PB CONSULT
ENVIRONMENTAL MANAGEMENT SERVICES

TERRESTRIAL BIODIVERSITY COMPLIANCE STATEMENT

MALMESBURY KLIPKOPPIE SOLAR PROJECT

THE PROPOSED ESTABLISHMENT OF A 10 – 20 MW SOLAR FACILITY (& CONECTING CABLE ROUTES) ON A PORTION OF ERF 327, MALMESBURY SWARTLAND MUNICIPALITY, WESTERN CAPE PROVINCE.

PREPARED FOR:

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28 February 2024

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EXECUTIVE SUMMARY

The Swartland Municipality would like to establish a 10 - 20 MW solar photovoltaic facility on a portion of Erf 327 (Malmesbury) to reduce the negative impact of the national energy crisis on the town. The property belongs to the Municipality and is zoned for Agricultural Zone 1. A 20 MW solar facility is expected require around 60 ha of land. The study area is located on a north/northwest facing slope (most desirable for solar radiation) and fairly close to a Municipal 11kV substation. The site is currently used for agriculture (dry land, commercial annual crops & grazing). However, the site is located just east of the Klipkoppie Municipal Nature Reserve and to the south of the Driehoekpad Municipal Nature Reserve. The proposed connecting cable routes might impact on both these reserves.

VEGETATION TYPE & STATUS

According to the South African vegetation map (2018) (Mucina & Rutherford, 2006), the study area overlaps an area that would have been covered by the **endangered** Swartland Granite Renosterveld vegetation type (Figure 7).

WATERCOURSES & WETLANDS

The study is located just south of the Diep River (which runs through Malmesbury) and just east of a small unnamed seasonal tributary to the Diep River (which is also the easter boundary of the Klipkoppie Municipal Nature Reserve). Both these river systems have been identified as either ecological support areas or critical biodiversity areas. Neither of these watercourses will be directly impacted by the proposed solar facility itself, but potentially by the powerline routes (Figure 4). According to the information received the powerline routes were chosen to follow existing roads (which will minimise the impact on remaining natural veld in will be overhead where it cross the watercourses), which will minimise the impacts significantly.

VEGETATION ENCOUNTERED

The site verification confirmed that the study area had been transformed as a result of long-term cultivation. No remaining natural veld of any significance remains anywhere within the study area. The whole site still shows signs of recent cultivation together and is covered with crop remains or weedy species (including patches of the indigenous weed, *Galenia africana* (often a disturbance indicator species) (Photo 1 to Photo 9). The only plant species of any significance within the study area were 3 mature wild olive trees (*Olea europaea*) (Photo 8 & Photo 9).

Renosterveld, once cultivated, is unlikely to restore itself (for many generations, if ever), even with active rehabilitation. In this case, rehabilitation and conservation of the site is not considered a viable option as there would be many other areas in better condition more worthy of conservation efforts.

CONSERVATION PRIORITY AREAS

The study area might impact on ecological support areas (ESA 2) and critical biodiversity areas (CBA 1) associated with the Diep River and its seasonal tributary (west of the study area). The proposed cable routes will impact on the Klipkoppie Municipal Nature Reserve (a CBA 1) to the west of the study area and the Driehoekpad Municipal Nature Reserve to the north of the study area (Figure 4) (CapeNature, 2017). Neither of these watercourses will be directly impacted by the proposed solar facility.

However, the connecting powerlines might impact on two watercourses and its associated CBA's & ESA's. It might also affect CBA's associated with the Klipkoppie Municipal Nature Reserve. At the river the powerlines will be overhead, and within the Nature Reserves the powerlines will be placed underground next to existing roads (which will result in a temporary short to medium term impact). The overall impact on critical biodiversity areas can be easily reduced and even avoided by the implementation of the mitigation recommendations (Heading 7).

PROTECTED PLANT SPECIES

According to the NEMA EIA screening tool report for this project (Refer to Appendix 1), the relative plant species sensitivity is considered of "**High Sensitivity**", because the study area might touch or overlap sensitive areas. The original vegetation type is classified as endangered and specifically because of the potential that quite an extensive number of sensitive plants might occur in this area (or is known to have a distribution within the broader area or this vegetation type).

- No red-data or any protected plant species were observed within the proposed footprint (refer to Heading 4.4).
- The study area had been under cultivation (dry-land commercial annual crops) over a long period of time and the veld transformed. Only a few hardy or indigenous pioneer species managed to survive the continual impact of agriculture and altered fire regimes. None of the species listed in the screening report were observed.

Because of the degraded state of the study area, it is considered unlikely that the proposed solar facility will result in any significant impact on the plant species sensitivity theme. As a result, the Plant Species theme for this study area is should be rated as **Low Sensitive**.

FAUNA & AVI-FAUNA

Historically several large and small mammals would have been expected to occur within the Fynbos / Renosterveld vegetation of the Swartland area (although not in large numbers). Fynbos does not support a high number of birds , but all six bird species endemics to the south-west Cape are fynbos species. On the other hand, Fynbos supports large numbers of butterfly species, many of which, are now at risk, especially the myrmecophilous (ant associated) butterflies from the family Lycaenidae, because of ongoing disturbances to their preferred habitat (often small areas). Although fynbos is not particularly rich in reptiles and amphibians, many of the species living there are both endemic and threatened. The very rare geometric tortoise is found in only a few surviving fynbos areas and is regarded as the world's second rarest tortoise. The Cape has more than half of South Africa's frog species. Furthermore, of the 62 different frogs occurring here, 29 are endemic being found nowhere else on earth.

According to the **NEMA EIA Sensitivity** scan for the site (Appendix 1) the Animal Species Theme Sensitivity is **High Sensitive** because of the potential presence of the species listed in the Table below (Table 8). Unfortunately, because of the long history of agriculture and the transformed nature of the veld (and other reasons listed in Table 8) it is considered highly unlikely that the proposed development will result in any significant additional impact on any of these species.

As a result, the animal species theme sensitivity for this project is considered to be **Low Sensitive**.

REHABILITATION OPTIONS

Because of the long history of cultivation and other associated farming practices on the property (and its immediate surroundings) it is considered highly unlikely that natural veld would ever be able to re-establish itself in this area without human intervention. It is well known that renosterveld is unlikely to restore itself, once cultivated.

TERRESTRIAL BIODIVERSITY

According to the **NEMA EIA Sensitivity** scan for the site (Appendix 1) the Terrestrial Biodiversity Theme Sensitivity is considered **VERY HIGH SENSITIVE** because of the potential impact on ecological support areas (ESA's), critical biodiversity areas (CBA's), endangered Swartland Granite Renosterveld vegetation type and sensitive fauna & flora species.

According, to the overall terrestrial impact assessment (Table 9) the main impacts associated with the proposed development will be:

- The potential impact on the two watercourses and the potential impact on the CBA associated with the Klipkoppie Municipal NR;
- A potential low impact on bird species (specifically the Secretary bird).

The Terrestrial Biodiversity Evaluation for this study (Table 9), gives the potential accumulative impact is considered to a **Medium/Low negative**, which can be reduced to very low with mitigation.

With mitigation it is considered highly unlikely that the development will contribute significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g., migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened species.
- Loss of ecosystem connectivity.

As a result, the Terrestrial Biodiversity Theme Sensitivity for the proposed project is considered **LOW SENSITIVE**.

MAIN CONCLUSION

It is the opinion of the author that a full botanical assessment will not produce any significant additional information. The sensitivity map focuses on the protection of the watercourses (with its associated CBA and ESA areas) and the Klipkoppie Municipal NR (Refer to Figure 8).

WITH THE AVAILABLE INFORMATION IT IS RECOMMENDED THAT THE PROJECT BE APPROVED.

DETAILS OF THE AUTHOR

This is a specialist report compiled by Peet Botes from PB Consult.

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INDEPENDENCE & CONDITIONS

PB Consult is an independent entity with no interest in the activity other than fair remuneration for services rendered. Remunerations for services are not linked to approval by decision making authorities and the company have no interest in secondary or downstream development because of the authorization of this project. There are no circumstances that compromise the objectivity of this report. The findings, results, observations and recommendations given in this report are based on the author's best scientific and professional knowledge and available information. The author reserves the right to modify aspects of this report, including the recommendations if new information become available which may have a significant impact on the findings of this report.

RELEVANT QUALIFICATIONS & EXPERIENCE OF THE AUTHOR

Mr. Peet Botes holds a BSc. (Hons.) degree in Plant Ecology from the University of Stellenbosch (Nature Conservation III & IV as extra subjects). Since qualifying with his degree, he had worked for more than 20 years in the environmental management field, first at the Overberg Test Range (a Division of Denel) managing the environmental department of OTR and being responsible for developing and implementing an ISO14001 environmental management system, ensuring environmental compliance, performing environmental risk assessments with regards to missile tests and planning the management of the 26 000 ha of natural veld, working closely with CapeNature (De Hoop Nature Reserve).

In 2005 he joined Enviroscientific, an independent environmental consultancy specializing in wastewater management, botanical and biodiversity assessments, developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits and was also responsible for helping develop the biodiversity part of the Farming for the Future audit system implemented by Woolworths. During his time with Enviroscientific he performed more than 400 biodiversity and environmental legal compliance audits.

During 2010 he joined EnviroAfrica in order to move back to the biodiversity aspects of environmental management. Experience with EnviroAfrica includes NEMA EIA applications, environmental management plans for various industries, environmental compliance audits, environmental control work as well as more than 70 biodiversity & botanical specialist studies.

Towards the end of 2017, Mr Botes started his own small environmental consulting business focusing on biodiversity & botanical assessments, biodiversity management plans and environmental compliance audits.

Mr. Botes is a registered Professional Botanical, Environmental and Ecological Scientists at SACNASP (South African Council for Natural Scientific Professions) as required in terms of Section 18(1)(a) of the Natural Scientific Professions Act, 2003, since 2005.

DECLARATION OF INDEPENDENCE

THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Petrus, Jacobus, Johannes Botes, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014, as amended, and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 326) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 13 of GN No. R. 326.

Note: The terms of reference must be attached.

Signature of the specialist:

PB Consult (Sole Proprietor)

Name of company:

29 February 2024

Date:

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ABBREVIATIONS

BAR	Basic Assessment Report
CBA	Critical biodiversity area (in terms of the 2017 City of Cape Town Biodiversity Network)
EA	Environmental Authorization (Record of Decision)
EAP	Environmental assessment practitioner
ECO	Environmental Control Officer
EIA	Environmental impact assessment
EMP	Environmental Management Plan or Program
EMS	Environmental management system
EN	Endangered
ESA	Ecological support area (in terms of the 2017 City of Cape Town Biodiversity Network)
LT	Least Threatened
NEMA	National Environmental Management Act, 1998 (Act no. 107 of 1998)
VU	Vulnerable

1. INTRODUCTION

The Swartland Municipality would like to establish a 10 - 20 MW solar photovoltaic facility on a portion of Erf 327 (Malmesbury) to reduce the negative impact of the national energy crisis on the town. The property belongs to the Municipality and is zoned for Agricultural Zone 1. The study area (a portion of Erf 327) is located just southeast of the urban edge of the town of Malmesbury and just more than 130 ha in size. A 20 MW solar facility is expected require around 60 ha of land. The study area is located on a north/northwest facing slope (most desirable for solar radiation) and fairly close to a Municipal 11kV substation. The site is currently used for agriculture (dry land, commercial annual crops & grazing). However, the site is located just east of the Klipkoppie Municipal Nature Reserve and to the south of the Driehoekpad Municipal Nature Reserve. The proposed connecting cable routes might impact on both these reserves.

According to the vegetation map of South Africa (2018), the study area overlaps an area that used to be covered by Swartland Granite Renosterveld (Figure 7), a vegetation type that has been classified as **endangered** in terms of the revised national list of ecosystems that are threatened and in need of protection (2022). The study is located just south of the Diep River (which runs through Malmesbury) and just east of a small unnamed seasonal tributary to the Diep River (which is also the easter boundary of the Klipkoppie Municipal Nature Reserve). Both these river systems have been identified as either ecological support areas or critical biodiversity areas (Western Cape Biodiversity Spatial Plan, 2017). The proposed solar facility will not have a direct impact on these features, but the cable routes might result in an impact.

The site visit confirmed that the study area had been transformed as a result of long term commercial agriculture. Apart from the adjoining river systems (and their associated riparian vegetation) the only botanical features of any significance were the presence of three (3) mature wild olive trees (*Olea europaea*) within the study area.

The DFFE screening report for the proposed site, compiled by EnviroAfrica on the 25th of July 2023 (Appendix 1), identifies the following potential environmental sensitivities:

- The relative Animal species theme sensitivity is considered of **High Sensitivity**;
- The relative Plant species theme sensitivity is considered of **High Sensitivity**;
- The relative Terrestrial Biodiversity theme sensitivity is considered of **Very High Sensitivity**.

A freshwater specialist had been appointed to evaluate the aquatic biodiversity theme (which is also considered **Very Hight Sensitive**).

1.1. LEGISLATION GOVERNING THIS STUDY

This is a specialist report, compiled in terms of:

- The National Environmental Management Act, Ac. 107 of 1998 (NEMA);
- 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 NEMA (Government Notice No. 320 of 20 March 2020).

1.2. TERMS OF REFERENCE

Since the Terrestrial Biodiversity-, the Animal Species- and the Plant Species sensitivities have been identified as high to very high a Terrestrial Biodiversity Assessment or Compliance Statement were required. PB Consult was appointed by EnviroAfrica to perform a site sensitivity verification and a terrestrial biodiversity report.

The terms of reference for this appointment were to:

- Perform a site visit and evaluate the sensitivity of the site in terms of the Biodiversity Protocol for specialist assessment.
- Determine and record the position of any flora or fauna species of special significance (e.g., protected species, or rare or endangered species) that should be avoided or that may require "search & rescue" intervention.
- Locate and record sensitive areas from a terrestrial biodiversity perspective within the proposed development footprint that may be interpreted as obstacles to the proposed development.
- Map a sensitive areas and make recommendations on optimal placement (in terms of minimum environmental impact) of the proposed sand mine.
- Make recommendations on impact minimization where applicable

1.3. ACTIVITY DESCRIPTION

The Swartland Municipality would like to establish a 10-20 MW Solar facility on a of Erf 327, Malmesbury. The footprint of the development is expected to be less than 60 ha.

2. STUDY AREA

2.1. LOCATION & LAYOUT

Malmesbury is the largest town within the Swartland Municipal area, about 65 km north of Cape Town (within the Western Cape Province) (Figure 1). The portion of Erf 327, identified as the study area, is about 130 ha in size and located to the southeast of the urban edge of town, and east of the Klipkoppie Municipal Nature Reserve.

The proposed development will impact on approximately 60 ha of the property (Refer to the red area in Figure 2). Figure 2 gives an overview of the study area (red) and the associated power line routes (yellow) in relation to the town of Malmesbury. It also shows the location of watercourses in close proximity to the proposed development.

Figure 3 shows the location of the two Municipal Nature Reserves that might be impacted by the proposed development powerline routes. However, the powerlines routes were chosen to follow existing roads in order to minimise the impact on intact vegetation.

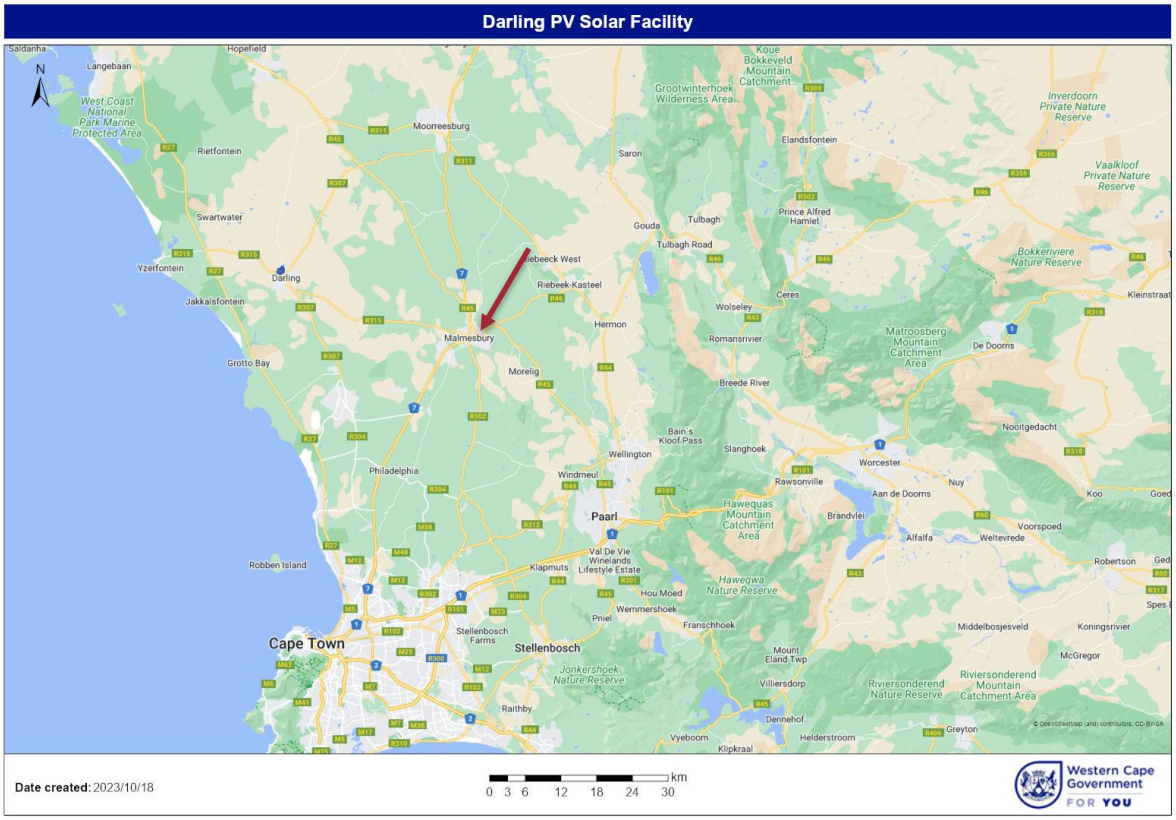

Figure 1: A map showing the location of the town of Malmesbury in the Western Cape Province

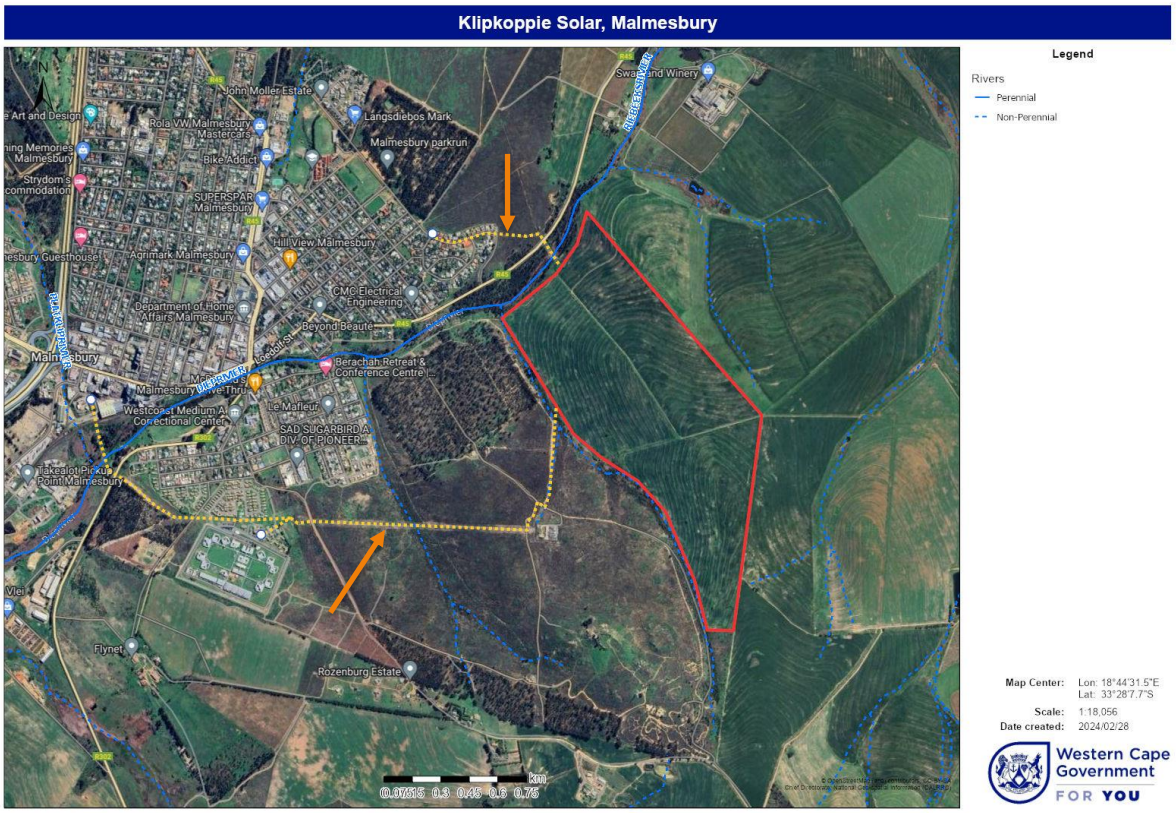

Figure 2: CapeFarmMapper image showing the location of the study area (red) and the power line routs (yellow dotted-lines, marked by arrows).

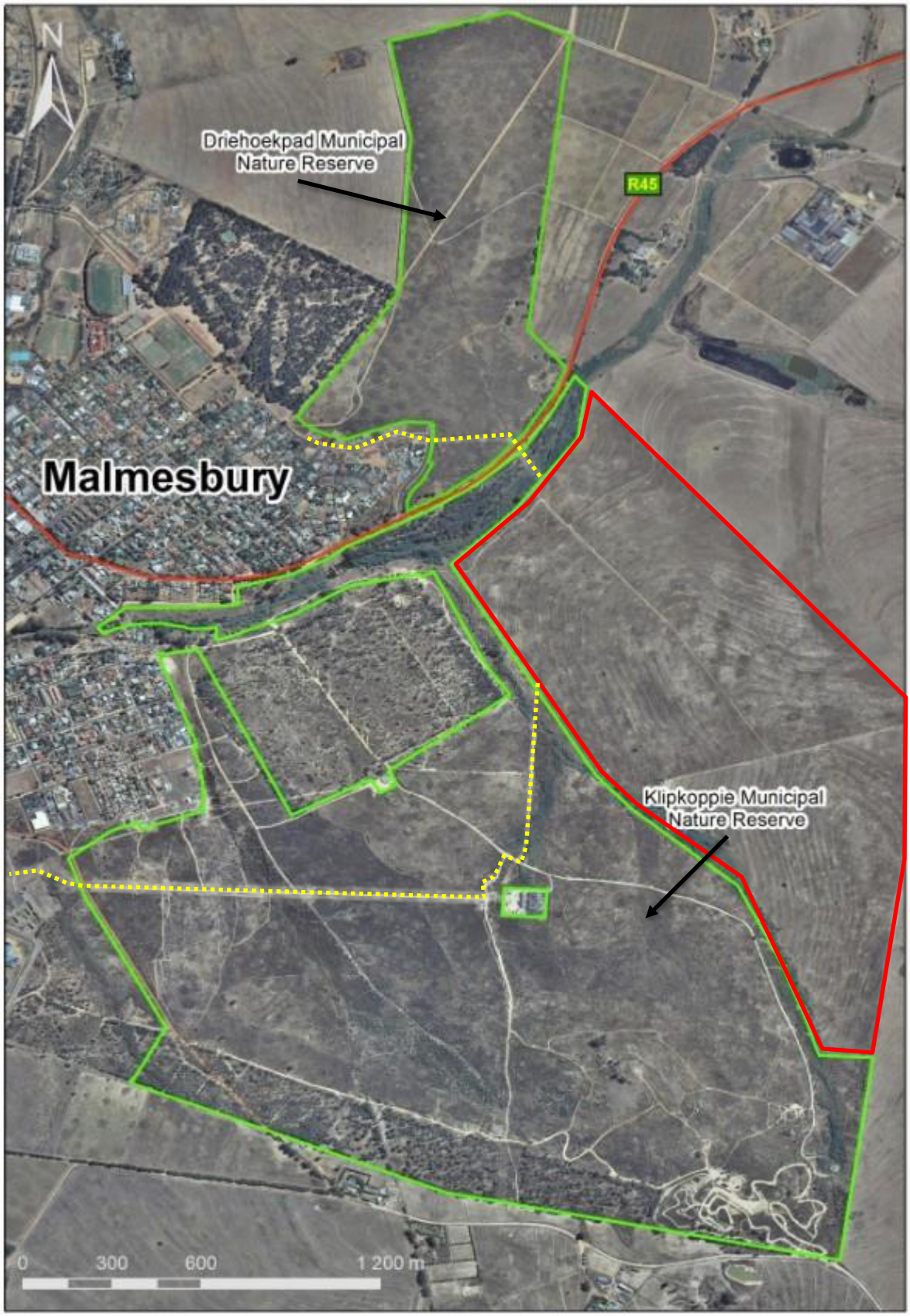

Figure 3: An image showing the study area (red) the proposed powerline routes (yellow dotted lines) in relation to the Klipkoppie- and Driehoekpad Municipal Nature Reserves (Source: EOH Coastal & Environmental Services, June 2018).

2.2. CRITICAL BIODIVERSITY AREAS MAPS

The 2017 Western Cape Biodiversity Spatial Plan (WCBSP) includes a map of biodiversity importance for the entire province, covering both the terrestrial and freshwater realms, as well as major coastal and estuarine habitats (Pool-Stanvliet, 2017). The WCBSP is the product of a systematic biodiversity plan that delineates, on a map, Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which require safeguarding to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services (CapeNature, 2017).

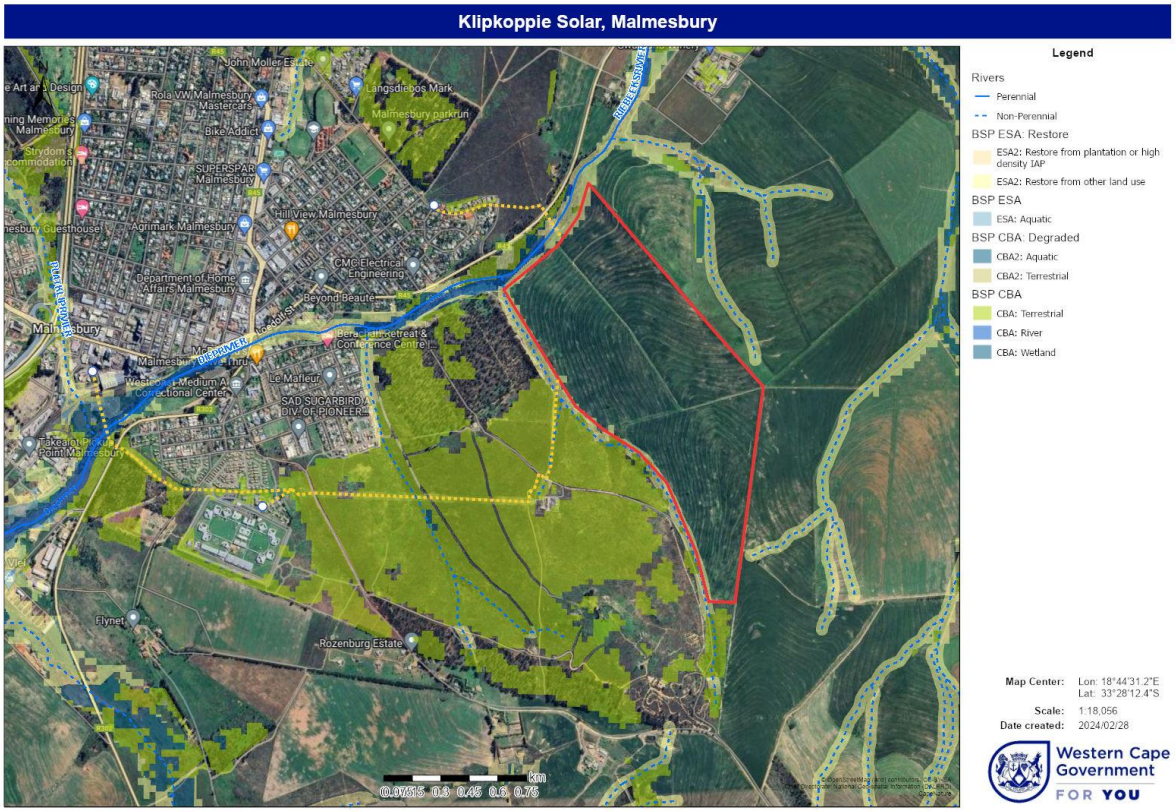

Figure 4: Western Cape Biodiversity Spatial Plan (2017) showing the study area and associated critical biodiversity areas (CapeFarmMapper).

According to the 2017, Western Cape Biodiversity Spatial Plan (WCBSP) the study area might impact on ecological support areas (ESA 2) and critical biodiversity areas (CBA 1) associated with the Diep River and its seasonal tributary (west of the study area) (Figure 4) (CapeNature, 2017).

The proposed cable routes will impact on the Klipkoppie Municipal Nature Reserve (a CBA 1) to the west of the study area and the Driehoekpad Municipal Nature Reserve to the north of the study area. Both routes might also impact on the CBA's and ESA's associated with the water courses (Figure 4) (CapeNature, 2017).

2.3. LANDUSE

According to the 2020, DEA Land Cover (9-class) map of South Africa, the study area is considered cultivated land used for the cultivation of commercial annual crops on drylands (Refer to Figure 5). This was confirmed by the site visit. It also confirmed that the study area does not support any remaining natural veld of any consequence. The only botanical features of any significance were the presence of three (3) mature wild olive trees (*Olea europaea*) within the study area.

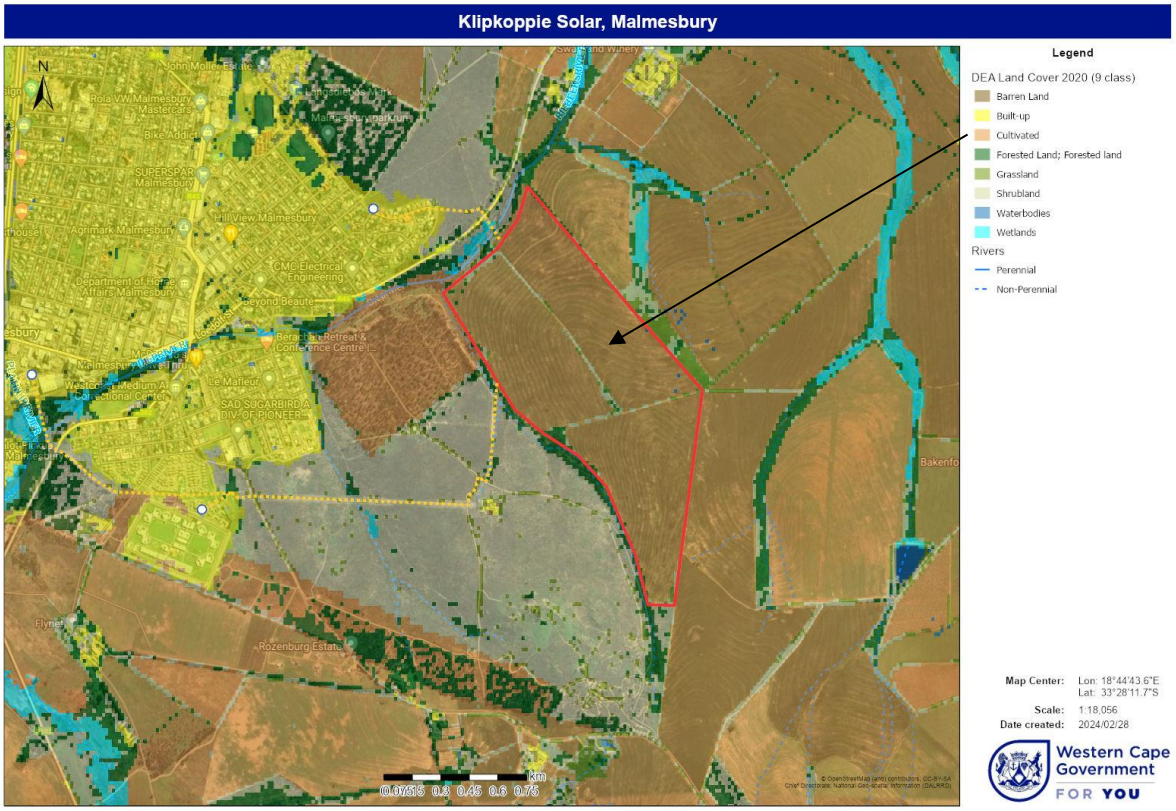

Figure 5: Land Cover 9-class (DEA, 2020) showing the expected land cover within the study area.

3. APPROACH & METHODOLOGY

The protocol for specialist assessment and minimum report content and requirements for environmental impacts on terrestrial biodiversity was published in GN. No. 320 of 20 March 2020. It includes the requirements for a desktop analysis and site verification.

3.1. DESKTOP ANALYSIS

The first step of the study was to conduct a desktop analysis of the study area and its immediate surroundings. Using the DFFE screening tool report as basis, spatial information from online databases such as SANBI BGIS and Google Earth were used to evaluate the site in terms of vegetation, obvious differences in landscape (e.g., variations in soil type, rocky outcrops etc.) or vegetation densities , which might indicate differences in plant community or species composition, critical biodiversity areas and other terrestrial biodiversity features as identified in the screening tool.

This information was used to prepare a study area map, which is used as a reference during the physical site visit. Plant species lists were prepared, and species of special significance were flagged.

3.2. SITE SENSITIVITY VERIFICATION

The fieldwork for project was carried out on the 21st of November 2023. The site survey was conducted over a 4-hour period, by walking and driving the site and sampling the vegetation, using a modified approach, based on the Braun-Blanquet vegetation survey method (Werger, 1974).

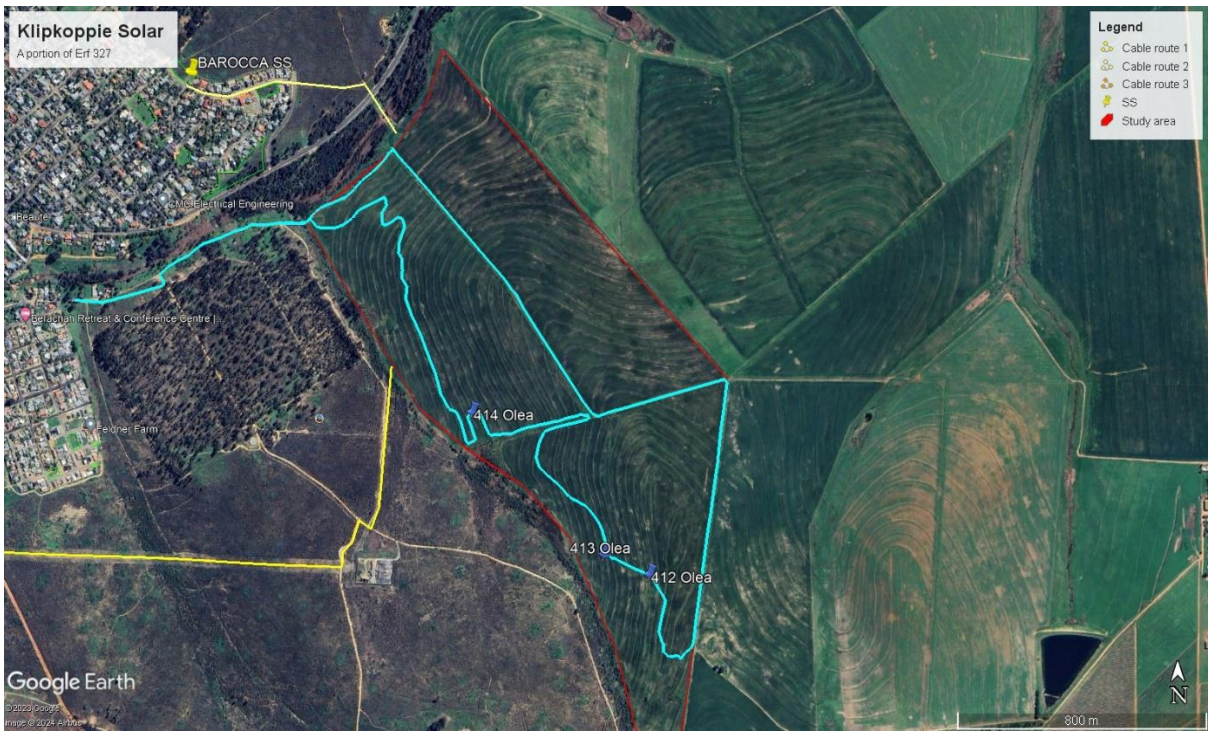

Figure 6: Google overview, showing the study area and the site verification routes used as well as the location of the *Olea* trees.

Protected or other special plants and any terrestrial feature of significance was, marked by waypoints

and/or on the study map, and photographed (Figure 6). A hand-held Garmin GPSMAP 62s was used to track the sampling route and for recording waypoints. During the survey notes, and photographic records were collected. All efforts were made to ensure that any variation in vegetation or soil condition, which might indicate special botanical features (e.g., rocky outcrops, watercourses or heuweltjies), were visited. Efforts was also made to ensure that the plant species list was as complete as possible.

3.3. LIMITATIONS, ASSUMPTIONS AND UNCERTAINTIES

The findings are based on a one-day site visit (not long-term repetitive sampling), which means that it is likely that some species might have been missed. However, the site was transformed as a result of past and present agricultural practices. The only indigenous species were either weedy or associated with the remaining (although degraded) vegetation along the watercourses. It was still very clear that in terms of botanical status, most of the study area had been transformed. The few remaining indigenous species were identifiable and a good understanding of the status of the vegetation and plant species in the study areas were obtained. Confidence in the findings are high. There should be no limiting factors which could significantly alter the outcome of this study (especially since the site is basically transformed). It is unlikely that a full botanical assessment will result in any additional findings that would have a significant impact on the outcome.

3.4. IMPACT ASSESSMENT METHOD

The concept of environmental impact assessment in terms of the National Environmental Management Act, Act 107 of 1998 (NEMA) and the Environmental Impact Assessment (EIA) was developed to identify and evaluate the nature of potential impact to determine whether an activity is likely to cause significant environmental impact on the environment. The concept of significance is at the core of impact identification, evaluation and decision making, but despite this the concept of significance and the method used for determining significance remains largely undefined and open to interpretation (DEAT, 2002).

The objective of this study was to evaluate the remaining biodiversity of the study area to identify significant environmental features which might be impacted by of the proposed activity. The Ecosystem Guidelines for Environmental Assessment (De Villiers *et. al*., 2005), were used to evaluate the botanical significance of the property with emphasis on:

- Significant ecosystems
    - Threatened or protected ecosystems
    - Special habitats
    - Corridors and or conservancy networks
- Significant species
    - Threatened or endangered species
    - Protected species.

3.4.1. DETERMINING SIGNIFICANCE

Determining impact significance from predictions of the nature of the impact has been a source of debate and will remain a source of debate. The author used a combination of scaling and weighting methods to determine significance based on a simple formula. The formula used is based on the method proposed by Edwards (2011). However, the criteria used were adjusted to suite its use for botanical assessment. In this document significance rating was evaluated using the following criteria.

Significance = Conservation Value x (Likelihood + Duration + Extent + Severity) (Edwards 2011)

3.4.2. CRITERIA USED

***Conservation value*:** Conservation value refers to the intrinsic value of an attribute (e.g., an ecosystem, a vegetation type, a natural feature or a species) or its relative importance towards the conservation of an ecosystem or species or even natural aesthetics. Conservation status is based on habitat function, its vulnerability to loss and fragmentation or its value in terms of the protection of habitat or species (Refer to Table 1 for categories used).

Likelihood refers to the probability of the specific impact occurring because of the proposed activity (Refer to Table 2, for categories used).

Duration refers to the length in time during which the activity is expected to impact on the environment (Refer to Table 3).

Extent refers to the spatial area that is likely to be impacted or over which the impact will have influence, should it occur (Refer to Table 4).

Severity refers to the direct physical or biophysical impact of the activity on the surrounding environment should it occur (Refer to Table 5).

Table 1: Categories used for evaluating conservation status.

CONSERVATION VALUE	
Low (1)	The attribute is transformed, degraded not sensitive (e.g. Least threatened), with unlikely possibility of species loss.
Medium/low (2)	The attribute is in good condition but not sensitive (e.g. Least threatened), with unlikely possibility of species loss.
Medium (3)	The attribute is in good condition, considered vulnerable (threatened), or falls within an ecological support area or a critical biodiversity area, but with unlikely possibility of species loss.
Medium/high (4)	The attribute is considered endangered or, falls within an ecological support area or a critical biodiversity area, or provides core habitat for endemic or rare & endangered species.
High (5)	The attribute is considered critically endangered or is part of a proclaimed provincial or national protected area.

Table 2: Categories used for evaluating likelihood.

LIKELIHOOD	
Highly Unlikely (1)	Under normal circumstances it is almost certain that the impact will not occur.
Unlikely (2)	The possibility of the impact occurring is very low, but there is a small likelihood under normal circumstances.
Possible (3)	The likelihood of the impact occurring, under normal circumstances is 50/50, it may or it may not occur.
Probable (4)	It is very likely that the impact will occur under normal circumstances.
Certain (5)	The proposed activity is of such a nature that it is certain that the impact will occur under normal circumstances.

Table 3: Categories used for evaluating duration.

DURATION	
Short (1)	Impact is temporary and easily reversible through natural process or with mitigation. Rehabilitation time is expected to be short (1-2 years).
Medium/short (2)	Impact is temporary and reversible through natural process or with mitigation. Rehabilitation time is expected to be relative short (2-5 years).
Medium (3)	Impact is medium-term and reversible with mitigation but will last for some time after construction and may require ongoing mitigation. Rehabilitation time is expected to be longer (5-15 years).
Long (4)	Impact is long-term and reversible but only with long term mitigation. It will last for a long time after construction and is likely to require ongoing mitigation. Rehabilitation time is expected to be longer (15-50 years).
Permanent (5)	The impact is expected to be permanent.

Table 4: Categories used for evaluating extent.

EXTENT	
Site (1)	Under normal circumstances the impact will be contained within the construction footprint.
Property (2)	Under normal circumstances the impact might extent outside of the construction site (e.g., within a 2 km radius), but will not affect surrounding properties.
Surrounding properties (3)	Under normal circumstances the impact might extent outside of the property boundaries and will affect surrounding landowners or –users, but still within the local area (e.g., within a 50 km radius).
Regional (4)	Under normal circumstances the impact might extent to the surrounding region (e.g., within a 200 km radius), and will impact on landowners in the larger region (not only surrounding the site).
Provincial (5)	Under normal circumstances the effects of the impact might extent to a large geographical area (>200 km radius).

Table 5: Categories used for evaluating severity.

SEVERITY	
Low (1)	It is expected that the impact will have little or no affect (barely perceptible) on the integrity of the surrounding environment. Rehabilitation not needed or easily achieved.
Medium/low (2)	It is expected that the impact will have a perceptible impact on the surrounding environment, but it will maintain its function, even if slightly modified (overall integrity not compromised). Rehabilitation easily achieved.
Medium (3)	It is expected that the impact will have an impact on the surrounding environment, but it will maintain its function, even if moderately modified (overall integrity not compromised). Rehabilitation easily achieved.
Medium/high (4)	It is expected that the impact will have a severe impact on the surrounding environment. Functioning may be severely impaired and may temporarily cease. Rehabilitation will be needed to restore system integrity.
High (5)	It is expected that the impact will have a very severe to permanent impact on the surrounding environment. Functioning irreversibly impaired. Rehabilitation often impossible or unfeasible due to cost.

3.4.3. SIGNIFICANCE CATEGORIES

The formal NEMA EIA application process was developed to assess the significance of impacts on the surrounding environment (including socio-economic factors), associated with any specific development proposal to allow the competent authority to make informed decisions. Specialist studies must advise the environmental assessment practitioner (EAP) on the significance of impacts in his field of specialty. To do this, the specialist must identify all potentially significant environmental impacts, predict the nature of the impact, and evaluate the significance of that impact should it occur.

Potential significant impacts are evaluated, using the method described above, to determine its potential significance. The potential significance is then described in terms of the categories given in Table 6. Mitigation options are evaluated, and comparison is then made (using the same method) of potential significance before mitigation and potential significance after mitigation (to advise the EAP).

Table 6: Categories used to describe significance rating (adjusted from DEAT, 2002)

SIGNIFICANCE	DESCRIPTION
Insignificant or Positive (4-22)	There is no impact, or the impact is insignificant in scale or magnitude because of low sensitivity to change or low intrinsic value of the site, or the impact may be positive.
Low (23-36)	An impact barely noticeable in scale or magnitude because of low sensitivity to change or low intrinsic value of the site or will be of very short-term or is unlikely to occur. Impact is unlikely to have any real effect and no or little mitigation is required.
Medium Low (37-45)	Impact is of a low order and therefore likely to have little real effect. Mitigation is easily achieved. Social, cultural, and economic activities can continue unchanged, or impacts may have medium to short term effects on the social and/or natural environment within site boundaries.
Medium (46-55)	Impact is real, but not substantial. Mitigation is both feasible and easily possible but may require modification of the project design or layout. Social, cultural, and economic activities of communities may be impacted, but can continue (albeit in a different form). These impacts will usually result in medium to long term effect on the social and/or natural environment, within site boundary.
Medium high (56-63)	Impact is real, substantial, and undesirable, but mitigation is feasible. Modification of the project design or layout may be required. Social, cultural, and economic activities may be impacted, but can continue (albeit in a different form). These impacts will usually result in medium to long-term effect on the social and/or natural environment, beyond site boundary within local area.
High (64-79)	An impact of high order. Mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural, and economic activities of communities are disrupted and may come to a halt. These impacts will usually result in long-term change to the social and/or natural environment, beyond site boundaries, regional or widespread.
Unacceptable (80-100)	An impact of the highest order possible. There is no possible mitigation that could offset the impact. Social, cultural, and economic activities of communities are disrupted to such an extent that these come to a halt. The impact will result in permanent change. Very often these impacts are un-mitigatable and usually result in very severe effects, beyond site boundaries, national or international.

4. THE VEGETATION

According to the South African vegetation map (2018) (Mucina & Rutherford, 2006), the study area would originally have been covered by Swartland Granite Renosterveld (Figure 7). **Swartland Granite Renosterveld** is considered "**endangered**" (having experienced extensive spatial decline of approximately 83% since 1750, with high rates of habitat loss since 1990, with ongoing biotic disruption from invasive species and overgrazing), in terms of the "*Revised List of ecosystems that are threatened and in need of protection*" (GN 2747 of 18 November 2022), promulgated in terms of the National Environmental Management Biodiversity Act, Act 10 of 2004.

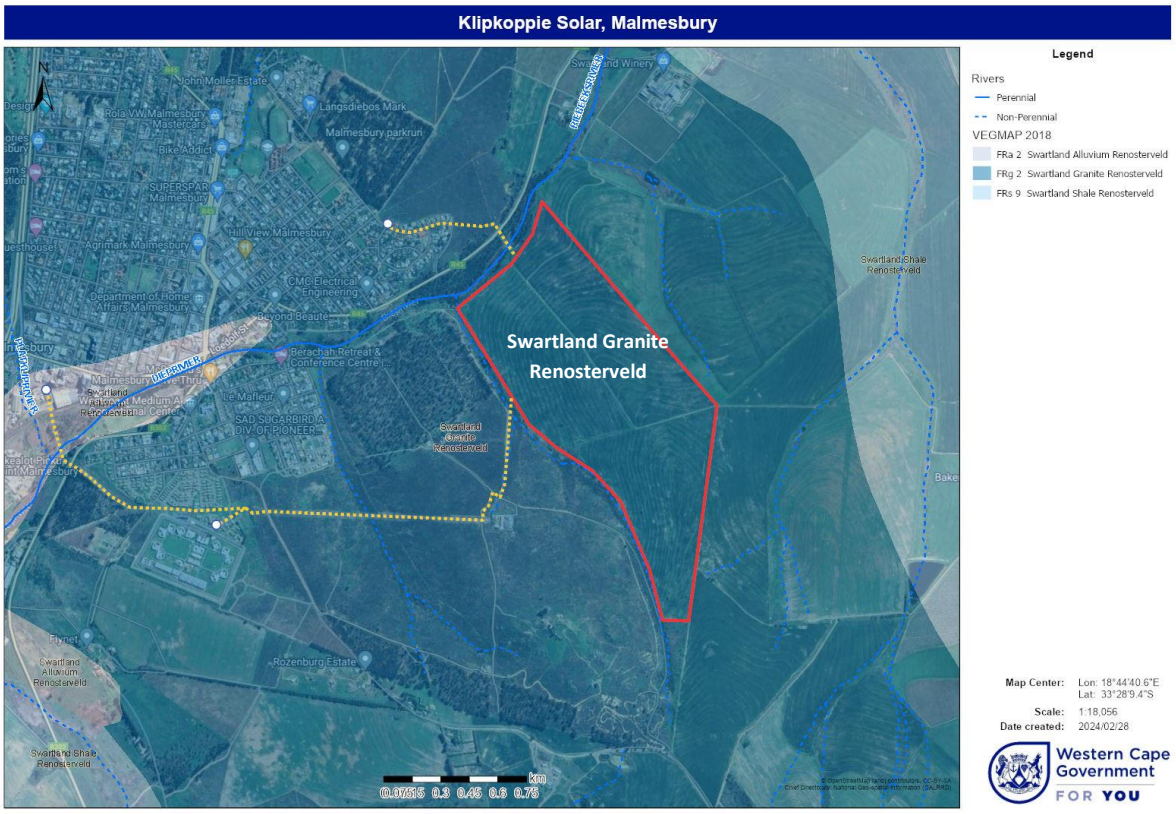

Figure 7: Vegetation map of South Africa (2018), showing the expected vegetation in the vicinity of the footprint.

Mucina & Rutherford (2006) describe Swartland Granite Renosterveld as a mosaic of grasslands/herblands and medium dense, microphyllous shrublands dominated by renosterbos, with groups of small trees and tall shrubs associated with heuweltjies and rock outcrops, occurring on undulating plains and moderate foot slopes of the mountains.

4.1. THE VEGETATION IN CONTEXT

Due to its relatively flat topography, fertile soils, and proximity to Cape Town, the Swartland became established as a wheat-growing area around the mid-1700s. In the late 1800s, when gold and diamonds were discovered upcountry, farming in the region expanded significantly. During this time the Swartland became an almost uninterrupted agricultural area. Renosterveld is a part of the Fynbos Biome but does not include the three major families that typify Fynbos. Proteaceae, Ericaceae and

Restionaceae are rarely present or entirely absent.

Renosterveld has long been the least understood component of the Fynbos Biome, with very little known of its functioning and ecological requirements. It is, however becoming increasingly appreciated for its uniqueness and high species diversity, especially geophytes (Jacobs & Jangle, 2008). Four of the 30 recognized types of renosterveld occur in the Swartland, namely Swartland Shale, Granite, Silcrete and Alluvium Renosterveld. Three of these types are classified as Critically Endangered and the fourth as Vulnerable. The South African Red List (2020) states that Swartland Shale Renosterveld contains the highest concentration of threatened plant species: 214 species in total, 25 of which are endemic to this vegetation type. Historically, Swartland Granite Renosterveld was next most widespread vegetation type in the Swartland. A very prominent feature of Swartland renosterveld is its heuweltjies (earth mounds). These are the distinctive circular patches or 'spots' in the veld that give the Tygerberg its name (Mucina & Rutherford, 2006). The formation these *heuweltjies* is attributed to harvester termites (Van Wyk & Smith, 2001). . These patches are subject to constant disturbance by termites and their predators, and the on-going transportation of plant material by termites to the *heuweltjies* results in nutrient enrichment mounds (Mucina & Rutherford, 2006).

Swartland Granite Renosterveld occurs on sandy to loamy soils delivered from Cape Granite and can retain a considerable amount of moisture during the winter and spring. Almost 80% of this vegetation type had been transformed due to agriculture (it being prime quality land) and by urban sprawl. Hence the conservation target of 26% remains unattainable. Only very small portions (0.5%) enjoy statutory protection. Alien grasses are particularly pervasive, the most important being *Lolium multiflorum*, *Avena fatua* and *Bromus diandrus*. Alien woody species include *Acacia saligna*, *Pinus pinaster* as well as various species of *Eucalyptus* (Cape E-news, 10-07-2018).

A further important threat to biodiversity conservation in lowland vegetation is invasive alien species. The Core Cape Floristic Subregion is particularly susceptible to invasion by alien trees, mostly species of Australian *Acacia*, Hakea and *Eucalyptus*, and pines from the Northern Hemisphere. Many of these trees are considered ecosystem transformers as they out-compete the indigenous vegetation and alter ecosystem processes, such as nutrient cycling, fire, and the hydrological regime.

4.2. VEGETATION ENCOUNTERED

The site visit confirmed that the study area had been transformed as a result cultivation practices over a long period of time. No remaining natural veld of any significance remains anywhere within the study area. The whole site still shows signs of recent cultivation together and is covered with crop remains or weedy species (including patches of the indigenous weed, *Galenia africana* (often a disturbance indicator species) (Photo 1 to Photo 9). The only plant species of any significance within the study area were 3 mature wild olive trees (*Olea europaea*) (Photo 8 & Photo 9). It is common knowledge that Renosterveld, once cultivated, will not restore itself for many generations (if ever). In this case the indigenous vegetation had been transformed a result of agriculture and associated activities. Within or on the disturbed border of the Diep River to the north of the site a few other hardy indigenous species were also observed, such as *Anthanasia trifurcata*, *Aspalathus acuminata, Eriocephalus africanus, Maytenus oleoides* and *Searsia undulata* were occasionally observed within the dense stands of alien invasive trees (outside of the footprint area) (Photo 10).

Photo 1: A typical view of the vegetation encountered within the western portion of the study area (looking from east to west). Note the patches of *Galenia africana* within the stubble.

Photo 2: Another typical view of the vegetation encountered (looking from south to north). The top half of the site can be seen in the background to the left. To the right the Klipkoppie Municipal Nature Reserve can be seen (the vegetated area).

Photo 3: Looking from the middle of the site in a southeasterly direction over the eastern half of the study area (clearly showing the effects of continuous agriculture).

Photo 4: Looking from northeast to southwest over the lower portion of the site. Kraalbos (*Galenia africana*) again visible as patches within the stubble.

Photo 5: Looking from southeast to northwest over the top part of the study area. The effects of agriculture again clearly visible.

Photo 6: Looking from east to west onto the seasonal tributary of the Diep River, which forms the eastern boundary of the Klipkoppie Municipal NR.

Photo 7: Looking west over the top part of the study area, onto the Klipkoppie Municipal NR (in the background). Note the effects of agriculture in the foreground (the study area).

Photo 8: Looking down onto the study area (southeast to northwest) from the top section of the study area towards Malmesbury. The location of the 3 wild olive trees (*Olea europaea*) are marked with arrows.

Photo 9: A photo of one of the 3 wild olive trees observed.

Underneath and protected by the *Olea europaea* trees, *Lycium ferocissimum* and occasionally *Searsia undulata* individuals were encountered (both hardy indigenous species).

Photo 10: A photo of the remaining riparian vegetation along the Diep River (which is slightly away from the northern boundary of the study area).

4.3. FLORA ENCOUNTERED

Table 7 gives a list of the plant species encountered in the study area. It is important to note that the species list is based on a one-day site visit, and the focus was on the evaluation of the vegetation status more than a full botanical assessment. However, the author took care to look for potential significant species (e.g., protected- and rare or endangered species) that might be located within this vegetation type (most of the weedy alien species were not listed). No red-listed plants or any other protected plant species were observed.

Table 7: List of plant species observed within the proposed development footprint.

NO.	SPECIES NAME	FAMILY	STATUS	LOCATION
1.	*Aspalathus acuminata*	FABACEAE	LC	Medium/Large thorny shrub – only on the outer edges of the site.
2.	*Echium vulgare*	BORAGINACEAE	Naturalised weed	Occasionally observed.
3.	*Eriocephalus africanus*	ASTERACEAE	LC	Herbaceous herb, only on the lower outer edges of the site
4.	*Anthanasia trifurcata*	ASTERACEAE	LC	Medium herb, within the riparian zone and lower outer edges.
5.	*Galenia africana*	AIZOACEAE	LC	A weedy herb, often used as a disturbance indicator species.

NO.	SPECIES NAME	FAMILY	STATUS	LOCATION
6.	*Lycium ferocissimum*	SOLANACEAE	LC	Hardy shrub occasionally observed underneath wild olive trees.
7.	*Maytenus oleoides*	CELASTRACEAE	LC	Small tree only observed within the Diep River riparian zone.
8.	*Searsia undulata*	ANACARDACEAE	LC	A medium to large shrub, occasionally under wild olive.

4.4. THREATENED AND PROTECTED PLANT SPECIES

South Africa has become the first country to fully assess the status of its entire flora. Major threats to the South African flora are identified in terms of the number of plant taxa Red-Listed as threatened with extinction as a result of threats like, habitat loss (e.g. infrastructure development, urban expansion, crop cultivation and mines), invasive alien plant infestation (e.g. outcompeting indigenous plant species), habitat degradation (e.g. overgrazing, inappropriate fire management etc.), unsustainable harvesting, demographic factors, pollution, loss of pollinators or dispersers, climate change and natural disasters (e.g. such as droughts and floods). South Africa uses the internationally endorsed IUCN Red List Categories and Criteria in the Red List of South African plants. However, due to its strong focus on determining risk of extinction, the IUCN system does not highlight species that are at low risk of extinction but may nonetheless be of high conservation importance. As a result, a SANBI uses an amended system of categories to highlight species that may be of low risk of extinction but are still of conservation concern (SANBI, 2015).

Red list of South African plant species: The Red List of South African Plants online provides up to date information on the national conservation status of South Africa's indigenous plants (SANBI, 2020).

- No red-listed species was observed during the study.

NEM:BA protected plant species: The National Environmental Management: Biodiversity Act, Act 10 of 2004, provides for the protection of species through the "Lists of endangered, endangered, vulnerable and protected species" (GN. R. 152 of 23 February 2007).

- No species protected in terms of NEM: BA was observed.

NFA Protected plant species: The National Forests Act (NFA) of 1998 (Act 84 of 1998) provides for the protection of forests as well as specific tree species (as updated).

- No species protected in terms of the NFA was observed.

4.5. PLANT SPECIES SENSITIVITY THEME

According to the DFFE screening tool report for this project (Refer to Appendix 1), the relative plant species sensitivity is considered High Sensitivite, because the study area might touch or overlap sensitive areas. The original vegetation type is classified as endangered and specifically because of the potential that quite an extensive number of sensitive plants might occur in this area (or is known

to have a distribution within the broader area or this vegetation type). A list of these plants is given within the screening report from Page 16 to 19 (Appendix 1). The list includes a number of unnamed Sensitive species. The names of these species were requested through a Eiadatarequest (email eiadatarequests@sanbi.org.za). The list includes several plants from the following plant taxa: *Babiana*, *Gladiolus*, *Moraea*, *Pelargonium*, *Eriospermum*, *Disa Othonna* and *Lachenalia*.

The study area had been under cultivation (dry-land commercial annual crops) over a long period of time and the veld transformed. Only a few hardy or indigenous pioneer species managed to survive the continual impact of agriculture and altered fire regimes. None of the species listed in the screening report were observed.

Because of the degraded state of the study area, it is considered unlikely that the proposed solar facility will result in any significant impact on the plant species sensitivity theme. As a result, the Plant Species theme for this study area is should be rated as **Low Sensitive**.

5. FAUNA AND AVI-FAUNA

No fauna or avi-fauna screening was done as part of this study, but observations were made during the site visit. The property has been under intensively cultivation (dry-land commercial crops & livestock grazing) over a long period of time and also falls within an area with a long history of intensive cultivation. The watercourse to the north of the study area are heavily degraded as a result of invasive alien infestation degraded and was probably ploughed as part of the agricultural fields in the past). The upper parts of the watercourse to the west of the study area (the eastern boundary of the Klipkoppie Municipal NR) is in a much better condition, but the lower parts have also been degraded as a result of the impact of alien invasive plantations the lower slopes of the Klipkoppie area.

5.1. ANIMAL SPECIES THEME SENSITIVITY

Historically it is expected that large mammals such as Mountain Zebra, Quagga, Bluebuck, Red Hartebeest, Eland, Bontebok, Elephant, Black Rhino, Buffalo, Lion, Cheetah, Wild Dog, Spotted Hyena and Leopard were common in the Western Cape (although probably not in large numbers). Of these large mammals, only the Mountain Zebra and Leopard survived (by fleeing to the mountains), with the Zebra and Bontebok just surviving near Bredasdorp (or within reserves). All the other species became extinct in the Fynbos Biome, although many have been re-introduced into conservation areas from outside the region. The Quagga and Bluebuck are now extinct (www.inaturalist.org/posts/13033-renosterveld).

Smaller mammals common to the Western Cape are chacma baboons, klipspringers, grysbok, dassies, mongooses, cape dune mule-rat and the striped mouse. Fynbos also does not support high numbers of birds, but all six bird species endemic to the south-west Cape are fynbos species, e.g. the Cape sugarbird and orange breasted sunbird. These two birds are found only in fynbos and play an important role in pollinating flowers, including those of heaths (erica's) and proteas. Another very common sunbird frequenting the fynbos biome, is the lesser double collared sunbird. On the other hand, Fynbos supports large numbers of butterfly species, many of which, are now at risk, especially the myrmecophilous (ant associated) butterflies from the family Lycaenidae. The early stages (larvae)

of many of these butterfly species are entirely carnivorous and live on a diet of ant brood. The butterfly larvae live inside the nest of their host ant. Myrmecophilous butterflies require the presence of both host ant and host plant as well as optimal climatic conditions. The disturbance of their preferred habitat (often small areas) could lead to the extinction of a rare species confined to a single location. Although fynbos is not particularly rich in reptiles and amphibians, many of the species living there are both endemic and threatened. The very rare geometric tortoise is found in only a few surviving fynbos areas and is regarded as the world's second rarest tortoise. The Cape has more than half of South Africa's frog species. Furthermore, of the 62 different frogs occurring here, 29 are endemic being found nowhere else on earth. The Table Mountain ghost frog lives only in the mountain's fast-flowing rocky streams. The tiny micro frog and Cape platanna are restricted to a few surviving vleis in the south-west Cape (https://whalecoast.info/attraction/animals-living-in-fynbos/).

According to the **NEMA EIA Sensitivity** scan for the site (Appendix 1) the Animal Species Theme Sensitivity is High Sensitive because of the potential presence of the species listed in the Table below (Table 8).

Table 8: Animal species theme according to the NEMA EIA Sensitivity Scan results.

FEATURES	MOTIVATION
Aves – **High/Medium** *Circus maurus* (Black Harrier) **Endangered (EN)**	**Status:** The Black harrier is an endangered bird and one of southern Africa's rarest endemic raptors (Birdlife International, 2023). **Habitat:** It favours Renosterveld, short Fynbos and Karoo habitat, where it breeds in shallow nests on the ground. These birds are mostly associated with larger, well-connected, and more pristine patches of veld and is often considered an indicator of well-preserved natural veld (Curtis-Scott *et. al.*, 2020). The proposed project will impact on transformed veld (transformed) with almost no natural vegetation left. The disturbed veld and the proximity to constant anthropogenic activities will not be favored as nesting sites as it will not provide protection and camouflage for its young. The black harrier might hunt over this area (although even this is unlikely, since most of the area is characterized by intensive cultivation), but it is unlikely to roost or breed in this area. As a result, it is considered highly unlikely that the proposed development will result in any significant additional impact on the breeding or feeding patterns of these birds. With regards to the is project the sensitivity rating is considered **low sensitive**.
Aves – **High/Medium** *Sagittarius serpentarius* (Secretary bird) **Vulnerable (VU)**	**Status**: The secretary bird is considered **vulnerable** because of population size reduction of greater than 30% over the past 10 years. The cause for this reduction is not fully understood and may not be reversible (Retief, 2015). This species is widespread throughout sub-Saharan Africa (Ferguson-Lees & Christie, 2001), except the extreme deserts of the Namib coast and the forested region around the equator in western Africa. Secretary birds are not migratory but are highly mobile. Young birds in particular can undertake extensive and often rapid movements, primarily in arid areas (Boshoff & Allan, 1997; Herholdt & Anderson 2006). Habitat loss, driven by agriculture and urban development, is the primary threat to this species. Excessive burning and overgrazing of grasslands for livestock may reduce carrying capacity and availability of prey species (Parker 1994). Secretary birds suffer mortalities through collisions with powerlines (Hartley 1991) and there is a risk in South Africa that wind farms might have a negative impact on this species. **Habitat**: These birds hunt exclusively on the ground, either alone or in pairs and prefers open savannahs or grasslands and are common near agricultural areas.

FEATURES	MOTIVATION
	It is not unlikely that the Secretary bird may hunt over the study area (and surroundings) and the development may result in a small impact on its hunting area but is unlikely to impact on roosting or nesting areas. However, most of the surrounding landscape to the south is still remaining agricultural land (the impact will thus be low). With regards to this project the sensitivity rating is considered **Low Sensitive**.
Invertebrate – **Medium** *Pachysoma aesculapius* (Scarab dung beetle) **Vulnerable (VU)**	**Status & Distribution**: This beetle is part of the scarab beetle family and is listed as **vulnerable** by IUCN (Davis, 2013). However, as most of the historical distribution range of this species is within modified or developing coastline. Since it is unsure if this species is present in the in the West Coast National Park it must be regarded as the most threatened South African Pachysoma species (Harrison et.al., 2003). According to Harrison et. al., 2003, this beetle, historically, could be found from Cape Town to the mouth of the Olifants River (which might be the barrier to the northwards extension of its distribution. The southern populations (Somerset West, Cape Flats, Salt River) material only dated from between 1882 to 1886 and are possibly now extinct (the most recent collection in the south is from the Modder River in 1987, which runs to the north of Grotto Bay). The West Coast National Park is the closest conservation area for this species, with a single record from the 1960's (which remains unconfirmed). **Habitat**: This species of beetle appears to prefer firm sands on coastal hummocks, riverbanks and vegetated dunes (Harrison *et. al.,* 2003). According to the IUCN red list database's geographical range, the study area might fall within the potential historical distribution range for this species. The most recent southern observation of this species was made at the Modder River, which is far to the northwest and nearer to the coast. The study area is not near the coastal domain and the site itself is significantly degraded/transformed. According to Davis (2013) it is presumed locally extinct in the southernmost part of its known range. As a result, is considered highly unlikely that the proposed project will have any significant additional impact on the survival or distribution of this species. With regards to this project the sensitivity rating is considered to be **Low sensitive**.
Invertebrate – **Medium** *Aneuryphymus montanus* (Yellow-winged Agile Grasshopper) **Vulnerable (VU)**	**Status**: The Yellow-winged Agile Grasshopper is a **vulnerable** endemic to the Cape region of South Africa. The continuing decline in the quality of habitat have resulted in a continuing decline in the number of mature individuals inferred. It is only known from six localities in the Cape region of South Africa (Hochkirch *et. al.*, 2018). **Habitat**: The species is associated with fynbos vegetation, where it has been collected "amongst partly burnt stands of evergreen sclerophyllous plants in rocky foothills" (Brown, 1960 in Hochkirch *et.al.*, 2018). It prefers south-facing cool slopes (Kinvig, 2005 in Hochkirch *et.al*., 2018). The study area is located on north-facing sandy hill transformed as a result of agriculture that does not support the preferred habitat for this species. It is considered highly unlikely that the development will result in any additional impact on the survival of this species. With regards to the is project the sensitivity rating should be **low sensitive**.

6. TERRESTRIAL BIODIVERSITY THEME SENSITIVITY

The proposed project entails the establishment of a Solar PV facility (maximum footprint of 60 ha) within an area that used to be covered by Swartland Granite Renosterveld (Figure 7), an **endangered** vegetation type.

The site verification confirmed that the study had been subject to agriculture (dry-land commercial annual crops) over a long period of time. The vegetation within the study area can now be described as transformed in terms of botanical sensitivity (renosterveld does not restore itself, once cultivated).

The watercourses to the north (Diep River) and the seasonal tributary to the west of the study area, will not be impacted by the proposed solar facility (but potentially by the powerline routes). The powerlines will also impact on ecological support areas (ESA 2) and critical biodiversity areas (CBA 1) associated with these watercourses (Figure 4). According to the information received the powerline routes were chosen to follow existing roads (which will minimise the impact on remaining natural veld in will be overhead where it cross the watercourses). The associated impact of the proposed powerline routes are also considered to be low.

6.1. VEGETATION ENCOUNTERED

The site verification confirmed that the study area had been transformed as a result of long-term cultivation. No remaining natural veld of any significance remains anywhere within the study area. The whole site still shows signs of recent cultivation together and is covered with crop remains or weedy species (including patches of the indigenous weed, *Galenia africana* (often a disturbance indicator species) (Photo 1 to Photo 9). The only plant species of any significance within the study area were 3 mature wild olive trees (*Olea europaea*) (Photo 8 & Photo 9).

Renosterveld, once cultivated, is unlikely to restore itself (for many generations, if ever), even with active rehabilitation. In this case, rehabilitation and conservation of the site is not considered a viable option as there would be many other areas in better condition more worthy of conservation efforts.

6.2. PLANT SPECIES SENSITIVITY

According to the NEMA EIA screening tool report for this project (Refer to Appendix 1), the relative plant species sensitivity is considered of "**High Sensitivity"**, because the study area might touch or overlap sensitive areas. The original vegetation type is classified as endangered and specifically because of the potential that quite an extensive number of sensitive plants might occur in this area (or is known to have a distribution within the broader area or this vegetation type).

- No red-data or any protected plant species were observed within the proposed footprint (refer to Heading 4.4).
- The study area had been under cultivation (dry-land commercial annual crops) over a long period of time and the veld transformed. Only a few hardy or indigenous pioneer species managed to survive the continual impact of agriculture and altered fire regimes. None of the species listed in the screening report were observed.

Because of the degraded state of the study area, it is considered unlikely that the proposed solar facility will result in any significant impact on the plant species sensitivity theme. As a result, the Plant Species theme for this study area is should be rated as **Low Sensitive**.

6.3. FAUNA AND AVI-FAUNA SENSITIVITY

Historically several large and small mammals would have been expected to occur within the Fynbos / Renosterveld vegetation of the Swartland area (although not in large numbers). Fynbos does not support a high number of birds , but all six bird species endemics to the south-west Cape are fynbos species. On the other hand, Fynbos supports large numbers of butterfly species, many of which, are now at risk, especially the myrmecophilous (ant associated) butterflies from the family Lycaenidae, because of ongoing disturbances to their preferred habitat (often small areas). Although fynbos is not particularly rich in reptiles and amphibians, many of the species living there are both endemic and threatened. The very rare geometric tortoise is found in only a few surviving fynbos areas and is regarded as the world's second rarest tortoise. The Cape has more than half of South Africa's frog species. Furthermore, of the 62 different frogs occurring here, 29 are endemic being found nowhere else on earth.

According to the **NEMA EIA Sensitivity** scan for the site (Appendix 1) the Animal Species Theme Sensitivity is High Sensitive because of the potential presence of the species listed in the Table below (Table 8). Unfortunately, because of the long history of agriculture and the transformed nature of the veld (and other reasons listed in Table 8) it is considered highly unlikely that the proposed development will result in any significant additional impact on any of these species.

As a result, the animal species theme sensitivity for this project is considered to be **Low Sensitive**.

6.4. CONSERVATION PRIORITY AREAS (CBA'S & ESA'S)

According to the 2017, Western Cape Biodiversity Spatial Plan (WCBSP) the study area might impact on ecological support areas (ESA 2) and critical biodiversity areas (CBA 1) associated with the Diep River to the north of the site and its tributary to the west of the (CapeNature, 2017) (Figure 4).

However, the footprint for the development area can be easily fitted in the existing agricultural area (transformed area). The connecting powerlines were located to follow existing roads (which will minimise the impact) and will be overhead where it crosses the two watercourses. As a result, the impact should be relatively small and temporary.

6.5. TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

The following table rates the significance of environmental impacts associated with the proposed development (using the methods described under Heading 3.4). It also evaluates the expected accumulative effect of the proposed development as well as the No-Go option.

Table 9: Impact assessment associated with the proposed activity.

Impact assessment								
Aspect	**Mitigation**	**CV**	**Lik**	**Dur**	**Ext**	**Sev**	**Significance**	Short discussion
Special habitats: Potential impact on special habitats (e.g. true quartz or "heuweltjies")	Without mitigation	4	2	3	1	1	28	The proposed solar facility will impact on transformed agricultural land (but there are watercourses to the north and west of the study area).
	With mitigation	4	1	2	1	1	20	Ensure that the solar facility does not have any additional physical impact on any of the watercourses.
Watercourses & Wetlands: Potential impact	Without mitigation	4	3	4	1	3	44	The proposed footprint area was chosen to avoid the watercourse.

Impact assessment								
Aspect	**Mitigation**	**CV**	**Lik**	**Dur**	**Ext**	**Sev**	**Significance**	Short discussion
on natural water resources and it's ecological support areas.	With mitigation	4	1	2	1	1	20	Ensure that the solar facility does not have any additional impact on any of the watercourses.
Vegetation status: Loss of vulnerable or endangered vegetation and associated habitat.	Without mitigation	4	1	3	1	1	24	The proposed solar facility will impact on transformed agricultural land.
	With mitigation	2	1	2	1	1	10	Ensure that the solar facility does not have any additional impact on any of the watercourses.
Conservation priority: Potential impact on protected areas, CBA's, ESA's or Centre's of Endemism.	Without mitigation	4	3	4	1	3	44	The solar facility can be placed to avoid impacts on any CBA or ESA, but the connecting powerlines might have a slight temporary impact on 2 watercourses.
	With mitigation	4	1	2	1	1	20	Using overhead powerlines will minimise the impact on both the watercourses.
Connectivity: Potential loss of ecological migration corridors.	Without mitigation	4	2	3	1	1	28	The proposed solar facility will impact on transformed agricultural land and should not result in any additional impact on connectivity.
	With mitigation	4	1	2	1	1	20	Ensure that the solar facility does not have any additional impact on any of the watercourses.
Protected & endangered plant species: Potential impact on threatened or protected plant species.	Without mitigation	4	2	3	1	1	28	No red-data-, protected plants or sensitive species listed in the DFFE screening report were observed within the study area.
	With mitigation	4	1	2	1	1	20	Ensure that the solar facility does not have any additional impact on any of the watercourses.
Fauna: Potential impact on mammals, reptiles & amphibians.	Without mitigation	4	2	3	1	2	32	The DFFE screening report lists sensitive Avi-fauna & invertebrate species that might be impacted. The potential impact is rated as Low Sensitive. Refer to Table 8.
	With mitigation	4	1	2	1	1	20	The sensitivity assessment (Table 8) suggests that it is highly unlikely that any of these species will be encountered or frequent the study area.
Cumulative impacts: Cumulative impact associated with proposed activity.	Without mitigation	4	3	4	1	3	44	Potential impact on 60ha of transformed agricultural land, CBA's and ESA's associated with two watercourses and sensitive, flora, fauna and avi-fauna.
	With mitigation	4	1	2	1	1	20	Refer to the recommendations above.
The "No-Go" option: Potential impact associated with the No-Go alternative.	Without mitigation	2	2	4	1	1	16	The study area is used for agriculture, which is likely to continue. Renosterveld is unlikely to restored itself, even with active rehabilitation, but the potential impact on the two watercourses could be avoided.
	With mitigation							

According to the **NEMA EIA Sensitivity** scan for the site (Appendix 1) the Terrestrial Biodiversity Theme Sensitivity is considered **VERY HIGH SENSITIVE** because of the potential impact on ecological support areas (ESA's), critical biodiversity areas (CBA's), endangered Swartland Granite Renosterveld vegetation type and sensitive fauna & flora species.

According, to the overall terrestrial impact assessment (Table 9) the main impacts associated with the proposed development will be:

- The potential impact on the two watercourses and the potential impact on the CBA associated with the Klipkoppie Municipal NR;
- A potential low impact on bird species (specifically the Secretary bird).

The Terrestrial Biodiversity Evaluation for this study (Table 9), gives the potential accumulative impact is considered to a **Medium/Low negative**, which can be reduced to very low with mitigation.

With mitigation it is considered highly unlikely that the development will contribute significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g., migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species.
- Loss of ecosystem connectivity.

As a result, the Terrestrial Biodiversity Theme Sensitivity for the proposed project is considered **LOW SENSITIVE**.

6.6. CONCLUSIONS

The status of the vegetation within the study area is considered transformed (old agricultural land). On the edges of the study area, and scattered throughout the site, a number of hardy pioneer shrubs species were occasionally observed. The only plant species of any significance within the study area were 3 mature wild olive trees (*Olea europaea*) (Photo 8 & Photo 9). Renosterveld is unlikely to restore itself (for many generations, if ever), even with active rehabilitation. Rehabilitation would only be possible if the study area is actively replanted and re-seeded with indigenous vegetation from surrounding intact veld and then protected as a conservation area. In this case, rehabilitation and conservation of the site is not considered a viable option as there would be many other areas in better condition more worthy of conservation efforts.

However, the connecting powerlines might impact on two watercourses and its associated CBA's & ESA's. It might also affect CBA's associated with the Klipkoppie Municipal Nature Reserve. At the river the powerlines will be placed underground next to existing roads (which will result in a temporary short to medium term impact).

The Sensitivity map (Figure 8) focuses on the protection of the aquatic CBA's and ESA's associated with the two watercourses (Green in Figure 8). This will also minimize the impact on the Klipkoppie Municipal NR.

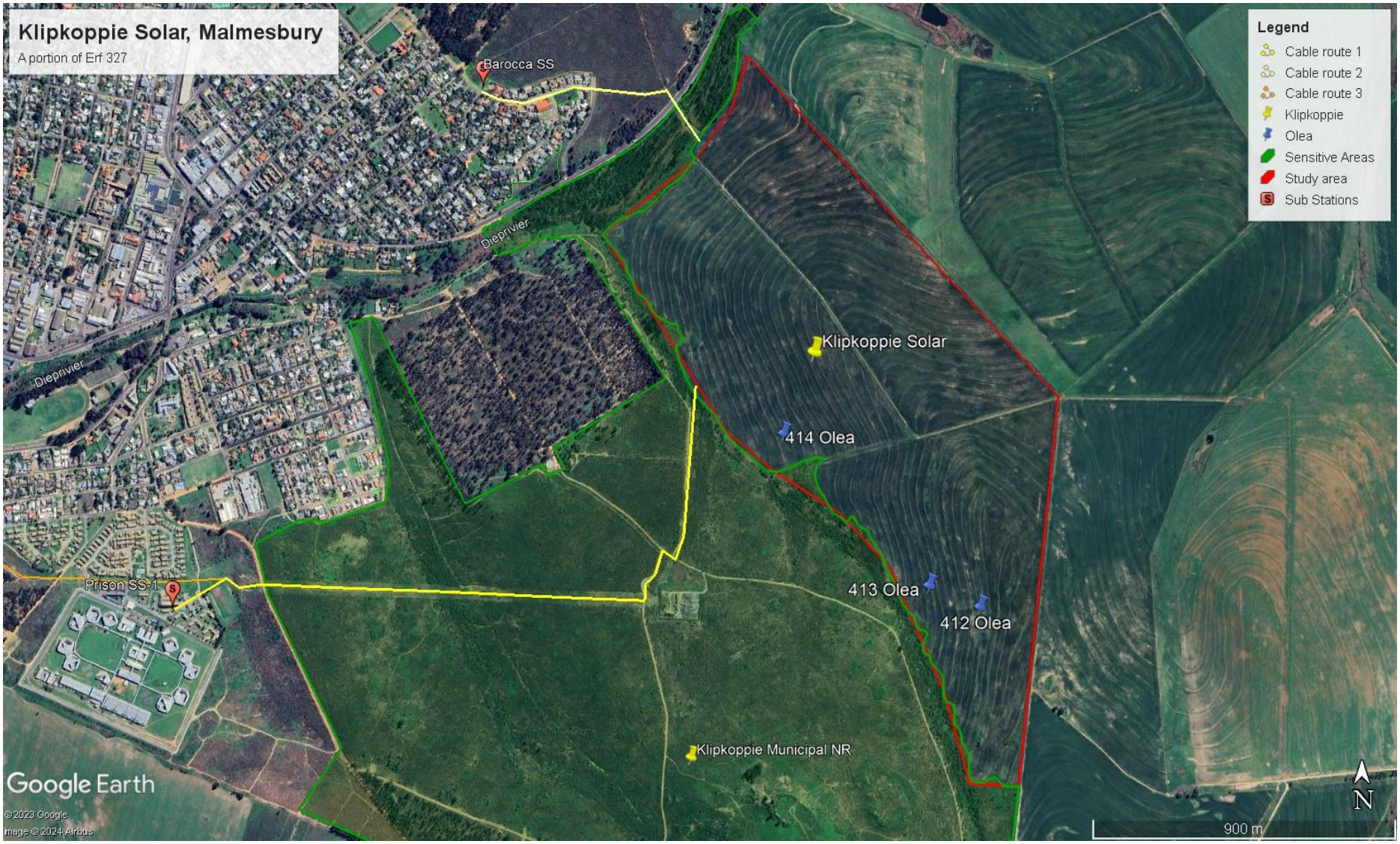

Figure 8: Sensitivity map: Google Earth Image showing the study area (red) the location of the sensitive areas (green) which includes the Klipkoppie Nature Reserve**.**

7. RECOMMENDATIONS

The study area is considered transformed with no intact or natural veld of any significance remaining. However, potential additional impacts on critical biodiversity areas, ecological support areas, the watercourses (even though degraded) and the impact on the two Municipal Nature Reserves should be minimised.

The following mitigation recommendations should be implemented (refer to Figure 8).

- The proposed solar infrastructure can be placed anywhere within the proposed study area but for the following:
    - The existing entrance road between the study area and the and the Diep River should be used as the northern boundary for any development (staying within the existing agricultural land).
    - To the west, the development boundary must follow along the lowest existing agricultural contour (but preferably with a further buffer zone of 10 – 20 m) to ensure that the watercourse and its remaining riparian vegetation is protected from any further disturbance.
    - In other words, no further direct impact to be allowed on any of the watercourses or its remaining riparian vegetation.
    - All efforts should be made to protect the three mature wild olive trees (Olea europaea) marked identified in Figure 8.
- Overhead powerlines should be used where it crosses the Diep River to the north (towards the Barocca SS) and the tributary to the Diep River to the west (towards the Prison SS and the Main SS).
- Within the two Municipal Reserves (especially the Klipkoppie NR, which has also been identified as a CBA) the powerlines MUST follow existing roads (to minimise the disturbance footprint).

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APPENDIX 1: NEMA EIA SCREENING REPORT

APPENDIX 2: CURRICULUM VITAE – P.J.J. BOTES

Curriculum Vitae: Peet JJ Botes

Address: 22 Buitekant Street, Bredasdorp, 7280; **Cell**: 082 921 5949

Nationality:	South African
ID No.:	670329 5028 081
Language:	Afrikaans / English
Profession:	Environmental Consultant & Auditing
Specializations:	Botanical & Biodiversity Impact Assessments
	Environmental Compliance Audits
	Environmental Impact Assessment
	Environmental Management Systems
Qualifications:	**BSc** (Botany & Zoology), with Nature Conservation III & IV as extra subjects; Dept. of Natural Sciences, Stellenbosch University 1989.
	Hons. BSc (Plant Ecology), Stellenbosch University, 1989
	More than 20 years of experience in the Environmental Management Field (Since 1997 to present).
Professional affiliation:	Registered Professional Botanical, Environmental and Ecological Scientist at SACNASP (South African Council for Natural Scientific Professions) since 2005.
SACNAP Reg. No.:	400184/05

BRIEF RESUME OF RELEVANT EXPERIENCE

1997-2005: Employed by the Overberg Test Range (a Division of Denel), responsible for managing the environmental department of OTB, developing and implementing an ISO14001 environmental management system, ensuring environmental compliance, performing environmental risk assessments with regards to missile tests and planning the management of the 26 000 ha of natural veld, working closely with CapeNature (De Hoop Nature Reserve).

2005-2010: Joined Enviroscientific, as an independent environmental consultant specializing in wastewater management, botanical and biodiversity assessments, developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits and was also responsible for helping develop the biodiversity part of the Farming for the Future audit system implemented

by Woolworths. During his time with Enviroscientific he performed more than 400 biodiversity and environmental legal compliance audits.

2010-2017: Joined EnviroAfrica, as an independent Environmental Assessment Practitioner and Biodiversity Specialist, responsible for Environmental Impact Assessments, Biodiversity & Botanical specialist reports and Environmental Compliance Audits. During this time Mr Botes compiled more than 70 specialist Biodiversity & Botanical impact assessment reports ranging from agricultural-, infrastructure pipelines- and solar developments.

2017-Present: Establish a small independent consultancy (PB Consult) specialising in Environmental Audits, Biodiversity and Botanical specialist studies as well as Environmental Impact Assessment.

LIST OF MOST RELEVANT BOTANICAL & BIODIVERSITY STUDIES

Botes. P. 2007: Botanical assessment. Schaapkraal, Erf 644, Mitchell's Plain. A preliminary assessment of the vegetation in terms of the Fynbos Forum: Ecosystem guidelines. 13 November 2007.

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Botes, P. 2012(b): Proposed Disselfontein Keren Energy Holdings Solar Facility on Farm Disselfontein no. 77, Hopetown. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 28 March 2012.

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Botes, P. 2018(h): Tripple D farm agricultural development – Development of a further 60 ha of vineyards, Erf 1178, Kakamas, Northern Cape Province. Botanical assessment of the proposed footprint. 8 October 2018.

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Botes, P. 2020(a): Gamakor & Noodkamp Low cost housing – Botanical Assessment of the proposed formalization of the Gamakor and Noodkamp housing development on the remainder and portion 128 of the Farm Kousas No. 459 and Ervin 1470, 1474 and 1480, Gordonia road, Keimoes. Kai !Gariep Local Municipality, Northern Cape Province. 6 February 2020.

Botes, P. 2020(b): Feldspar Prospecting & Mining, Farm Rozynen Bosch 104, Kakamas. Botanical assessment of the proposed prospecting and mining activities on Portion 5 of The Farm Rozynen Bosch No. 104, Kakamas, Khai !Garib Local Municipality, Northern Cape Province. 12 February 2020.

Botes, P. 2020(c): Boegoeberg housing project – Botanical assessment of the proposed formalization and development of 550 new erven on the remainders of farms 142 & 144 and Plot 1890, Boegoeberg settlement, !Kheis Local Municipality, Northern Cape Province. 1 July 2020.

Botes, P. 2020(d): Komaggas Bulk Water supply upgrade – Botanical assessment of the proposed upgrade of the existing Buffelsrivier to Komaggas BWS system, Rem. of Farm 200, Nama Khoi Local Municipality, Northern Cape Province. 8 July 2020.

Botes, P. 2020(e): Grootdrink housing project – Botanical assessment of the proposed formalization and development of 370 new erven on Erf 131, Grootdrink and Plot 2627, Boegoeberg Settlement, next to Grootdrink, !Kheis Local Municipality, Northern Cape Province. 14 July 2020.

Botes, P. 2020(f): Opwag housing project – Botanical assessment of the proposed formalization and development of 730 new erven on Plot 2642, Boegoeberg Settlement and Farm Boegoeberg Settlement NO.48/16, Opwag, !Kheis Local Municipality, Northern Cape Province. 16 July 2020.

Botes, P. 2020(g): Wegdraai housing project – Botanical assessment of the Proposed formalization and development of 360 new erven on Erven 1, 45 & 47, Wegdraai, !Kheis Local Municipality, Northern Cape Province. 17 July 2020.

Botes, P. 2020(h): Topline (Saalskop) housing project – Botanical assessment of the pproposed formalization and development of 248 new erven on Erven 1, 16, 87, Saalskop & Plot 2777, Boegoeberg Settlement, Topline, !Kheis Local Municipality, Northern Cape Province. 18 July 2020.

Botes, P. 2020(i): Gariep housing project – Botanical assessment of the proposed formalization and development of 135 new erven on Plot 113, Gariep Settlement, !Kheis Local Municipality, Northern Cape Province. 20 July 2020.