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AGRICULTURAL AGRO-ECOSYSTEM SPECIALIST ASSESSMENT FOR THE PROPOSED KLIPKOPPIE PV SOLAR PLANT ON REMAINDER OF ERF NO. 327 MALMESBURY, WESTERN CAPE

Report by
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13 March 2024

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EXECUTIVE SUMMARY

South Africa urgently needs electricity generation, and renewable energy offers good potential for that, but requires land. Agriculturally zoned land will inevitably need to be used for the renewable energy generation that the country requires. However, to ensure food security, energy facilities should be located where they do not exclude viable crop production from land.

This assessment disputes the high sensitivity classification of the assessed area by the screening tool and rates the entire assessed area as being of medium agricultural sensitivity with a maximum land capability of 7 because of its assessed agricultural production potential and current agricultural land use.

The climate and terrain are suitable for small grain crops, as grown in the surrounding area but the cropping potential of the site is limited by soil constraints. The constraints are low water and nutrient holding capacity of the bleached, sandy upper soil horizons, limited soil depth in places, and limited drainage. Because of these constraints, the site is marginal for viable rainfed small grain cropping.

An agricultural impact is a change to the future agricultural production potential of land. In this case, the site is considered to be below the threshold for needing to be conserved as agricultural production land because of the limitations that make it marginal for cropping. The use of this land for non-agricultural purposes will cause minimal loss of agricultural production potential in terms of national food security. As a result, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed here as being of low significance.

The development's acceptability and ultimate approval requires the weighing of all relevant factors, only a few of which are agricultural, against each other. All the potential benefits that the development might offer to society need to be weighed against its costs, which include some loss of potential arable land. Such a weighing is far beyond the scope of an agricultural impact assessment, which therefore cannot conclude on the acceptability of the proposed development.

The development's acceptability is motivated by the following points:

- 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. Furthermore, a reduction in coal power saves national water resources and therefore

potentially makes more water available for irrigated agriculture.

1 INTRODUCTION

Environmental and change of land use authorisation is being sought for the proposed Klipkoppie PV solar plant on remainder of Erf no. 327, Malmesbury, Western Cape (see location in Figure 1). In terms of the National Environmental Management Act (Act No 107 of 1998 - NEMA), an application for environmental authorisation requires an agricultural assessment. In this case, based on the high agricultural sensitivity of the assessed area by the screening tool (see Section 7), the level of agricultural assessment required by the protocol is an Agricultural Agro-Ecosystem Specialist Assessment.

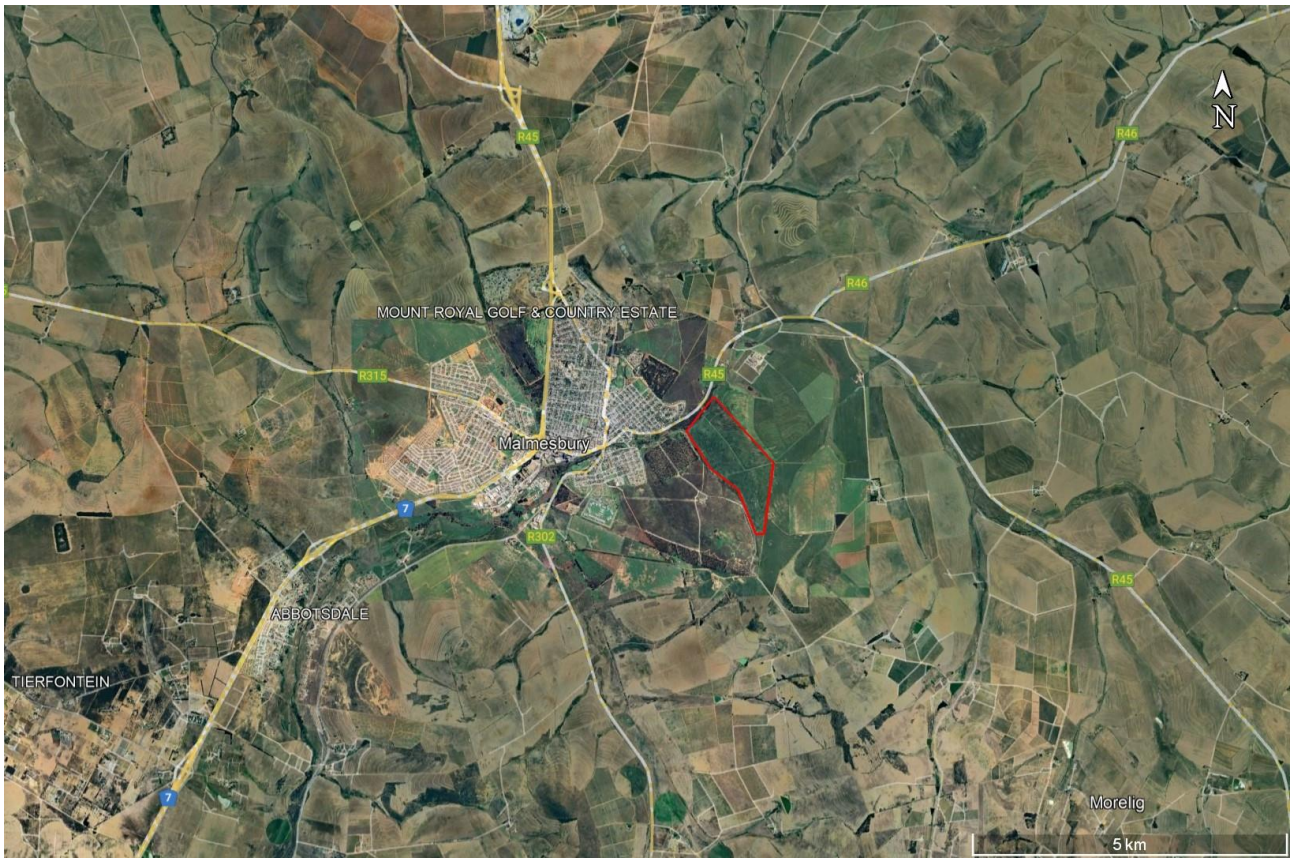

Figure 1. *Locality map of the development on the southwestern outskirts of the town of Malmesbury.*

The purpose of an agricultural assessment is to answer the question:

> Will the proposed development cause a significant reduction in agricultural production potential, and most importantly, will it result in a loss of arable land?

Section 9 of this report unpacks this question, particularly with respect to what constitutes a significant reduction. To answer the above question, it is necessary to determine the existing agricultural production potential of the land that will be impacted, and specifically whether it is viable arable land or not. This is done in Section 8 of this report. Section 8, 9, and the conclusion of

this report directly address the above question and therefore contain the essence of the agricultural impact assessment.

As is shown in Section 9, this assessed development will result in minimal loss of viable arable land and therefore poses minimal threat to agricultural production potential.

2 PROJECT DESCRIPTION

The proposed facility will consist of the standard infrastructure of a PV energy facility including PV arrays; inverters; cabling; auxiliary buildings; access and internal roads; 11kV grid connection; temporary construction laydown areas; and perimeter fencing. The facility will have a total generating capacity of up to 20 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 assessed area, as shown in Figures 2 and 3, is 135 hectares.

3 TERMS OF REFERENCE

The terms of reference for this study are to fulfill the requirements of the *Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources*, 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 Agro-Ecosystem Specialist Assessment, as stipulated in the protocol, are listed below, and the section number of this report which fulfils each stipulation is given after it in brackets.

1. The assessment must be undertaken by a soil scientist or agricultural specialist registered with the South African Council for Natural Scientific Professions (SACNASP). (**Appendix 3**)
2. The assessment must be undertaken on the preferred site and within the proposed development footprint. (**Figures 2 and 3**)
3. The assessment must be undertaken based on a site inspection as well as an investigation of the current production figures, where the land is under cultivation or has been within the past 5 years, and must identify:

1. the extent of the impact of the proposed development on the agricultural resources (**Section 9.1**)
2. whether or not the proposed development will have an unacceptable negative impact on the agricultural production capability of the site (**Section 12**), and in the event where it does, whether such a negative impact is outweighed by the positive impact of the proposed development on agricultural resources.

4. The status quo of the site must be described, including the following aspects which must be considered as a minimum in the baseline description of the agro-ecosystem:
    1. The soil form/s, soil depth (effective and total soil depth), top and sub-soil clay percentage, terrain unit and slope (**Section 8**);
    2. Where applicable, the vegetation composition, available water sources as well as agro-climatic information (**Section 8**);
    3. The current productivity of the land based on production figures for all agricultural activities undertaken on the land for the past 5 years, expressed as an annual figure and broken down into production units (**Section 8**);
    4. The current employment figures (both permanent and casual) for the land for the past 3 years, expressed as an annual figure (**Section 8**);
    5. Existing impacts on the site, located on a map where relevant (e.g. erosion, alien vegetation, non-agricultural infrastructure, waste, etc **Section 8**).
5. Assessment of Impacts, including the following which must be considered as a minimum in the predicted impact of the proposed development on the agro-ecosystem:
    1. Change in productivity for all agricultural activities based on the figures of the past 5 years, expressed as an annual figure and broken down into production units (**Section 9.1**);
    2. Change in employment figures (both permanent and casual) for the past 5 years expressed as an annual figure (**Section 9.1**);
    3. Any alternative development footprints within the preferred site which would be of “medium” or “low” sensitivity for agricultural resources as identified by the screening tool and verified through the site sensitivity verification (**Section 9.3**).
6. The findings of the Agricultural Agro-Ecosystem Specialist Assessment must be written up in an Agricultural Agro-Ecosystem Specialist Report that contains as a minimum the following information:
    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 vita (**Appendix 1);**
    2. A signed statement of independence by the specialist (**Appendix 2**);
    3. The duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment (**Section 4**);
    4. A description of the methodology used to undertake the on-site assessment inclusive of the equipment and models used, as relevant (**Section 4**);

5. 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**);
6. An indication of the potential losses in production and employment from the change of the agricultural use of the land as a result of the proposed development (**Section 9.1**);
7. an indication of possible long-term benefits that will be generated by the project in comparison to the benefits of the agricultural activities on the affected land (**Section 11.3**);
8. Additional environmental impacts expected from the proposed development based on the current status quo of the land including erosion, alien vegetation, waste, etc. (**Section 11.4**);
9. Information on the current agricultural activities being undertaken on adjacent land parcels (**Section 8**);
10. an identification of any areas to be avoided, including any buffers (**Section 9.3**);
11. a motivation must be provided if there were development footprints identified as per point 5.3 above that were identified as having a medium or low agricultural sensitivity and that were not considered appropriate (**not applicable**);
12. Confirmation from the soil scientist or agricultural specialist that all reasonable measures have been considered in the micro-siting of the proposed development to minimise fragmentation and disturbance of agricultural activities (**Section 11.1**);
13. A substantiated statement from the soil scientist or agricultural specialist with regards to agricultural resources on the acceptability or not of the proposed development and a recommendation on the approval or not of the proposed development (**Section 12**);
14. Any conditions to which this statement is subjected (**no conditions**);
15. Where identified, proposed impact management outcomes or any monitoring requirements for inclusion in the Environmental Management Programme (EMPr) (**Section 10**);
16. A description of the assumptions made and any uncertainties or gaps in knowledge or data (**Section 5**).

4 METHODOLOGY OF STUDY

The assessment was based on an on-site investigation of the soils and agricultural conditions conducted on 21 February 2024. It was also informed by existing climate, soil, and agricultural potential data for the site (see references). The aim of the on-site assessment was to:

1. ground-truth cropland status and consequent agricultural sensitivity;
2. assess the soil potential;

3. gain an understanding of overall agricultural production potential across the site.

Soils were assessed based on the investigation of existing soil exposures in combination with indications of the surface conditions and topography, and strategically positioned auger samples where necessary. Soils were classified according to the South African soil classification system (Soil Classification Working Group, 1991).

An assessment of soils and long-term agricultural potential is in no way affected by the season in which the assessment is made, and therefore the fact that the assessment was done in summer has no bearing on its results. The 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 development requires approval from the National Department of Agriculture, Land Reform and Rural Development (DALRRD) because it is on agriculturally zoned land. This approval is separate to the Environmental Authorisation. There are two approvals that apply. 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 development site. This agricultural assessment report will serve that purpose.

The second approval is a consent for long-term lease required in terms of the Subdivision of Agricultural Land Act (Act 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 can only be applied for once the Municipal Rezoning Certificate and Environmental Authorisation has been obtained.

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.

Power lines require the registration of a servitude for each farm portion crossed. In terms of the Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA), the registration of a power line servitude requires written consent of the Minister unless either of the following two conditions apply:

- if the servitude width does not exceed 15 metres; and
- if Eskom is the applicant for the servitude.

If one or both conditions apply, then no agricultural consent is required. The second condition is likely to apply, even if another entity gets Environmental Authorisation for and constructs the power line, but then hands it over to Eskom for its operation. Eskom is currently exempt from agricultural consent for power line servitudes.

7 SITE SENSITIVITY VERIFICATION

A specialist agricultural assessment is required to include a verification of the agricultural sensitivity of the development site as per the sensitivity categories used by the web-based environmental screening tool of the Department of Forestry, Fisheries and the Environment (DFFE). However, such an exercise is of limited value. What is of importance to an agricultural assessment, rather than the site sensitivity verification, is its assessment of the cropping potential and its assessment of the impact significance, both of which are not necessarily correlated with sensitivity.

The screening tool classifies agricultural sensitivity according to two independent criteria, from two independent data sets, both of which may be indicators of the land's agricultural production potential but are limited in that the first is outdated and the second relies on fairly course data. The two criteria are:

1. whether the land is classified as cropland or not on the field crop boundary data set (Crop Estimates Consortium, 2019), and
2. its land capability rating on the land capability data set (DAFF, 2017)

All classified cropland is, by definition, either high or very high sensitivity. 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 (DAFF, 2017). The higher land capability values (≥8 to 15) are likely to indicate suitability 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 the screening tool's agricultural sensitivity is shown in Table 1.

Table 1: 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

The agricultural sensitivity of the site, as given by the screening tool, is shown in Figure 2.

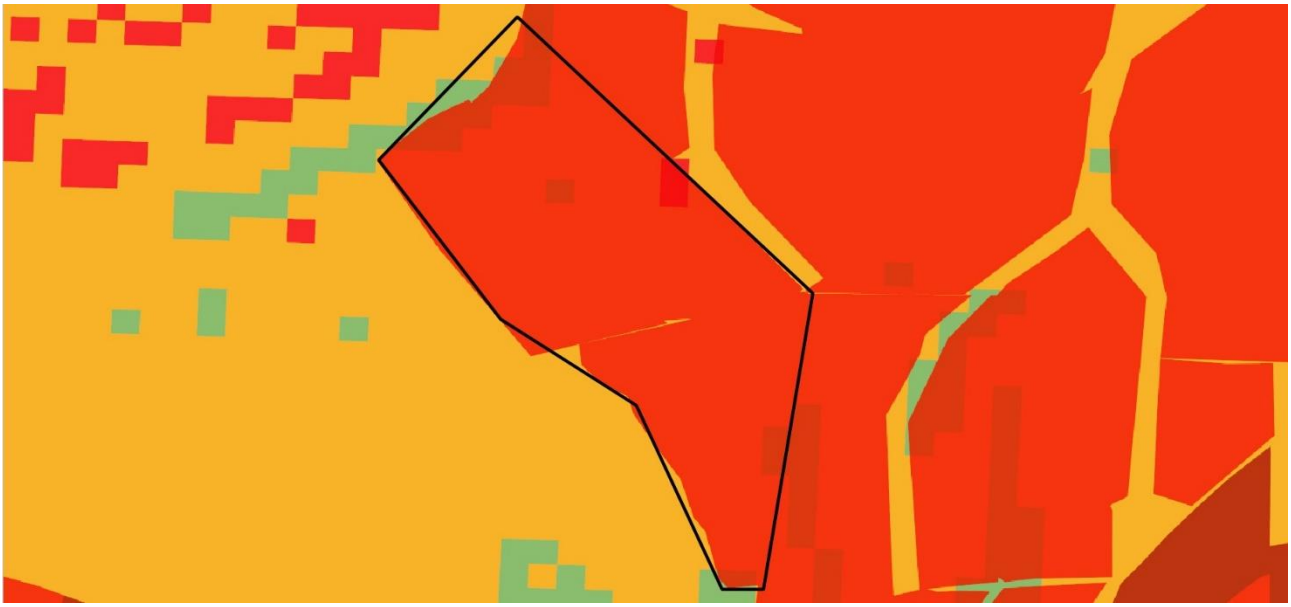

Figure 2. *The assessed site (black outline) overlaid on agricultural sensitivity, as given by the screening tool (green = low; yellow = medium; red = high; dark red = very high). The screening tool's high sensitivity is disputed by this assessment, which rates the entire assessed area as being of medium agricultural sensitivity.*

This verification of sensitivity addresses both components that determine it, namely cropping status and land capability. The screening tool classifies the assessed area as ranging from low to high agricultural sensitivity. The high sensitivity classification is due to most of the land being classified

as cropland and some (only 2 pixels) being classified with a land capability of 9. However, the data set used by the screening tool to classify cropland is outdated. All land across the footprint is no longer used as cropland. This land should not, therefore, still be classified as cropland and allocated high sensitivity because of it. This assessment therefore disputes the high sensitivity rating by the screening tool that is based on cropping status.

The classified land capability of the site ranges from 4 to 9 . This assessment disputes a classified land capability of >7, based on an assessment that the site is marginal for viable rain-fed crop production, predominantly because of soil limitations (see Section 8). These limitations make the land undeserving of a land capability of >7.

In conclusion, this assessment disputes the high sensitivity classification of the assessed area by the screening tool and rates the entire assessed area as being of medium agricultural sensitivity with a maximum land capability of 7 because of its assessed agricultural production potential and current agricultural land use.

8 BASELINE DESCRIPTION OF THE AGRO-ECOSYSTEM

The purpose of this section of an agricultural assessment report is to present the baseline information that controls the agricultural production potential of the site so that an assessment of that potential can be made. Agricultural production potential, and particularly cropping potential is one of three factors that determines the significance of the agricultural impact, together with size of footprint and duration of impact (see Section 9).

All the important parameters that control the agricultural production potential of the site are given in Table 2. The land type soil data as well as data from soil auger samples taken on site are given in Appendix 5. A satellite image map of the development site is given in Figure 3 and photographs of site conditions are shown in Figures 4 and 5.

The site falls outside 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.

Table 2: Parameters that control and/or describe the agricultural production potential of the site.

	Parameter	Value
Climate	Köppen-Geiger climate description (Beck *et al*, 2018)	Temperate, dry summer, hot summer
	Mean Annual Rainfall (mm) (Schulze, 2009)	460 to 475mm
	Reference Crop Evaporation Annual Total (mm) (Schulze, 2009)	1300 to 1310
Terrain	Terrain type	Swartland hilly terrain
	Terrain morphological unit	Predominantly mid slope
	Slope gradients (%)	3 to 16
	Altitude (m)	178
Soil	Geology (DAFF, 2002)	Db66: Mainly granite of the Paardeberg Pluton, Cape Granite Suite. Db44: Mainly alluvium; occasional greywacke, phyllite and quartzitic sandstone of the Tygerberg and Moorreesburg Formations, Malmesbury Group.
	Land type (DAFF, 2002)	Db66; Db44
	Description of the soils	Moderately deep, very light textured (sandy), light coloured, bleached, poorly drained, duplex soils on underlying granite clay
	Dominant soil forms	Cartref, Kroonstad, Vilafontes
	Soil capability classification (out of 9) (DAFF, 2017)	4 (low-moderate) to 6 (moderate-high)
	Soil limitations	low water and nutrient holding capacity, limited soil depth in places, and limited drainage
Land use	Agricultural land use in the surrounding area	Wheat; Canola; Wine Grapes
	Agricultural land use on the site	Fallow, but was previously used for wheat
Gener	Long-term grazing capacity (ha/LSU) (DAFF, 2018)	36

	Parameter	Value
	Land capability classification (out of 15) (DAFF, 2017)	4 (low-very low) to 9 (moderate-high)
	Within Protected Agricultural Area (DALRRD, 2020)	No
	Within Renewable Energy Development Zone (REDZ)	No

Figure 3. *Satellite image map of the development.*

The agricultural protocol requires the current productivity of the land based on detailed production figures and it requires the current employment figures. The land is municipally owned and was previously rented to a farmer but has not been rented or used for agricultural production for several years.

There are no existing impacts on the site that are relevant to agricultural impact.

8.1 Assessment of the agricultural production potential

This assessment of the agricultural production potential of the site is based on an integration of the different parameters in Table 2 above and the on-site soil investigation.

The climate and terrain are suitable for small grain crops, as grown in the surrounding area but the cropping potential of the site is limited by soil constraints, as identified in Table 2. The constraints are low water and nutrient holding capacity of the bleached, sandy upper soil horizons, limited soil depth in places, and limited drainage. Because of these constraints, the site is marginal for viable rainfed small grain cropping.

Although viable rain-fed cropping may have been done on the site in the past, the marginal potential makes it high risk economically. It should be noted that cropping potential changes with a changing agricultural economy over time. Poorer lands that may have been cropped with economic viability in the past, are abandoned as cropland because they become too marginal for viable crop production in a more challenging agricultural economy, with increased input costs.

Figure 4. *Typical site conditions showing the very sandy upper soil horizons in the mole hills.*

Figure 5. *Typical site conditions looking down the site towards Malmesbury.*

9 ASSESSMENT OF THE AGRICULTURAL IMPACT

9.1 Impact identification and assessment

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

The most significant loss of agricultural land possible, for any development anywhere in the country, is of high yielding cropland, and the least significant possible, is 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 (approximately only 13% of the country's surface area) and the relative abundance of the rest of agricultural land across the country that is only good enough to be used for grazing. If land can support viable and sustainable crop production, then it is considered to be 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 considered to be below the threshold and of much lower priority for being conserved.

In this case, the site is considered to be below the threshold for needing to be conserved as agricultural production land because of the limitations that make it marginal for cropping, discussed in Section 8. The use of this land for non-agricultural purposes will cause minimal loss of agricultural production potential in terms of national food security. As a result, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed here as being of low significance.

The agricultural protocol requires the expected change in productivity and employment figures. The land is municipally owned and was previously rented to a farmer but has not been rented or used for agricultural production for several years. Therefore, no change in productivity or employment is expected as a result of the proposed development.

9.2 Cumulative impact assessment

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 this:

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?

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 determines the quantitative loss of agricultural land if all renewable energy project applications within a 30 km radius become operational. These projects are listed in Appendix 4 of this report. Note that electrical grid infrastructure projects do not contribute to a loss of agricultural land and are not therefore included in this calculation of cumulative land loss. The area of land taken out of agricultural use as a result of all the projects listed in Appendix 4 (total generation capacity of 442 MW) will amount to a total of approximately 312 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 0.11% of the surface area. This is within an acceptable limit in terms of loss of marginal potential agricultural land.

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 pose a cumulative impact risk.

Due to all 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.

9.3 Assessment of alternatives

Specialist assessments for environmental authorisation are required to assess the impacts of alternatives, including the no-go alternative. As already noted, 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, because agriculture will be completely excluded from

within the boundary, regardless of layout. Any alternative layouts within the boundary will have equal agricultural impact and are assessed as equally acceptable.

It is recommended that the site choice for the facility occupies its required area of land at the bottom of the investigated area. In general, the soil potential increases up the slope and from an agricultural impact perspective, it would be an advantage to retain the higher lying, higher potential part of the stie for agricultural production.

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. The impacted land has marginal agricultural production potential for cropping, and the impact of the development is medium. 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 to the environmental, social, and economic benefits associated with the development of renewable energy in South Africa.

10 MITIGATION

10.1 Mitigation measures

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

1. A system of storm water management, which will prevent erosion on and downstream of the site, will be an inherent part of the engineering design on site.
2. 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 30 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 site, 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.

11 ADDITIONAL ASPECTS REQUIRED IN AN AGRICULTURAL ASSESSMENT

11.1 Micro-siting

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. As already discussed above, micro-siting within the footprint will make no material difference to agricultural impacts and disturbance. Also as discussed above, it is recommended that the site choice for the facility occupies the bottom of the investigated area to utilise lower potential agricultural land.

11.2 Confirmation of linear activity

The agricultural protocol requires confirmation, in the case of a linear activity, that the land can be returned to the current state within two years of completion of the construction phase. The overhead power line is the only linear component of the project, to which this provision is applicable. It is hereby confirmed that the land under the overhead power line, where it is not occupied by other facility infrastructure, can be returned to the current state of agricultural production potential within two years of construction, with the obvious disclaimer that the pylons will continue to be present for the duration of the operational lifetime of the power line.

11.3 Long term benefits versus agricultural benefits

The proposed development will have the following long-term benefits:

- 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. Furthermore, a reduction in coal power saves national water resources and therefore potentially makes more water available for irrigated agriculture.

11.4 Additional environmental impacts

There are no additional environmental impacts of the proposed development that are relevant to agriculture and that will not be considered by other specialists.

12 CONCLUSION

The site is classified as high agricultural sensitivity by the screening tool. This assessment disputes the high sensitivity classification of the assessed area by the screening tool and rates the entire assessed area as being of medium agricultural sensitivity with a maximum land capability of 7 because of its assessed agricultural production potential and current agricultural land use.

The climate and terrain are suitable for small grain crops, as grown in the surrounding area but the cropping potential of the site is limited by soil constraints. The constraints are low water and nutrient holding capacity of the bleached, sandy upper soil horizons, limited soil depth in places, and limited drainage. Because of these constraints, the site is marginal for viable rainfed small grain cropping.

An agricultural impact is a change to the future agricultural production potential of land. In this case, the site is considered to be below the threshold for needing to be conserved as agricultural production land because of the limitations that make it marginal for cropping. The use of this land for non-agricultural purposes will cause minimal loss of agricultural production potential in terms of national food security. As a result, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed here as being of low significance.

The development's acceptability and ultimate approval requires the weighing of all relevant factors, only a few of which are agricultural, against each other. All the potential benefits that the development might offer to society need to be weighed against its costs, which include some loss of potentially arable land. Such a weighing is far beyond the scope of an agricultural impact assessment, which therefore cannot conclude on the acceptability of the proposed development.

The development's acceptability is motivated by the following points:

- 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. Furthermore, a reduction in coal power saves national water resources and therefore potentially makes more water available for irrigated agriculture.

13 REFERENCES

Beck, H.E., N.E. Zimmermann, T.R. McVicar, N. Vergopolan, A. Berg, E.F. Wood. 2018. Present and future Köppen-Geiger climate classification maps at 1-km resolution, Nature Scientific Data. Available at: https://gis.elsenburg.com/apps/cfm/.

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

Department of Agriculture Forestry and Fisheries (DAFF). 2018. Long-term grazing capacity map for South Africa developed in line with the provisions of Regulation 10 of the Conservation of Agricultural Resources Act, Act no 43 of 1983 (CARA), available on Cape Farm Mapper. Available at: https://gis.elsenburg.com/apps/cfm/

Department of Agriculture, Forestry and Fisheries (DAFF). 2017. National land capability evaluation raster data layer, 2017. Pretoria.

Department of Agriculture, Forestry and Fisheries (DAFF). 2002. National land type inventories data set. Pretoria.

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

Department of Environmental Affairs (DEA). 2015. Strategic Environmental Assessment for wind and solar photovoltaic development in South Africa. CSIR Report Number CSIR: CSIR/CAS/EMS/ER/2015/001/B. Stellenbosch.

Schulze, R.E. 2009. South African Atlas of Agrohydrology and Climatology, 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

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
A PROPOSED KLIPKOPPIE PV SOLAR PLANT ON REMAINDER OF ERF 327, MALMESBURY

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	SoilZA (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@soilza.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 March 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

08/03/2024

Date

Signature of the Commissioner of Oaths

2024. 03. 08

Date

SUID-AFRIKAANSE POLISIEDIENS
GEMEENSKAPSDIENSSENTRUM
08 MAR 2024
COMMUNITY SERVICE CENTRE
MELKBOSSTRAND
SOUTH AFRICAN POLICE SERVICE

SOUTH AFRICAN POLICE SERVICE
COMMUNITY SERVICE CENTRE
MELKBOSSTRAND
08 MAR 2024
GEMEENSKAPSDIENSSENTRUM
SUID-AFRIKAANSE POLISIEDIENS

APPENDIX 3: SACNASP REGISTRATION CERTIFICATE

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 field(s) of practice (Schedule 1 of the Act)

Soil Science (Professional Natural Scientist)

Effective **15 August 2012** Expires **31 March 2025**

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)
12/12/20/2109/AM3	Uitspan	PV	10
12/12/20/2384	Tygerfontein	PV	19
12/12/20/2638/AM3	Groenekloof	WEF	56
12/12/20/2217/AM3	Clover Valley	WEF	4
12/12/20/2393/AM2	Diepkuil	PV	19.5
12/12/20/1985	Eenboom	PV	5
14/12/16/3/3/2/961/AM3	Hartebees	WEF	160
14/12/16/3/3/2/2105	Bergrivier	WEF	140
12/12/20/2400/AM2	Riebeek Kasteel	PV	8
	Klipkoppie	PV	20
Total solar			82
Total wind			360
Total			442

Note: Electrical grid infrastructure projects do not contribute to a loss of agricultural land and are not therefore included in this table and in the calculation of cumulative land loss.

APPENDIX 5: SOIL DATA

Table 4: Soil data from investigated auger samples on site.

Sample number	Soil form & family	Depth (mm)	Clay % A horizon	Clay % B horizon	Depth limiting layer
1	Cartref 1200	650	4	35	Weathered granite saprolite
2	Cartref 1200	600	4	35	Weathered granite saprolite
3	Glenrosa 2111	500	4	35	Weathered granite saprolite
4	Kroonstad 1000	600	3	45	Dense, poorly drained clay
5	Cartref 1200	500	4	35	Weathered granite saprolite
6	Kroonstad 1000	600	3	45	Dense, poorly drained clay
7	Vilafontes 1120	650	5	15	Weathered granite saprolite
8	Vilafontes 1120	650	5	15	Weathered granite saprolite

Table 5: Land type soil data

Land type	Soil series (forms)	Depth (mm)	Clay % A horizon	Clay % B horizon	Depth limiting layer	% of land type
Db44	Kd	600 - 900	5 - 10	25 - 35	gc	16,2
Db44	Oa	900 > 1200	10 - 20	10 - 30	R	14,1
Db44	Kd	500 - 800	2 - 6	25 - 35	gc	13,8
Db44	Du	900 > 1200	10 - 20		R	12,8
Db44	Ka	200 - 400	2 - 6		gc	10,2
Db44	Es	500 - 800	6 - 15	25 - 35	pr	7,8
Db44	Ss	300 - 500	2 - 6	25 - 35	pr	7,0
Db44	Lo	> 1200	2 - 6	2 - 6		4,0
Db44	S					3,5
Db44	We	200 - 400	2 - 6	2 - 6	sp	3,1
Db44	R					3,0
Db44	Gs	300 - 500	6 - 15		so,R	2,3
Db44	Lo	500 - 900	6 - 15	6 - 15	sp	1,9
Db44	Ms	100 - 300	6 - 15		R	0,5
Db66	Sw	200 - 400	15 - 30	35 > 55	vp	22,1
Db66	Gs	150 - 500	5 - 10	30 - 35	so,R	21,8
Db66	Kd	250 - 500	4 - 10	25 - 35	gc	10,3
Db66	Es	150 - 400	4 - 10	25 - 35	pr	10,0
Db66	R					9,5
Db66	Ss	200 - 500	5 - 10	30 - 40	pr	8,9
Db66	Du;Oa	600 > 1200	5 - 25	15 - 35	so,R	7,9

Land type	Soil series (forms)	Depth (mm)	Clay % A horizon	Clay % B horizon	Depth limiting layer	% of land type
Db66	Cf	300 - 600	0 - 6	30 - 35	so,R	7,5
Db66	Hu	800 > 1200	10 - 20	10 - 30	so,R	1,5
Db66	Gs	150 - 500	10 - 20	30 - 35	so,R	0,5