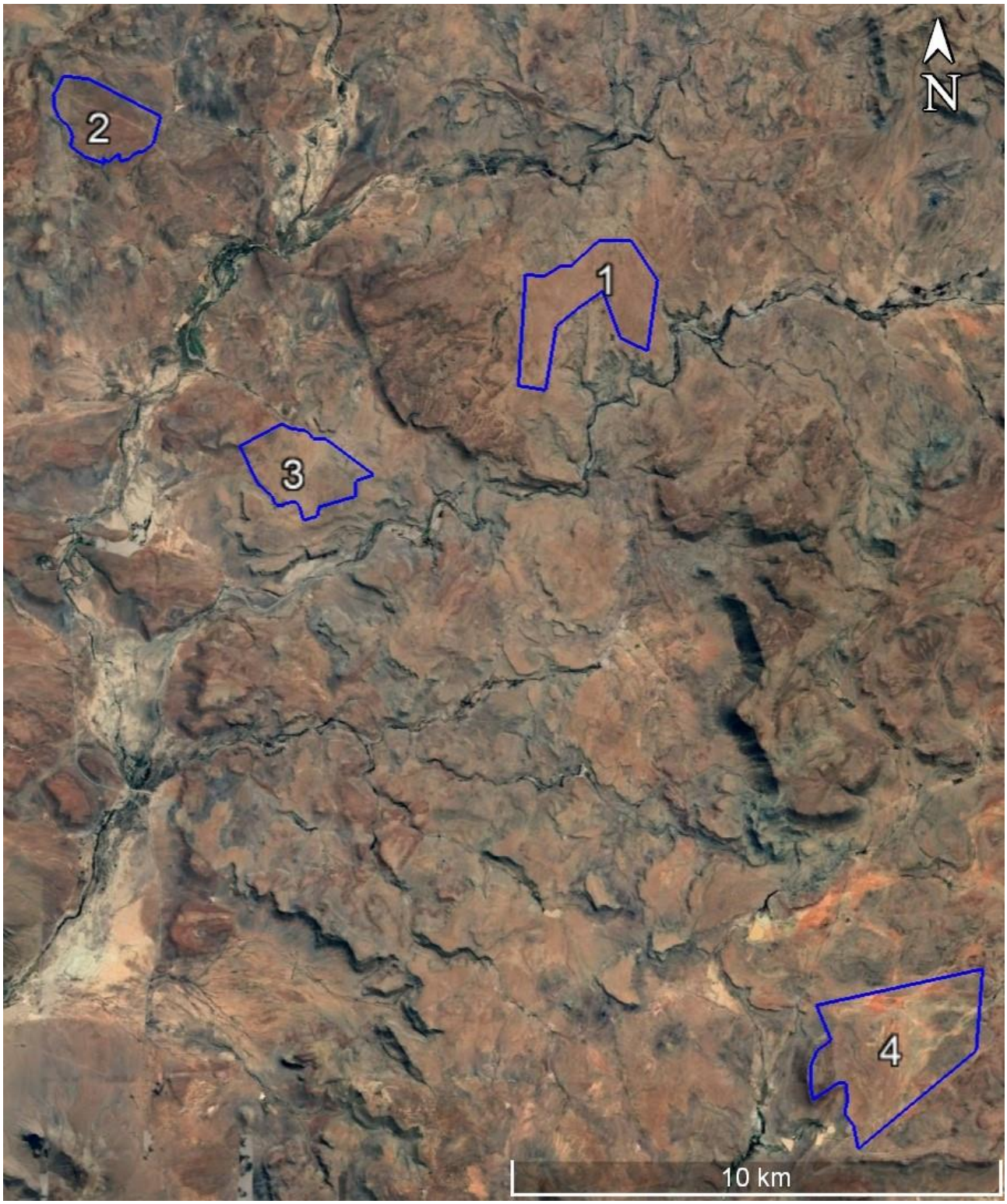


Figure 2. *Satellite image map of the assessed footprints.*

Table 1. Parameters that control and/or describe the agricultural production potential of **four of the proposed Padloper Solar facility footprints (i.e., Padloper Solar 1-4).**

	Parameter	Value
Climate	Köppen-Geiger climate description	Arid, steppe, cold
	Mean Annual Rainfall (mm)	270-309
	Reference Crop Evaporation Annual Total (mm)	1317-1448
	Climate capability classification (out of 9)	3 (low) to 4 (low-moderate)
Terrain	Terrain type	Elevated Karoo plateaus
	Terrain morphological units	Predominantly mid-slope
	Slope gradients (%)	0-3
	Altitude (m)	1245-1450
	Terrain capability classification (out of 9)	7 (high)
Soil	Geology	KAROO DOLERITE SUITE: Dolerite, minor ultrabasic rocks, and BALFOUR FORMATION: Greenish- to bluish-grey and greyish-red mudstone, siltstone, subordinate sandstone, and MIDDLETON FORMATION: Brownish-red and greenish-grey mudstone, subordinate siltstone and sandstone
	Land type	Fc131 and Ib126
	Description of soils	Predominantly very shallow, medium textured soils on underlying weathered bedrock
	Dominant soil forms	Mispah, Valsrivier, Hutton, Rock outcrops
	Soil capability classification (out of 9)	3 (low)
Land use	Agricultural land use in the surrounding area	Grazing
	Agricultural land use on the facility footprints	Grazing
	Land Cover classification on the facility footprints	Low shrubland (nama karoo)
General	Long-term grazing capacity (hectares per Large Stock Unit)	20-22
	Land capability classification (out of 15)	4 (low-very low) to 6 (low-moderate)
	Within Protected Agricultural Area	No

7.1 Assessment of the agricultural production potential – applicable to all four of the proposed Padloper Solar facility footprints (i.e., Padloper Solar 1-4)

This assessment of the agricultural production potential of the facility footprints is based on an integration of the different parameters provided in Table 1 above.

The arid climate is the limiting factor for land capability, although the shallow soils are an additional limitation. Moisture availability is very limiting to any kind of agricultural production, including grazing and is completely insufficient for rain-fed crop production. The climate and soil constraints mean that **all four of the facility footprints have very low agricultural potential and its agricultural use is limited to grazing only.**

8 ASSESSMENT OF THE AGRICULTURAL IMPACT

8.1 Impact identification and assessment - – applicable to all four of the proposed Padloper Solar facility footprints (i.e., Padloper Solar 1-4)

It should be noted that an Agricultural Compliance Statement is not required to formally rate agricultural impacts by way of impact assessment tables.

An agricultural impact is a change to the future agricultural production potential of land. In most developments, including the one being assessed here, this is primarily caused by the exclusion of agriculture from the footprint of the development. Soil erosion and degradation may also contribute to loss of agricultural production potential. The significance of an agricultural impact is a direct function of the following three factors:

1. the size of the footprint of land from which agriculture will be excluded (or the footprint that will have its potential decreased),
2. the baseline production potential (particularly cropping potential) of that land, and
3. the length of time for which agriculture will be excluded (or for which potential will be decreased).

The most significant agricultural impact possible, ignoring the length of time component, is therefore a loss of a large area of high yielding cropland and the least significant impact is a loss of a small area of low carrying capacity grazing land.

Cropping potential is highlighted in factor 2, above, because the threshold, above which it is a priority to conserve land for agricultural production, is determined by the scarcity of arable crop production land in South Africa and the relative abundance of land that is only good enough to be used for grazing. If land can support viable and sustainable crop production, then it is above the

threshold and is a priority for being conserved as agricultural production land. If land is unable to support viable and sustainable crop production, then it is below the threshold and of much lower priority for being conserved.

In this case, the total footprint of land that will be lost should the proposed Padloper PV 1-4 projects be developed which will be lost for the lifetime of the development, is approximately 1204 hectares. The production potential of that land is limited to only being suitable as low carrying capacity grazing land. The loss of such land, of which there is no scarcity in the country, represents a minimal loss of agricultural production potential in terms of national food security and for the affected farm.

It is also important to note that renewable energy facilities can have both positive and negative effects and it is the net sum of these positive and negative effects that determines the extent of the overall change in future production potential.

The development of each of the proposed Padloper PV 1-4 projects will provide a positive economic impact on affected farmportions. The income generated by the farming enterprises through the lease of the land to the energy facility is highly likely to exceed the potential agricultural income from the facility footprints. It will diversify the farm's income sources and provide reliable and predictable income that is independent of variable agricultural economic factors such as weather, agricultural markets and agricultural input costs. This is likely to increase cash flow and financial security and improve farming operations and productivity on the rest of the farm or other properties owned by the same farmer through increased investment into farming.

Since the agricultural land loss is not of viable cropland and that its negative impact is offset by economic benefits to farming, the overall negative agricultural impact of each of the developments is assessed here as being of low significance.

8.2 Cumulative impact assessment – applicable to all four of the proposed Padloper Solar facility projects (i.e., Padloper Solar 1-4)

Specialist assessments for environmental authorisation are required to assess cumulative impacts. The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being

assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is:

> *What loss of future agricultural production potential is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present or reasonably foreseeable future impacts, cause that level in the area to be exceeded?*

The Department of Forestry, Fisheries and the Environment (DFFE) requires compliance with a specified methodology for the assessment of cumulative impacts. This is positive in that it ensures engagement with the important issue of cumulative impacts. However, the required compliance has some limitations and can, in the opinion of the author, result in an over-focus on methodological compliance, while missing the more important task of effectively answering the above defining question.

This cumulative impact assessment has considered all renewable energy projects within a 30 km radius. These are listed in Appendix 4 of this report. In quantifying the cumulative impact, the area of land taken out of agricultural use as a result of all the projects listed in Appendix 4 (total generation capacity of 2789 MW) will amount to a total of approximately 4687 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 30 km radius (approximately 282,700 ha), this amounts to only 1.66% of the surface area. This is within an acceptable limit in terms of loss of low potential agricultural land which is only suitable for grazing, and of which there is no scarcity in the country. This is particularly so when considered within the context of the following point.

In order for South Africa to develop the renewable energy generation that it urgently needs, agriculturally zoned land will need to be used for renewable energy generation. It is far more preferable to incur a cumulative loss of agricultural land in a region such as the one being assessed, which has no crop production potential, and low grazing capacity, than to lose agricultural land that has a higher potential, and that is much scarcer, to renewable energy development elsewhere in the country.

All of the projects contributing to cumulative impact for this assessment have the same agricultural impacts in a very similar agricultural environment, and therefore the same mitigation measures

apply to all.

It should also be noted that renewable energy development can only be located in fairly close proximity to a substation that has available capacity. This creates cumulative impact in such places. However, this is acceptable because it also effectively protects most agricultural land in the country from renewable energy development because only a small proportion of the country's total land surface is located in close enough proximity to an available substation to be viable for renewable energy development.

Furthermore, it should be noted that there are few land uses, other than renewable energy, that are competing for agricultural land use in this area. The cumulative impact from developments, other than renewable energy, is therefore likely to be low.

The loss of agricultural potential by soil degradation can effectively be prevented for renewable energy developments by generic mitigation measures that are all inherent in the project engineering and/or are standard, best-practice for construction sites. Soil degradation does not therefore therefore pose a cumulative impact risk.

Due to all of the considerations discussed above, the cumulative impact of loss of future agricultural production potential is assessed as low. It will not have an unacceptable negative impact on the agricultural production capability of the area and it is therefore recommended, from a cumulative agricultural impact perspective, that the development be approved.

8.3 Mitigation measures – applicable to all four of the proposed Padloper Solar facility projects (i.e., Padloper Solar 1-4)

Generic mitigation measures that are effective in preventing soil degradation are all inherent in the project engineering and/or are standard, best-practice for construction sites.

- A system of stormwater management, which will prevent erosion on and downstream of the facility footprints, will be an inherent part of the engineering on site. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there.
- Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 20 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it remains at the surface. Topsoil should only be stripped in areas that are excavated. Across most of the facility footprints, including construction lay down areas, it will be much more effective for rehabilitation, to retain the

topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire cut surface. It will be advantageous to have topsoil and vegetation cover below the panels during the operational phase to control dust and erosion.

8.4 Compliance with the allowable development limits

The agricultural protocol stipulates allowable development limits for renewable energy developments of > 20 MW. Allowable development limits refer to the area of a particular agricultural sensitivity category that can be directly impacted (i.e. taken up by the physical footprint) by a renewable energy development. The agricultural footprint is defined in the protocol as the area that is directly occupied by all infrastructures, including roads, hard standing areas, buildings, substations etc., that are associated with the renewable energy facility during its operational phase, and that result in the exclusion of that land from potential cultivation or grazing. It excludes all areas that were already occupied by roads and other infrastructure prior to the establishment of the energy facility but includes the surface area required for expanding existing infrastructure (e.g. widening existing roads). It excludes the corridor underneath overhead power lines but includes the pylon footprints. It therefore represents the total land that is excluded from agricultural use as a result of the renewable energy facility (the agricultural footprint).

For a solar energy facility, the footprint is the total area inside the security fence of the facility.

The allowable development limit on land of low or medium agricultural sensitivity with a land capability of <8, as the facility footprints have been verified to be, is 2.5 ha per MW for each of the four proposed solar facilities (i.e., Padloper Solar 1-4). This would allow the proposed Padloper PV 1-4 projects with a combined generating capacity of 700 MW to occupy an agricultural footprint of 700 X 2.5 = 1750 hectares. The proposed combined footprint of the facilities is approximately 1204 ha. **It is therefore confirmed that the combined footprint as well as the individual facility footprints (see Table 2) are in line with the allowable development limits contained in the agricultural protocol.**

Table 2. Compliance with the allowable development limits

Facility	Footprint	Capacity	Hectares per MW
Padloper 1	420	250	1.7
Padloper 2	222	150	1.5
Padloper 3	233	150	1.6
Padloper 4	329	150	2.2
Total	1204	700	1.7

8.5 Assessment of the no-go alternative – applicable to all four of the proposed Padloper Solar facility projects (i.e., Padloper Solar 1-4)

Specialist assessments for environmental authorisation are required to assess the impact of the no-go alternative. The no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. There are no agricultural impacts of the no-go alternative. Even though the impacted land has low agricultural production potential, and the impact of the development is low, its negative agricultural impact is more significant than that of the no-go alternative, and so from an agricultural impact perspective, the no-go alternative is the preferred alternative. However, the no-go option would prevent the proposed development from contributing economic benefits to the farm as well as contributing to the environmental, social and economic benefits associated with the development of renewable energy in South Africa.

8.6 Micro-siting to minimize fragmentation and disturbance of agricultural activities – applicable to all four of the proposed Padloper Solar facility projects (i.e., Padloper Solar 1-4)

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. However, the agricultural uniformity and low agricultural potential of the environment, and the lack of suitability for crop production across the facility footprints, means that the exact positions of all infrastructure will make no material difference to agricultural impacts and disturbance.

9 CONCLUSION: AGRICULTURAL COMPLIANCE STATEMENT – APPLICABLE TO ALL FOUR OF THE PROPOSED PADLOPER SOLAR FACILITY PROJECTS (I.E., PADLOPER SOLAR 1-4)

The classified land capability of each of the facility footprints is 4 (Low-Very low) to 6 (Low-Moderate). This assessment verifies that none of the four facility footprints are not within crop boundaries and verifies the classified land capability, based on the assessment of the lack of cropping potential of the facility footprints. **This assessment therefore confirms the low to medium sensitivity rating allocated to each of the four solar facilities by the National Web-based Screening Tool.**

The cropping potential of the area is completely limited by the combination of climate (arid climate with low moisture availability) and soil constraints (limited soil depth) so that it is totally unsuitable for rain-fed crop production. The very low agricultural potential of the facility footprints limits its

viable agricultural use to grazing only.

An agricultural impact is a change to the future agricultural production potential of land. This is primarily caused by the exclusion of agriculture from the footprint of the development. The significance of an agricultural impact is a direct function of the following three factors:

1. the size of the footprint of land from which agriculture will be excluded (or the footprint that will have its potential decreased)
2. the baseline production potential (particularly cropping potential) of that land
3. the length of time for which agriculture will be excluded (or for which potential will be decreased).

In this case, the total footprint of land that will be lost, which will be lost for the lifetime of the developments, is approximately 1204 hectares. The production potential of that land is limited to only being suitable as low carrying capacity grazing land. The loss of such land, of which there is no scarcity in the country, represents a minimal loss of agricultural production potential in terms of national food security and for the affected farm. Since no viable cropland is lost as a result of this development, its negative agricultural impact is therefore assessed as being of low significance and as acceptable.

Its acceptability is substantiated by the following points which are applicable to each of the proposed Padloper PV 1-4 projects:

- The amount of agricultural land use by the development is within the allowable development limits prescribed by the agricultural protocol. These limits reflect the national need to conserve valuable agricultural land and therefore to steer, particularly renewable energy developments, onto land with low agricultural production potential.
- The proposed development poses a low risk in terms of causing soil degradation because degradation can be effectively prevented by standard, generic, best practice mitigation actions that are inherent in the project engineering.
- The proposed development offers a positive impact on agriculture by way of improved financial security for farming operations.
- The PV panels will not necessarily 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 proposed development will also have the wider societal benefits of generating additional income and employment in the local economy.
- In addition, the proposed development will contribute to the country's urgent need for energy generation, particularly renewable energy that has much lower environmental and

agricultural impact than existing, coal powered energy generation.

- All renewable energy development in South Africa decreases the need for coal power and thereby contributes to reducing the large agricultural impact that open cast coal mining has on highly productive agricultural land throughout the coal mining areas of the country.

From an agricultural impact point of view, it is recommended that the proposed Padloper Solar Photovoltaic Facilities 1 to 4 be approved. The conclusion of this assessment on the acceptability of the proposed Padloper Solar Photovoltaic Facilities 1 to 4 and the recommendation for their approval is not subject to any conditions.

10 REFERENCES

Crop Estimates Consortium, 2019. *Field Crop Boundary data layer, 2019*. Pretoria. Department of Agriculture, Forestry and Fisheries.

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Department of Agriculture, Land Reform and Rural Development. 2020. Protected agricultural areas – Spatial data layer. 2020. Pretoria.

Schulze, R.E. 2009. SA Atlas of Climatology and Agrohydrology, available on Cape Farm Mapper. Available at: https://gis.elsenburg.com/apps/cfm/

Soil Classification Working Group. 1991. Soil classification: a taxonomic system for South Africa. Soil and Irrigation Research Institute, Department of Agricultural Development, Pretoria.

APPENDIX 1: SPECIALIST *CURRICULUM VITAE*

Johann Lanz
Curriculum Vitae

Education

M.Sc. (Environmental Geochemistry)	University of Cape Town	1996 - 1997
B.Sc. Agriculture (Soil Science, Chemistry)	University of Stellenbosch	1992 - 1995
BA (English, Environmental & Geographical Science)	University of Cape Town	1989 - 1991
Matric Exemption	Wynberg Boy's High School	1983

Professional work experience

I have been registered as a Professional Natural Scientist (Pri.Sci.Nat.) in the field of soil science since 2012 (registration number 400268/12) and am a member of the Soil Science Society of South Africa.

Soil & Agricultural Consulting **Self employed** **2002 - present**

Within the past 5 years of running my soil and agricultural consulting business, I have completed more than 170 agricultural assessments (EIAs, SEAs, EMPRs) in all 9 provinces for renewable energy, mining, electrical grid infrastructure, urban, and agricultural developments. I was the appointed agricultural specialist for the nation-wide SEAs for wind and solar PV developments, electrical grid infrastructure, and gas pipelines. My regular clients include: Zutari; CSIR; SiVEST; SLR; WSP; Arcus; SRK; Environamics; Royal Haskoning DHV; ABO; Enertrag; WKN-Windcurrent; JG Afrika; Mainstream; Redcap; G7; Mulilo; and Tiptrans. Recent agricultural clients for soil resource evaluations and mapping include Cederberg Wines; Western Cape Department of Agriculture; Vogelfontein Citrus; De Grendel Estate; Zewenwacht Wine Estate; and Goedgedacht Olives.
In 2018 I completed a ground-breaking case study that measured the agricultural impact of existing wind farms in the Eastern Cape.

Soil Science Consultant **Agricultural Consultors International (Tinie du Preez)** **1998 - 2001**

Responsible for providing all aspects of a soil science technical consulting service directly to clients in the wine, fruit and environmental industries all over South Africa, and in Chile, South America.

Contracting Soil Scientist **De Beers Namaqualand Mines** **July 1997 - Jan 1998**

Completed a contract to advise soil rehabilitation and re-vegetation of mined areas.

Publications

- Lanz, J. 2012. Soil health: sustaining Stellenbosch's roots. In: M Swilling, B Sebitosi & R Loots (eds). *Sustainable Stellenbosch: opening dialogues*. Stellenbosch: SunMedia.
- Lanz, J. 2010. Soil health indicators: physical and chemical. *South African Fruit Journal*, April / May 2010 issue.
- Lanz, J. 2009. Soil health constraints. *South African Fruit Journal*, August / September 2009 issue.
- Lanz, J. 2009. Soil carbon research. *AgriProbe*, Department of Agriculture.
- Lanz, J. 2005. Special Report: Soils and wine quality. *Wineland Magazine.*

I am a reviewing scientist for the *South African Journal of Plant and Soil*.

forestry, fisheries & the environment
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Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

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APPENDIX 2: SPECIALIST DECLARATION FORM AUGUST 2023

Specialist Declaration form for assessments undertaken for 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)

REPORT TITLE
THE PADLOPER SOLAR PHOTOVOLTAIC FACILITIES 1 TO 4 IN THE NORTHERN AND WESTERN CAPE PROVINCES NEAR MURRAYSBURG

Kindly note the following:

1. This form must always be used for assessment that are in support of 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 August 2023. 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.dffe.gov.za/documents/forms.
3. An electronic copy of the signed declaration form must be appended to all Draft and Final Reports submitted to the department for consideration.
4. The specialist must be aware of and comply with '*the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the act, when applying for environmental authorisation - GN 320/2020)'*, where applicable.

1. SPECIALIST INFORMATION

Title of Specialist Assessment	Agricultural Assessment
Specialist Company Name	Not applicable – sole proprietor
Specialist Name	Johann Lanz
Specialist Identity Number	6607045174089
Specialist Qualifications:	M.Sc. (Environmental Geochemistry)
Professional affiliation/registration:	Registered Professional Natural Scientist (Pr.Sci.Nat.) Reg. no. 400268/12 Member of the Soil Science Society of South Africa
Physical address:	1a Wolfe Street, Wynberg, Cape Town, 7800
Postal address:	1a Wolfe Street, Wynberg, Cape Town, 7800
Telephone	Not applicable
Cell phone	+27 82 927 9018
E-mail	johann@johannlanz.co.za

2. DECLARATION BY THE SPECIALIST

I, **Johann Lanz** declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. “the Protocols”) and in Government Notice No. 1150 of 30 October 2020.
- 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 NEMA Act.



Signature of the Specialist

Johann Lanz – Soil Scientist (sole proprietor)

Name of Company:

8 January 2024

Date

3. **UNDERTAKING UNDER OATH/ AFFIRMATION**

I, **Johann Lanz**, swear under oath that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Johann Lanz – Soil Scientist – sole proprietor

Name of Company

08/01/2024

Date

.....SERGEANT
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Signature of the Commissioner of Oaths

SUID-AFRIKAANSE POLISIEDIENS
STATION WYNBERG
HRM
08 JAN 2024
HRM
STATION WYNBERG
SOUTH AFRICAN POLICE SERVICE

2024/01/08

Date

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Johan Lanz

Registration Number: 400268/12

is a registered scientist

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

Soil Science (Professional Natural Scientist)

Effective **15 August 2012** Expires **31 March 2024**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

APPENDIX 4: PROJECTS INCLUDED IN CUMULATIVE IMPACT ASSESSMENT

Table 3**:** Table of all projects that were included in the cumulative impact assessment.

DFFE Reference	Project name	Technology	Capacity (MW)
12/12/20/2351	Ishwati Emoyeni Wind Energy Facility	Wind	280
14/12/16/3/3/2/410	Ishwati Emoyeni Wind Energy Facility	Wind	115
14/12/16/3/3/2/686	Umsinde Emoyeni wind energy facility phase 1	Wind	147
14/12/16/3/3/2/687	Umsinde Emoyeni wind energy facility phase 2	Wind	147
12/12/20/1788	Mainstream Wind and Solar Energy Facility at Victoria West	Wind & PV	700
14/12/16/3/3/2/2115	Nku solar PV facility, Northern Cape Province	PV	100
14/12/16/3/3/2/2116	Moriri solar PV facility, Northern Cape Province	PV	100
14/12/16/3/3/2/2118	Moriri and Kwana solar PV facilities, Northern Cape Province	PV	100
TBC	Padloper Solar 1	PV	250
TBC	Padloper Solar 2	PV	150
TBC	Padloper Solar 3	PV	150
TBC	Padloper Solar 4	PV	150
TBC	Padloper Solar 5	PV	150
TBC	Padloper Solar 6	PV	100
TBC	Padloper Solar 7	PV	150
Total solar			**1750**
Total wind			**1039**
Total			**2789**

APPENDIX 5: SOIL DATA

Table of land type soil data

Land type	Soil series (forms)	Depth (mm)	Clay % A horizon	Clay % B horizon	Depth limiting layer	% of land type
Fc131	Ms	50 - 100	10 - 15		R,so	36.0
Fc131	Va	600 - 1200	15 - 25	35 - 45	vr,vp	11.3
Fc131	Hu	100 - 400	15 - 25	15 - 25	R	10.5
Fc131	R					9.8
Fc131	Oa	300 - 800	15 - 20	20 - 30	R,ne	7.5
Fc131	Gs	200 - 300	10 - 25	20 - 35	so	7.0
Fc131	Sw	300 - 500	15 - 25	30 - 45	so	5.8
Fc131	Cv	200 - 800	10 - 20	15 - 25	ve	3.5
Fc131	Sd	300 - 800	15 - 30	35 - 45	ca	2.8
Fc131	Oa	300 - 800	15 - 25	35 - 45	R,ne	2.3
Fc131	Hu	300 - 600	15 - 30	35 - 40	R	1.5
Fc131	Ik	600 - 1200	15 - 35	30 - 35	ne	0.8
Fc131	Es	300 - 500	10 - 25	35 - 45	pr	0.8
Fc131	Du	300 - 600	10 - 35	10 - 35	ne	0.8
Ib126	R					62,7
Ib126	Ms	50 - 100	15 - 25		R	19,1
Ib126	Va	300 - 800	20 - 30	35 - 45	vr,vp	5,2
Ib126	Gs	50 - 100	15 - 25	15 - 35	R	4,7
Ib126	Sw	100 - 300	10 - 25	30 - 40	so	3,3
Ib126	Hu3	50 - 300	10 - 20	10 - 25	R	2,5
Ib126	Oa	300 - 800	15 - 30	20 - 35	ne	0,9
Ib126	Oa	300 - 900	20 - 30	35 - 40	ne	0,9
Ib126	Ik	500 - 1200	15 - 25	25 - 35	R	0,4
Ib126	Ss	100 - 300	20 - 35	35 - 45	pr	0,3
Ib126	Es	300 - 600	15 - 25	25 - 35	pr	0,2

APPENDIX 6: SITE SENSITVITY VERIFICATION - – APPLICABLE TO ALL FOUR OF THE PROPOSED PADLOPER SOLAR FACILITY PROJECTS (I.E., PADLOPER SOLAR 1-4)

In terms of the gazetted agricultural protocol, a site sensitivity verification must be submitted that:

- confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.;
- contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity.

Agricultural sensitivity is a direct function of the capability of the land for agricultural production. The different categories of agricultural sensitivity indicate the priority by which land should be conserved as agricultural production land. The agricultural sensitivity of the facility footprints, as given by the web-based environmental screening tool, is shown in Figure 2. The screening tool classifies agricultural sensitivity according to only two independent criteria, both of which are indicators of the land's agricultural production potential:

1. whether the land is classified as cropland or not, and
2. its land capability rating

Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain-fed agricultural production. It is rated by the Department of Agriculture's updated and refined, country-wide land capability mapping, released in 2016. The higher land capability values (≥8 to 15) are likely to be suitable as arable land for crop production, while lower values (<8) are only likely to be suitable as non-arable grazing land. The direct relationship between land capability rating and agricultural sensitivity is shown in Table 4.

Table 4. Relationship between land capability and agricultural sensitivity as given by the screening tool.

Land capability value	Agricultural sensitivity
1 – 5	Low
6 – 8	Medium
9 - 10	High
11 - 15	Very high

Because the land capability data is generated by GIS modelling and because it is applicable at a small scale (1:50 000 to 1:100 000) it is not necessarily accurate for a specific site and therefore

needs verification. The relationship between land capability and agricultural production potential is that a land capability rating of >8 should denote land that is suitable for viable rain-fed crop production and a rating equal to 8 is somewhat marginal. If land is unsuitable for viable rain-fed crop production then its verified land capability rating should be less than 8. Because crop boundaries change over time, they also need verification.

The screening tool rating of the agricultural sensitivity of the assessment area is low to medium. None of the land is classified as cropland and agricultural sensitivity is therefore purely a function of classified land capability as per Table 4, above. The classified land capability of each of the facility footprints is 4 (low-very low) to 6 (low-moderate). This assessment verifies that the facility footprints are not within crop boundaries and verifies the classified land capability, based on the assessment of the cropping potential of the facility footprints in this report (see Section 7). This assessment therefore confirms the low to medium sensitivity rating allocated for each of the proposed projects by the screening tool.

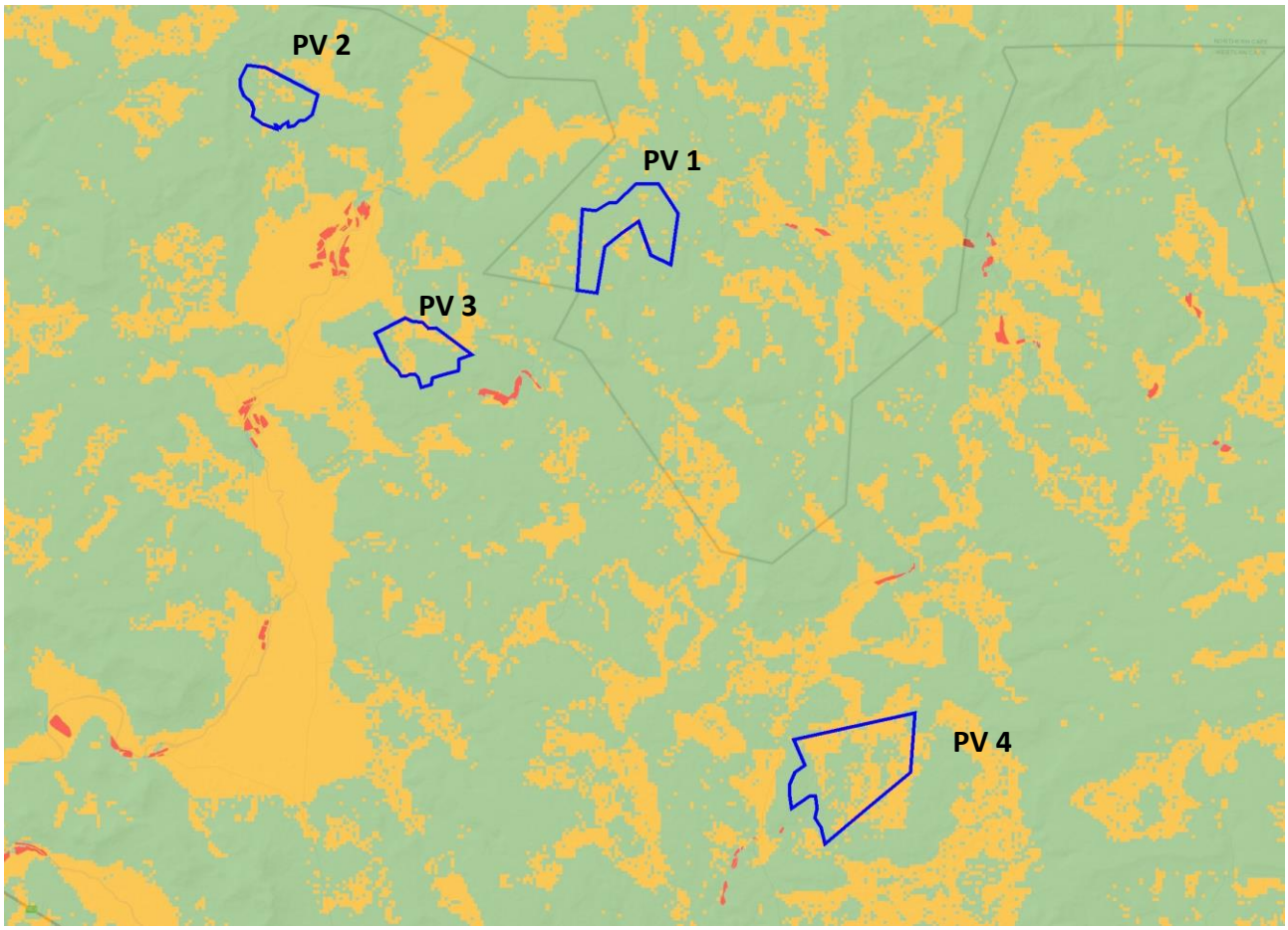


Figure 3. *The proposed PV assessed areas overlaid on agricultural sensitivity, as provided by the screening tool (green = low; yellow = medium; red = high; dark red = very high).* ***The screening tool's low to medium sensitivity is confirmed by this assessment.***

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REPUBLIC OF SOUTH AFRICA

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SPECIALIST DECLARATION FORM – AUGUST 2023

Specialist Declaration form for assessments undertaken for 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)

REPORT TITLE

Basic Assessment for the proposed development of the Padloper Solar PV Facility 2 (i.e., Padloper PV 2), as well as the proposed development of a 132 kV Overhead Power Line between the Padloper PV 2 and the proposed authorised Ishwati Emoyeni Collector Substation (i.e., Padloper EGI 2), and their associated infrastructure, near Murraysburg in the Western Cape Province.

Kindly note the following:

1. This form must always be used for assessment that are in support of 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 August 2023. 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.dffe.gov.za/documents/forms.
3. An electronic copy of the signed declaration form must be appended to all Draft and Final Reports submitted to the department for consideration.
4. The specialist must be aware of and comply with *'the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the act, when applying for environmental authorisation - GN 320/2020)'*, where applicable.

1. SPECIALIST INFORMATION

Title of Specialist Assessment	Agricultural Assessment
Specialist Company Name	Not applicable – sole proprietor
Specialist Name	Johann Lanz
Specialist Identity Number	[redacted]
Specialist Qualifications:	M.Sc. (Environmental Geochemistry)
Professional affiliation/registration:	Registered Professional Natural Scientist (Pr.Sci.Nat.) Reg. no. 400268/12 Member of the Soil Science Society of South Africa
Physical address:	[redacted]
Postal address:	
Telephone	
Cell phone	
E-mail	

2. DECLARATION BY THE SPECIALIST

I, **Johann Lanz** declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols") and in Government Notice No. 1150 of 30 October 2020.
- 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 NEMA Act.



Signature of the Specialist

Johann Lanz – Soil Scientist (sole proprietor)

Name of Company:

28 August 2023

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, **Johann Lanz**, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Johann Lanz – Soil Scientist (sole proprietor)

Name of Company

28/08/2023

Date

Signature of the Commissioner of Oaths

2023-08-28

Date

28 AUG 2023