DRAFT SCOPING REPORT

Draft Scoping Report for the proposed development of the Vhuvhili Solar Photovoltaic (PV) Facility near Secunda in the Mpumalanga Province.

APPENDIX G.1:

Agricultural Assessment

ENERTRAG

CSIR
Touching lives through innovation

Johann Lanz

Soil Scientist (Pr.Sci.Nat.)

Reg. no. 400268/12

Cell: 082 927 9018

e-mail: johann@johannlanz.co.za

1A Wolfe Street
Wynberg
7800
Cape Town
South Africa

SITE SENSITIVITY VERIFICATION AND AGRICULTURAL AGRO-ECOSYSTEM SPECIALIST ASSESSMENT FOR THE PROPOSED VHUVHILI SOLAR ENERGY FACILITY NEAR SECUNDA IN MPUMALANGA PROVINCE

Report by

Johann Lanz

14 February 2022

Table of Contents

EXECUTIVE SUMMARY

The key findings of this study are:

- Despite the screening tool showing some high agricultural sensitivity, the entire site was verified as being of medium agricultural sensitivity.
- The soils are predominantly high clay content, dark coloured vertic and melanic soils, underlain by rock in upland positions and clay in bottomland positions. Soil forms are Arcadia, Rensburg, Valsrivier, Swartland, Mayo and Milkwood.
- The soils vary in their suitability for crop production.
- Because of the favourable climate and the potentially high grain yields, farmers in the area utilise all suitable soil for grain production. Only soil that is not suitable for grain production is used for cattle grazing. Limitations that render the soil unsuitable for grain production are depth limitations due to rock or dense clay in the subsoil, and the limited drainage associated with the dense, poorly drained clay layers in the subsoil.
- The footprint of the solar facility has been deliberately laid out so that it avoids all areas that have suitable soils and are therefore used for grain production.
- Two potential negative, direct agricultural impacts have been identified as loss of agricultural potential by occupation of land and loss of agricultural potential by soil degradation. The loss by occupation will translate to a loss of 130 head of cattle.
- Two positive, indirect agricultural impacts have been identified as enhanced agricultural potential through increased financial security for farming operations and enhanced agricultural potential through improved security against stock theft and other crime.
- The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. This is substantiated by the facts that
    - The facility avoids all field crops on the farm and only occupies land that is of limited land capability and is not suitable for crop production.
    - The amount of agricultural land loss is within the allowable development limits prescribed by the agricultural protocol.
    - It offers improved financial security, as well as wider, societal benefits.
    - It offers security benefits against stock theft and other crime.
    - It poses a low risk in terms of causing soil degradation.
    - The loss by occupation is not permanent and land will become available again after the activity ceases.
- The proposed development is therefore acceptable from an agricultural impact point of view, and it is recommended that it be approved.

1. INTRODUCTION

Environmental authorisation is being sought for the proposed Vhuvhili Solar Energy Facility near Secunda in the Mpumalanga Province (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 an Agricultural Agro-Ecosystem Specialist Assessment.

Johann Lanz was appointed as an independent agricultural specialist to conduct the agricultural assessment. The objective and focus of an agricultural assessment is to assess whether or not the proposed development will have an unacceptable agricultural impact, and based on this, to make a recommendation on whether or not it should be approved.

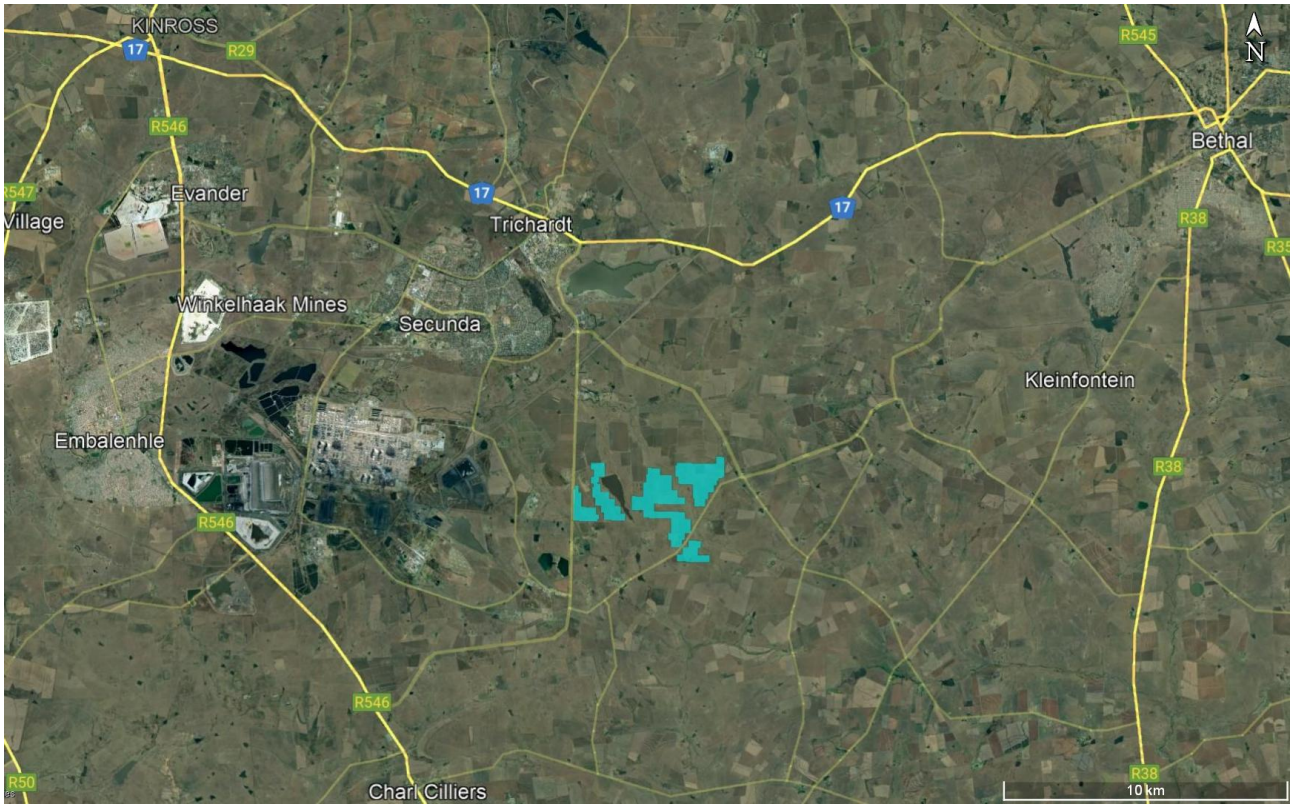


Figure 1. *Locality map of the proposed solar energy facility (light blue shading) to the south-east of the town of Secunda.*

The aim of the protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources is primarily to preserve scarce arable land for crop production, by ensuring that such land is not inappropriately used for non-agricultural land uses or impacted to the extent that the crop production potential is reduced. However, the land that is

excluded from potential agricultural use by this development is not suitable for crop production and is therefore not considered particularly preservation-worthy as agricultural production land.

2. PROJECT DESCRIPTION

The proposed Vhuvhili solar Photovoltaic (PV) facility will consist of the standard infrastructure of a PV facility including PV array; inverters; on-site substation and grid connection (which is subject to a separate assessment and EA); battery storage; auxiliary buildings; access and internal roads; and fencing and will have a total generating capacity of up to 300 MW.

The exact nature and layout of the different infrastructure within a renewable energy development has absolutely no bearing on the significance of agricultural impacts. It is therefore not necessary to detail the 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 on agricultural land, referred to as the agricultural footprint. Whether that footprint comprises a solar array, a road or a substation is irrelevant to agricultural impact. The total agricultural footprint for Vhuvhili SEF is 649 hectares.

3. TERMS OF REFERENCE

The terms of reference for this study is to fulfil 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 site includes land that is classified by the national web-based environmental screening tool as high sensitivity for impacts on agricultural resources. The level of agricultural assessment required in terms of the protocol (and hence in terms of NEMA) is therefore an Agricultural Agro-Ecosystem Specialist Assessment. The terms of reference for such an 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. The protocol also requires that a Site Sensitivity Verification be done.

1. The assessment must be undertaken by a soil scientist or agricultural specialist registered with the South African Council for Natural Scientific Professions (SACNASP).
2. The assessment must be undertaken on the preferred site and within the proposed development footprint.
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 9.11);
2. whether or not the proposed development will have an unacceptable negative impact on the agricultural production capability of the site (Section 9.13), 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 (Sections 8.1 & 8.2);
    2. Where applicable, the vegetation composition, available water sources as well as agro-climatic information (Sections 8.3, 8.4 & 8.5);
    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 8.8);
    4. The current employment figures (both permanent and casual) for the land for the past 3 years, expressed as an annual figure (Section 8.9);
    5. Existing impacts on the site, located on a map where relevant (e.g. erosion, alien vegetation, non-agricultural infrastructure, waste, etc.)(Section 8.10).
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 9.12);
    2. Change in employment figures (both permanent and casual) for the past 5 years expressed as an annual figure (Section 9.12);
    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 9.5).
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 2);
    2. A signed statement of independence by the specialist (Appendix 3);

3. The duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment (Section 4.1);
4. A description of the methodology used to undertake the on-site assessment inclusive of the equipment and models used, as relevant (Section 4.1);
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 9.12);
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 9.6);
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 9.7);
9. Information on the current agricultural activities being undertaken on adjacent land parcels (Section 8.6);
10. 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);
11. 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 9.8);
12. 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 9.13);
13. Any conditions to which this statement is subjected (Section 11);
14. Where identified, proposed impact management outcomes or any monitoring requirements for inclusion in the Environmental Management Programme (EMPr) (Section 10);
15. A description of the assumptions made and any uncertainties or gaps in knowledge or data (Section 5).
16. 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 9.9);
17. confirmation whether the development footprint is in line with the allowable development limits set in Table 1, including where applicable any deviation from the set development limits and motivation to support the deviation, including (Section 9.9):
    a. where relevant, reasons why the proposed development footprint is required to

exceed the limit;

b. where relevant, reasons why this exceedance will be in the national interest; and

c. where relevant, reasons why there are no alternative options available including evidence of alternatives considered; and

18. a map showing the renewable energy facilities within a 50km radius of the proposed development (Appendix 4)

4. METHODOLOGY OF STUDY

4.1 Methodology for assessing soils and agricultural potential

The assessment was based on an on-site investigation of the soils and agricultural conditions and was also informed by existing soil and agricultural potential data for the site. The following sources of existing information 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 1970's 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.
- Field crop boundaries were sourced from the 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.
- Grazing capacity data was sourced from the 2018 DAFF long-term grazing capacity map for South Africa, available on Cape Farm Mapper.
- Satellite imagery of the site and surrounds was sourced from Google Earth.

The aim of the on-site Site Sensitivity Verification was to:

1. ground truth cropland status and consequent agricultural sensitivity;
2. ground truth the land type soil data and achieve an understanding of specific soil conditions, and the variation of these across the site; and
3. assess on-site agricultural conditions;

This was achieved by a drive and walk-over investigation across the site. The site investigation was conducted on 12 October 2021.

The soil investigation was based on the investigation of existing excavations, soil auger samples as well as indications of the surface conditions and topography. Soils were classified according to the South African soil classification system (Soil Classification Working Group, 1991). This level of soil assessment is considered entirely adequate for an understanding of on-site soil potential.

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.

An interview with a farmer on some of the affected farm portions was conducted for information on farming activities on the site.

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

The Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA) requires that any long-term lease associated with the renewable energy facility be approved by the National Department of Agriculture, Land Reform and Rural Development (DALRRD). The SALA consent is separate from the application for Environmental Authorisation and needs to be applied for and obtained separately.

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 the construction of a renewable energy facility and its associated 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. SITE SENSITIVITY VERIFICATION

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

1. 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.;
2. contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity.

Agricultural sensitivity, in terms of environmental impact, and as used in the national web-based environmental screening tool, is a direct function of the capability of the land for agricultural production. This is because a negative impact, or exclusion of agriculture, on land of higher agricultural capability is more detrimental to agriculture than the same impact on land of low agricultural capability. The general assessment of agricultural sensitivity that is employed in the national web-based environmental screening tool identifies all arable land that can support viable crop production, as high (or very high) sensitivity. This is because there is a scarcity of arable production land in South Africa and its conservation for agricultural use is therefore a priority. Land which cannot support viable crop production is much less of a priority to conserve for agricultural use, and is rated as medium or low agricultural sensitivity.

The screening tool classifies agricultural sensitivity according to only two independent criteria – the land capability rating and whether the land is cultivated or not. All cultivated land is classified as at least high sensitivity, based on the logic that if it is under cultivation, it is indeed suitable for cultivation, irrespective of its land capability rating.

The screening tool sensitivity categories in terms of land capability are based upon the Department of Agriculture's updated and refined, country-wide land capability mapping, released in 2016. The data is generated by GIS modelling. Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain-fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability values (≥8 to 15) are likely to be suitable as arable land for crop production, while lower values are only likely to be suitable as non-arable, grazing land, or at the lowest extreme, not even suitable for grazing.

A map of the proposed development area overlaid on the screening tool sensitivity is given in Figure

2, below. The land capability of the site is 7 and 8. It includes a few, isolated pixels that are of a land capability value of 9, but because there are only 5 such pixels across the site, they are not significant. The differences in land capability values across the site are the result of how the land capability data is generated by modelling, rather than actual meaningful differences in agricultural potential on the ground. Values of 7 and 8 translate to a medium agricultural sensitivity for the site.

The high agricultural sensitivity in Figure 2 that covers part of the site is the result of those fields being classified as cropland. However, the data on croplands on the screening tool is outdated and not always accurate. The lands indicated as cropland are no longer or have never been used as cropland. Instead, as can be seen from photographs and the latest Google Earth image, they are used for pasture, with one minor exception. The exception is indicated in Figure 2 and 3 as the field outlined in green. This is the only cropland which intersects the footprint of the solar energy facility. The rest of the high agricultural sensitivity attributed to the site by the screening tool is disputed by this assessment because that land is no longer cropland, or never was. It is grassland grazing that is burnt or mowed from time to time, so can appear on satellite images as cropland. It should therefore not be classified as cropland or allocated high sensitivity because of it.

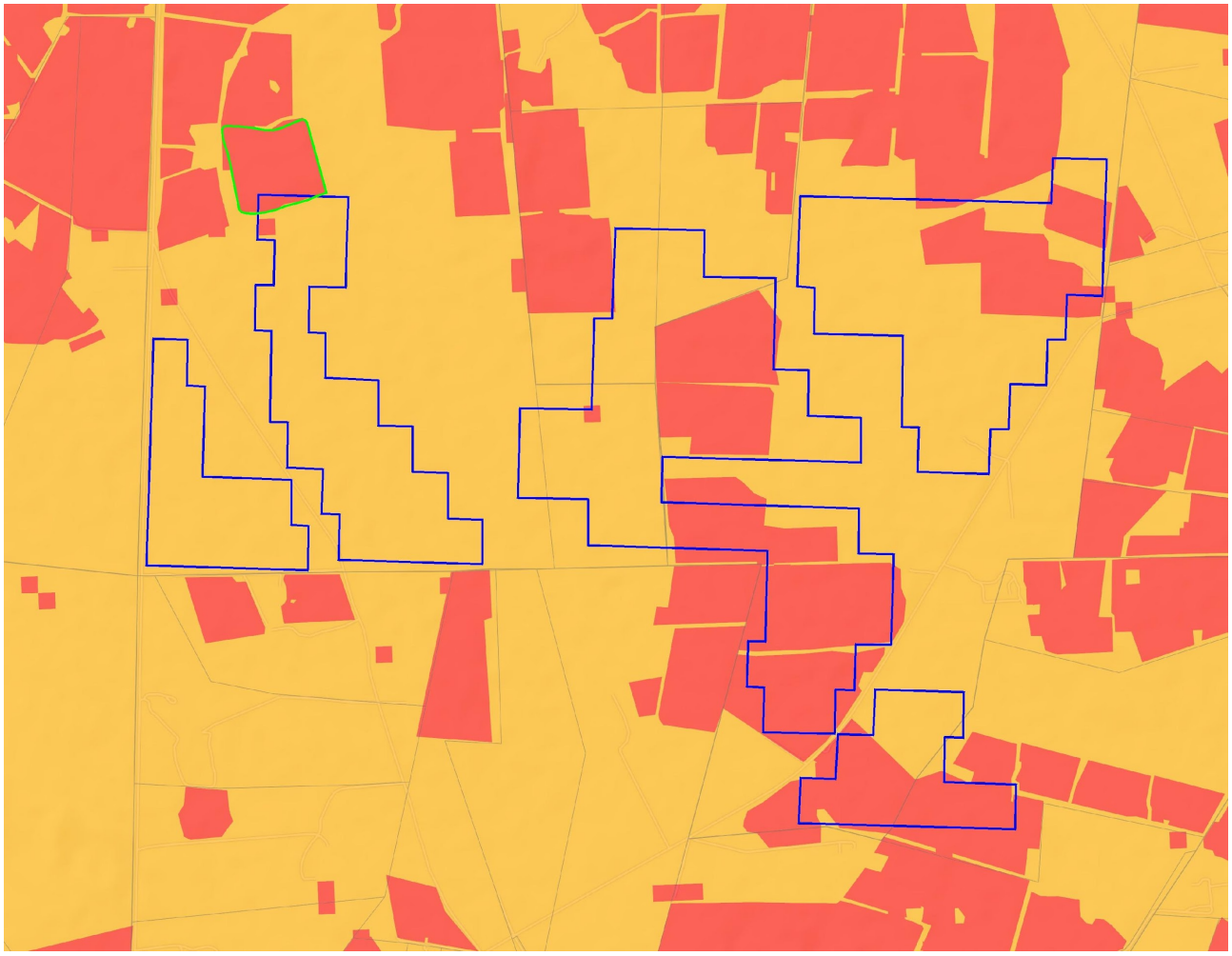


Figure 2. *The proposed development footprint (blue outline) overlaid on agricultural sensitivity, as given by the screening tool (yellow = medium; red = high). The one area of high agricultural sensitivity cropland on which the agricultural footprint infringes is shown in green outline. It is recommended that this cropland be a no-go area.*

This site sensitivity verification verifies the entire site (except for the tiny exception noted above, which is recommended as a no-go area) as being of medium agricultural sensitivity.

8. BASELINE DESCRIPTION OF THE AGRO-ECOSYSTEM

A satellite image map of the proposed footprint of the facility is shown in Figure 3 and photographs of site conditions are shown in Figures 4 to 7.

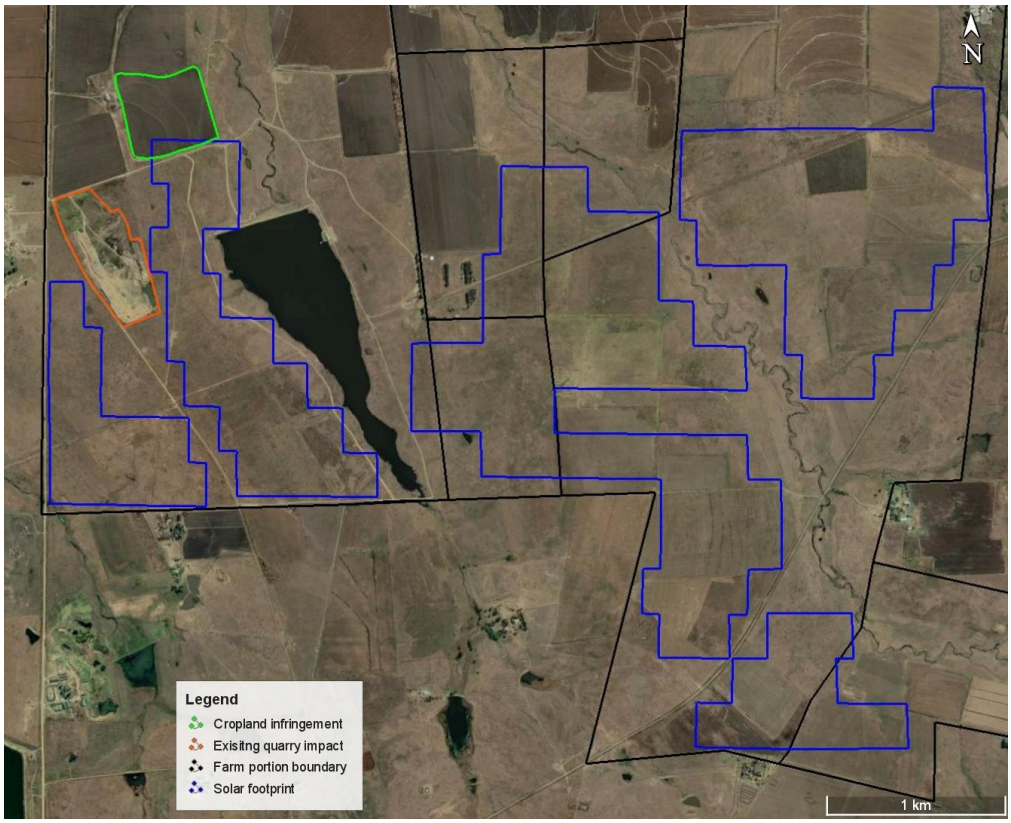


Figure 3. *Satellite image map of the proposed footprint of the facility.*

8.1 Soils

The entire site falls within one land type (see table of soil data in Appendix 1). The geology is dolerite as well as sandstone, grit and shale of the Vryheid formation of the Ecca group. The soils are predominantly high clay content, dark coloured vertic and melanic soils, underlain by rock in upland positions and clay in bottomland positions. Soil forms are Arcadia, Rensburg, Valsrivier, Swartland, Mayo and Milkwood. The agricultural potential of the soils is limited variously by the very high clay content, shallow depth and drainage limitations.

8.2 Terrain and slope

The site is situated on hilly terrain at an altitude of between 1,610 and 1,650 metres and slopes up to about 7%.

Figure 4. *Typical site conditions.*

Figure 5. *Typical site conditions. The dam is visible in the background.*

Figure 6. *Typical soil conditions where depth is limited by underlying rock.*

Figure 7. *Typical bottom-land soil conditions where depth is limited by underlying clay and drainage is limited.*

8.3 Available water sources

There is one fairly large farm dam on the site. There is no irrigation anywhere on the farms.

8.4 Vegetation

Natural vegetation of the site is Soweto Highveld Grassland, which has been disturbed by agricultural activities.

8.5 Agro-climatic information

The site has a summer rainfall with a mean annual rainfall of approximately 648 mm and a mean annual evaporation of approximately 1,290 mm.

8.6 Land use and development on and surrounding the site

The site is located in a grain farming agricultural region, but the soils vary in their suitability for crop production. Because of the favourable climate and the potentially high grain yields, farmers in the area, and particularly large scale farmers such as Dewald Te Water on whose land the site is located, utilise all suitable soil for grain production. Only soil that is not suitable for grain production is used for cattle grazing. Limitations that render the soil unsuitable for grain production are depth limitations due to rock or dense clay in the subsoil, and the limited drainage associated with the dense, poorly drained clay layers in the subsoil.

The footprint of the solar facility has been deliberately laid out so that it avoids the areas that have suitable soils and are therefore used for grain production. The grazing lands are *rooigras* (*Themeda triandra*) grasslands. Grass fields are burned or mowed from time to time.

Most of the farm portions on which the solar site is located, form only a small part of a much bigger farming operation that utilises many different farms with a total cropland of approximately 6,000 hectares and cattle grazing of around 7,000 to 8,000 hectares.

There is a quarry in close proximity to the solar site (see Figure 3).

8.7 Agricultural potential

Because of the favourable climate, grain yields are high. Average maize yield on the suitable soils on the farm is 8.5 tons per hectare. The long-term grazing capacity of the farm is also high at 5 hectares

per large stock unit.

8.8 Agricultural productivity

The development footprint is 649 hectares in extent. At a carrying capacity of 5 hectares per large stock unit, the footprint has a productivity of 130 head of cattle.

8.9 Agricultural employment

Twenty five agricultural labourers are employed in the total cattle farming operation that extends over multiple farms and an area of between 7,000 and 8,000 hectares.

8.10 Existing impacts on the site

There is an existing quarry impact on the site (see Figure 3).

9. ASSESSMENT OF AGRICULTURAL IMPACT

9.1 General

The focus and defining question of an agricultural impact assessment is to determine to what extent a proposed development will compromise (negative impacts) or enhance (positive impacts) current and/or potential future agricultural production. The significance of an impact is therefore a direct function of the degree to which that impact will affect current or potential future agricultural production. If there will be no impact on production, then there is no agricultural impact. Impacts that degrade the agricultural resource base, pose a threat to production and therefore are within the scope of an agricultural impact assessment.

For agricultural impacts, the exact nature and layout of the different infrastructure within a renewable energy development has absolutely no bearing on the significance of agricultural impacts. It is therefore not necessary to consider the design and layout of the facility within the agricultural footprint. All that is of relevance is simply the total footprint of the facility that excludes agricultural land use or impacts on agricultural land, referred to as the agricultural footprint.

It is important to consider the scale at which the significance of an impact is assessed. An agricultural impact equates to a temporary or permanent change in agricultural production potential of the land. The change in production potential of a farm or significant part of a farm is likely to be highly significant at the scale of that farm, but may be much less so at larger scales. This assessment

considers a regional and national scale to be the most appropriate one for assessing the significance of the loss of agricultural production potential.

9.2 Impact identification and discussion

Two potential negative agricultural impacts have been identified, that are direct impacts:

1. **Loss of agricultural potential by occupation of land** - Agricultural land directly occupied by the development infrastructure will become unavailable for agricultural use, with consequent potential loss of agricultural productivity and employment for the duration of the project lifetime. This impact is relevant only in the construction phase. No further loss of agricultural land use occurs in subsequent phases. The impact of this project is the loss of 649 hectares of grazing land.

2. **Loss of agricultural potential by soil degradation –** This impact only becomes relevant once the land is returned to agricultural land use after decommissioning. Soil can be degraded by impacts in three different ways: erosion; topsoil loss; and contamination. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard surface areas including roads. Loss of topsoil can result from poor topsoil management during construction related excavations. Hydrocarbon spillages from construction activities can contaminate soil. Soil degradation will reduce the ability of the soil to support vegetation growth. This impact only occurs during the construction and decommissioning phases. Due to the low slope of the land and the grass cover, the site has a low susceptibility to soil erosion. In addition, soil degradation control measures, as recommended and included in the EMPr, are likely to be effective in preventing soil degradation.

Two positive agricultural impacts have been identified, that are indirect impacts:

1. **Enhanced agricultural potential through increased financial security for farming operations -** Reliable income will be generated by the farming enterprises through the lease of the land to the energy facility. This is likely to increase their cash flow and financial security and could improve farming operations and productivity through increased investment into farming.
2. **Enhanced agricultural potential through improved security against stock theft and other crime** due to the presence of electric fencing, cameras and security personnel at the facility.

The extent to which any of these impacts is likely to actually change levels of agricultural production is small and the significance of all agricultural impacts is therefore low.

9.3 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. It is important to note that the cumulative impact assessment for a particular project, like what is being done here, is not the same as an assessment of the impact of all surrounding projects. The cumulative assessment for this project is an assessment only of the impacts associated with this project, but seen in the context of all surrounding impacts. It is concerned with this project's contribution to the overall impact, within the context of the overall impact. But it is not simply the overall impact itself.

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 agricultural land, with a consequent decrease in agricultural production. The defining question for assessing the cumulative agricultural impact is this:

> What level of loss of agricultural land use and associated loss of agricultural production 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?

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.

DFFE compliance for this project requires considering all renewable energy project applications within a 50 km radius. Two other renewable energy projects have been identified within a 50 km

radius and are listed (see Table 1 and Appendix 4).

In quantifying the cumulative impact, the area of land taken out of agricultural use because of all three listed projects (total generation capacity of 376 MW) will amount to a total of approximately 939 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 50 km radius (approximately 785,300 ha), this amounts to only 0.12% of the surface area. That is considered to be within an acceptable limit in terms of loss of agricultural land that is only suitable for grazing. This is particularly so when considered within the context of the following point:

In order for South Africa to achieve its renewable energy generation goals, 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, which has very little crop production potential, than to lose agricultural land that has crop production potential, and that is much scarcer, to renewable energy development elsewhere in the country.

The projects have the same agricultural impacts in a very similar agricultural environment, and therefore the same mitigation measures apply to both.

As discussed above, the risk of a loss of agricultural potential by soil degradation is low and can effectively be mitigated for renewable energy developments. If the risk for each individual development is low, then the cumulative risk is also low.

Due to all of the considerations discussed above, the cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. The proposed development is therefore acceptable in terms of cumulative impact, and it is therefore recommended that it be approved.

Table 1**:** Table of all renewable energy applications within a 50 km radius of the proposed development, that were included in the cumulative impact assessment.

DFFE Reference	Project name	Technology	Status	Capacity (MW)
14/12/16/3/3/2/754	Tutuka Photovoltaic (PV) Energy Facility	Solar PV	Approved	66
DEA/EIA/0000991/2012	Forzando SEF	Solar PV	In process	9.5
	Vhuvhili SEF	Solar PV	In process	300
Total				**375.5**

9.4 Impacts 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.

The development offers an alternative income source to agriculture, but it excludes agriculture from a proportion of the land. Therefore, the negative agricultural impact of the development is more significant than that of the no-go alternative, and so, purely from an agricultural impact perspective, the no-go alternative is the preferred alternative between the development and the no-go. 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.

9.5 Alternative development footprints and comparative assessment of alternatives

The agricultural protocol requires identification of 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.

The site sensitivity verification has however verified the entire footprint (providing that the one area of infringement is respected as a no-go area) as being of medium agricultural sensitivity.

Design and layout alternatives within the proposed agricultural footprint will make absolutely no material difference to the significance of the agricultural impacts. The same applies to technology alternatives, and there are therefore no preferred alternatives from an agricultural impact perspective. All alternatives are considered acceptable.

9.6 Long term project benefits versus agricultural benefits

The development will generate a greater per hectare income for the farming enterprise than the existing grazing will earn. It will also generate additional income and employment in the local economy. In addition, it will contribute to the country's need for energy generation, particularly renewable energy that has lower environmental and agricultural impact than existing, coal powered energy generation.

9.7 Additional environmental impacts

There are no additional environmental impacts of the proposed development that are relevant to agriculture.

9.8 Micro-siting to minimise fragmentation and disturbance of agricultural activities

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimise fragmentation and disturbance of agricultural activities. As long as the agricultural footprint avoids all areas used for crop production, the exact position of the footprint and all infrastructure within it will not make any material difference to agricultural impacts.

9.9 Allowable development limits

The agricultural protocol requires confirmation of whether the development footprint is in line with the allowable development limits or not and requires motivation to support any deviation from the limits. According to the land capability rating for the site, which includes a land capability value of 8, any solar facility will not be within the allowable development limits. However, a land capability of 8 is disputed for the proposed agricultural footprint of the development, and the facility is therefore within the allowable limits. The evidence for this is detailed below.

9.9.1 The purpose and detail of allowable development limits

The purpose of the agricultural protocol is to conserve valuable agricultural land for agricultural production by steering non-agricultural development away from higher potential agricultural land and onto lower potential land. The criteria by which land is valued is its suitability for sustained crop production. There is a scarcity of arable crop production land in South Africa. Therefore, if land is suitable for crop production, its conservation for agriculture should be prioritised. However, there is no scarcity of land that is only suitable as grazing land in the country and therefore, if land is only suitable as grazing land, its conservation for agricultural land use is of much less priority. It is such land onto which non-agricultural development should be steered whenever possible.

The suitability of land for crop production is the dividing line between land that is rated on the screening tool as medium sensitivity for impacts on agricultural resources and land that is rated as high sensitivity. High sensitivity land is suitable for crop production. Medium sensitivity land is not. High sensitivity lands are described in the protocol as *still preservation worthy since they include land with an agricultural production potential and suitability for specific crops.* Medium sensitivity lands are described as *very marginal arable land.*

The agricultural protocol achieves its purpose, in relation to renewable energy developments on agricultural land, by imposing allowable development limits on different agricultural sensitivity categories of land. The allowable development footprint is the area of a particular sensitivity category of land that can be directly occupied by the physical footprint of a renewable energy development. There are six different allowable development footprints, defined according to a combination of land capability and cropping status, as specified in Table 2, below.

Table 2: Allowable development limits as specified in the agricultural protocol.

Allowable footprint category	Agricultural sensitivity on screening tool	Allowable footprint (ha/MW)	Definition of category
1	Very high	0.00	Land capability of 11-15; or irrigated land; or dryland horticulture or viticulture
2	High	0.20	Land capability of 8-10 on existing field crops
3	High	0.25	Land capability of 6-7 on existing field crops
4	High	0.30	Land capability of 1-5 on existing field crops
5	High	0.35	Land capability of 9-10 outside of existing field crops
	Medium		Land capability of 8 outside of existing field crops
6	Medium	2.50	Land capability of 6-7 outside of existing field crops
	Low		Land capability of 1-5 outside of existing field crops

Solar energy is effectively prevented by the limits, from being developed on any land other than land of category 6 in Table 2 above.

9.9.2 The allowable development limits of the proposed site

The land capability rating for the site includes some areas with a land capability value of 8, which, as discussed above, should indicate suitability for crop production. However, as was shown in Section 8, the soils on the proposed site are not suitable for crop production, although some of the soils nearby are suitable and are used for crop production. Land capability mapping is not sufficiently detailed to distinguish between the soils that are suitable and those that are not, at the scale that is relevant to this site. Because the soils that are part of the agricultural footprint are not suitable for crop production, their accurate land capability is less than 8. Only those soils that are suitable for, and therefore used for crop production, should have a land capability ≥8.

The agricultural footprint of the development does therefore fall within category 6 in Table 2 above. A footprint of 300 MW x 2.5 is allowed for the Vhuvhili solar PV Facility. The agricultural footprint of 649 hectares is therefore within the allowable development limits.

9.10 Mitigation measures

The following mitigation measures are recommended for controlling soil degradation.

- Implement an effective system of stormwater run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.
- 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.
- Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilise disturbed soil against erosion, and to reduce dust formation.
- If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface, and then stabilised by facilitating vegetation cover.

9.11 Impact assessment

An Agricultural Agro-Ecosystem Specialist Assessment is required by the protocol to identify the extent of the impact of the proposed development on agricultural resources. The assessment of the extent of the impact is summarised in Table 3.

As discussed in Section 9.1, the consequence of an impact is a direct function of the degree to which that impact will affect current or potential future agricultural production.

Agricultural potential loss by land occupation occurs only on the site and for the lifetime of the development. Its consequence is considered moderate because the affected land is of limited land capability and is not suitable for crop production. For the same reason, the irreplaceability is considered low. The probability of this impact is very likely. Its reversibility is considered high, because after decommissioning the land can be returned to agricultural land use.

Agricultural potential loss by degradation occurs only on the site and only during the construction and decommissioning phases. Its consequence is considered slight because of the limited land capability and because the soil is not particularly susceptible to degradation. Irreplaceability is considered low because of the limited land capability as well. The probability of this impact is unlikely because of the low susceptibility. Its reversibility is considered moderate, because if soil is degraded there is some potential for rehabilitation.

Agricultural potential enhancement through increased financial security for farming operations occurs across the farming operation and during the operational phase. Its consequence is considered slight because increased farm investment is only likely to slightly increase farm productivity. Some financial improvement to farming operations is likely as a result of the additional revenue. Reversibility is considered high because the additional revenue will stop when the operation ceases. Irreplaceability is considered moderate because the additional revenue may not be easy to replace after the operation ceases, although once a renewable energy facility is established, it may well be recommissioned for continued operation.

Table 3: Rating of significance of potential impacts to agriculture.

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post Mitigation)	Confidence Level
Construction phase						
Agricultural potential loss by land occupation	**Status**	Negative	Low (4)	None possible	Low (4)	High
	Spatial Extent	Site Specific				
	Duration	Long-term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				
Agricultural potential loss by soil degradation	**Status**	Negative	Very low (5)	Maintain vegetation and facilitate re-vegetation. Strip, stockpile and re-spread topsoil.	Very low (5)	High
	Spatial Extent	Site Specific				
	Duration	Long-term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Operational phase						
Agricultural potential enhancement through increased financial security for farming operations	**Status**	Positive	Very low (5)	None possible	Very low (5)	High
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Moderate				
Decommissioning phase						
Agricultural potential loss by soil degradation	**Status**	Negative	Very low (5)	Maintain vegetation and facilitate re-vegetation. Strip, stockpile and re-spread topsoil.	Very low (5)	High
	Spatial Extent	Site Specific				
	Duration	Long-term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Low				

9.12 Impacts on agricultural production and employment

The development will result in the loss of productivity of 130 head of cattle from the farm. Because of the large size of the total farm operation, this loss is unlikely to have any impact on agricultural employment, although one or two farm workers may lose their employment as a result of the reduced number of cattle.

9.13 Impact statement

An Agricultural Agro-Ecosystem Specialist Assessment is required by the protocol to provide a substantiated statement on the acceptability, or not, of the proposed development and a recommendation on the approval, or not of the proposed development.

The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. **The proposed development is therefore acceptable**. This is substantiated by the following points:

1. The layout of the facility has been deliberately designed to avoid all field crops on the farm. The proposed development will therefore only occupy land that is of limited land capability and is not suitable for crop production. There is not a scarcity of such agricultural land in South Africa and its conservation for agriculture is not therefore a priority.
2. The amount of agricultural land loss is within the allowable development limits prescribed by the agricultural protocol. These limits reflect the national need to conserve valuable arable land and therefore to steer, particularly renewable energy developments, onto land that is not suitable for crop production.
3. The proposed development offers some positive impact on agriculture by way of improved financial security for farming operations, as well as wider, societal benefits.
4. The proposed development offers security benefits against stock theft and other crime due to the presence of electric fencing, cameras and security personnel at the facility.
5. The proposed development poses a low risk in terms of causing soil degradation, which can be adequately and fairly easily managed by mitigation management actions.
6. The loss of agricultural potential by occupation of land is not permanent. The land will become available again for agricultural use once the proposed activity ceases.

Therefore, from an agricultural impact point of view, it is recommended that the development be approved.

10. ENVIRONMENTAL MANAGEMENT PROGRAMME INPUTS

The environmental management programme inputs for the protection of soil resources are presented in the Tables 4-7 below for each phase of the development.

Table 4: Management plan for the planning and design phase

Impact	Mitigation / management objectives and outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Aspect: Protection of soil resources					
Erosion	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Design an effective system of stormwater run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.	Ensure that the storm water run-off control is included in the engineering design.	Once-off during the design phase.	Holder of the EA

Table 5: Management plan for the construction phase

Impact	Mitigation / management objectives and outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Aspect: Protection of soil resources					
Erosion	That vegetation clearing does not pose a high erosion risk.	Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilise disturbed soil against erosion.	Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation.	Every 4 months during the construction phase	Environmental Control Officer (ECO)
Topsoil loss	That topsoil loss is minimised	If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.	Record GPS positions of all occurrences of below-surface soil disturbance (e.g. excavations). Record the date of topsoil stripping and replacement. Check that topsoil covers the entire disturbed area.	As required, whenever areas are disturbed.	Environmental Control Officer (ECO)

Table 6: Management plan for the operational phase

Impact	Mitigation / management objectives and outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Aspect: Protection of soil resources					
Erosion	That denuded areas are re-vegetated to stabilise soil against erosion	Facilitate re-vegetation of denuded areas throughout the site	Undertake a periodic site inspection to record the progress of all areas that require re-vegetation.	Bi-annually	Facility Environmental Manager

Table 7: Management plan for the decommissioning phase

Impact	Mitigation / management objectives and outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Aspect: Protection of soil resources					
Erosion	That vegetation clearing does not pose a high erosion risk.	Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilise disturbed soil against erosion.	Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation.	Every 4 months during the decommissioning phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved.	Environmental Control Officer (ECO)
Topsoil loss	That topsoil loss is minimised	If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-	Record GPS positions of all occurrences of below-surface soil disturbance (e.g. excavations). Record the date of topsoil stripping and replacement. Check that topsoil	As required, whenever areas are disturbed.	Environmental Control Officer (ECO)

Impact	Mitigation / management objectives and outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
		spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.	covers the entire disturbed area.		

11. CONCLUSIONS

Despite the screening tool showing some high agricultural sensitivity, the entire site was verified as being of medium agricultural sensitivity. The soils are predominantly high clay content, dark coloured vertic and melanic soils, underlain by rock in upland positions and clay in bottomland positions. Soil forms are Arcadia, Rensburg, Valsrivier, Swartland, Mayo and Milkwood. The soils vary in their suitability for crop production.

Because of the favourable climate and the potentially high grain yields, farmers in the area utilise all suitable soil for grain production. Only soil that is not suitable for grain production is used for cattle grazing. Limitations that render the soil unsuitable for grain production are depth limitations due to rock or dense clay in the subsoil, and the limited drainage associated with the dense, poorly drained clay layers in the subsoil.

The footprint of the solar facility has been deliberately laid out so that it avoids the areas that have suitable soils and are therefore used for grain production.

Two potential negative, direct agricultural impacts have been identified as loss of agricultural potential by occupation of land and loss of agricultural potential by soil degradation. The loss by occupation will translate to a loss of 130 head of cattle. Two positive, indirect agricultural impacts have been identified as enhanced agricultural potential through increased financial security for farming operations and enhanced agricultural potential through improved security against stock theft and other crime.

The recommended mitigation measures are implementation of an effective system of stormwater

run-off control; maintenance of vegetation cover; and stripping, stockpiling and re-spreading of topsoil.

The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. This is substantiated by the facts that the facility avoids all field crops on the farm and only occupy land that is of limited land capability and is not suitable for crop production; the amount of agricultural land loss is within the allowable development limits prescribed by the agricultural protocol; it offers improved financial security, as well as wider, societal benefits; it offers security benefits against stock theft and other crime; it poses a low risk in terms of causing soil degradation; and the loss by occupation is not permanent and land will become available again after the activity ceases.

The proposed development is therefore acceptable from an agricultural impact point of view, and it is recommended that it be approved.

The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions other than implementation of the recommended mitigation measures.

12. REFERENCES

Cape Farm Mapper. 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, 2017. National land capability evaluation raster data layer, 2017. Pretoria.

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

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. 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: SOIL DATA OF LAND TYPES

Land type	Soil series (forms)	Depth (mm)	Clay % A horizon	Clay % B horizon	Depth limiting layer	% of land type
Ea17	Ar	300 - 900	45 - 70		so	57
Ea17	Rg	600 - 1000	45 - 70		gc	16
Ea17	Va	300 - 450	25 - 35	40 - 60	gc,vp	7
Ea17	Sw	200 - 450	25 - 35	40 - 60	lc	6
Ea17	My / Mw	150 - 500	30 - 50	20 - 30	so,R	5
Ea17	Bo	900 > 1200	35 - 50	35 - 50	gc,so	3
Ea17	Av	500 - 900	25 - 30	30 - 40	sp	2
Ea17	We	300 - 450	25 - 30	40 - 50	sp	2
Ea17	Ms / Gs	100 - 250	20 - 30		R,so	2
Ea17	R					2
Ea17	S					1

APPENDIX 2: 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**

In the past 5 years of running my soil and agricultural consulting business, I have completed more than 120 agricultural assessments (EIAs, SEAs, EMPRs) in all 9 provinces for renewable energy, mining, urban, and agricultural developments. My regular clients include: Aurecon; CSIR; SiVEST; Arcus; SRK; Environamics; Royal Haskoning DHV; Jeffares & Green; JG Afrika; Juwi; 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*.

APPENDIX 3: DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

10.4 The Specialist

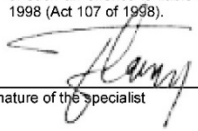
Note: Duplicate this section where there is more than one specialist.

I Johann Lanz, as the appointed specialist hereby declare/affirm the correctness of the information provided as part of the application, and that I:

- in terms of the general requirement to be independent (tick which is applicable):

X	other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
	am not independent, but another EAP that is independent and meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);

- have expertise in conducting specialist work as required, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- will ensure compliance with the EIA Regulations 2014;
- 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 application;
- will take into account, to the extent possible, the matters listed in regulation **18** of the regulations when preparing the application and any report, plan or document relating to the application;
- will disclose to the proponent or applicant, registered interested and affected parties 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 or the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority (unless access to that information is protected by law, in which case I will indicate that such protected information exists and is only provided to the competent authority);
- declare that all the particulars furnished by me in this form are true and correct;
- am aware that it is an offence in terms of Regulation 48 to provide incorrect or misleading information and that a person convicted of such an offence is liable to the penalties as contemplated in section 49B(2) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist

Johann Lanz - Soil Scientist

Name of company

06 June 2022

Date

APPENDIX 4: MAP OF PROJECTS CONSIDERED FOR CUMULATIVE IMPACT

Figure 8. *35 km and 50 km radius around the site showing all renewable energy projects in light blue outline.*