REPORT

for SiVEST SA (Pty) Ltd

by

SOIL CLIMATE AND WATER

AGRICULTURAL RESEARCH COUNCIL

SOIL INFORMATION FOR THE PROPOSED DEVELOPMENT OF THE 9.9MW WILDEBEESTKUIL 1 SOLAR PV PLANT & 132KV POWER LINE, 9.9 MW WILDEBEESTKUIL 2 SOLAR PV PLANT & 132KV POWER LINE AND ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE NORTH WEST PROVINCE

By

D.G. Paterson

Report No. GW/A/2020/23

September 2020

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DECLARATION

This report was overseen by me, DG Paterson of ARC-Soil Climate and Water. I have a PhD degree in Soil Science from University of Pretoria and have considerable experience in soil studies and agricultural assessments since 1981. I have compiled more than 200 such surveys for a variety of purposes.

This specialist report was compiled on behalf of SiVEST (Pty) Ltd for their use in undertaking a Scoping and Environmental Impact Assessment process for the proposed Leeudoringstad Solar Power Project in the North West Province.

I hereby declare that I am qualified to compile this report as a registered Natural Scientist (Reg. No. 400463/04) and that I am independent of any of the parties involved and that I have compiled an impartial report, based solely on all the information available.

D G Paterson
September 2020

EXECUTIVE SUMMARY

Soil information was obtained for the two (2) solar photovoltaic (4) plants and 132kV power lines proposed near the town of Leeudoringstad in the North West Province. The data source was existing 1:250 000 scale land type information and indicates that the soils are mostly shallow, with much rock.

It should be noted that a combined report has been compiled for both proposed solar PV plants and power lines (namely Wildbeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line). This is due to the fact that the proposed solar PV plants and power line corridors are located on the same properties, are identical in nature and have the same associated impacts and recommended mitigation measures. Where certain findings and/or mitigation measures are project specific, this has been indicated in the relevant section of this report.

The potential impact on the loss of agricultural land will be low, and there is not expected to be any significant soil erosion hazard, if standard mitigation measures are followed.

Cumulative soil-related impacts are also expected to be low.

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) - REQUIREMENTS FOR SPECIALIST REPORTS (APPENDIX 6)

Section in EIA Regulations 2014 (as amended)		Clause	Section in Report
Appendix 6	(1)	A specialist report prepared in terms of these Regulations must contain —	
	(a)	details of –	
		(i) the specialist who prepared the report; and	*P2*
		(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae.	*P2*
	(b)	A declaration that the person is independent in a form as may be specified by the competent authority;	*P2*
	(c)	An indication of the scope of, and the purpose for which, the report was prepared;	2
	(cA)	An indication of the quality and age of base data used for the specialist report;	2.5
	(cB)	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	5.2
	(d)	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	n/a
	(e)	A description of the methodology adopted in preparing the report or carrying out the specialised process; inclusive of equipment and modelling used;	2.5
	(f)	Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	5.2
	(g)	An indication of any areas to be avoided, including buffers;	5.5
	(h)	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	n/a
	(i)	A description of any assumptions made and any uncertainties or gaps in knowledge;	n/a
	(j)	A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment or activities;	5.2
	(k)	Any mitigation measures for inclusion in the EMPr;	Table 4
	(l)	Any conditions for inclusion in the environmental authorization;	n/a
	(m)	Any monitoring requirements for inclusion in the EMPr or environmental authorization;	n/a
	(n)	A reasoned opinion –	
		(i) as to whether the proposed activity, activities or portions thereof should be authorized;	6
		(iA) regarding the acceptability of the proposed activity or activities; and	6

		(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorized, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Table 4
	(o)	A description of any consultation process that was undertaken during the course of preparing the specialist report;	n/a
	(p)	A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	n/a
	(q)	Any other information requested by the authority.	n/a
	(2)	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	n/a

CONTENTS **Page**

1 INTRODUCTION

1.1. PROJECT DESCRIPTION

Project history

The original BA process for the proposed Wildebeestkuil PV Generation (Pty) Ltd (hereafter referred to as "Wildebeestkuil PV Generation") solar photovoltaic (PV) plant was initiated in August 2016. All specialist studies were undertaken and subsequently all site sensitivities were identified. The specialist studies and draft basic assessment reports (DBARs) were completed and released for 30-day public review. The BA was however put out on hold prior to submitting the final basic assessment reports (FBARs) to the Department of Environmental Affairs (DEA). In February 2017, the proposed capacity and layout of the solar PV plant was amended, and a new connection point and associated power line corridors were assessed. However, the project was put on hold prior to submitting the application forms to the DEA or commencing with the legislated public participation process. In August of 2020, Wildebeestkuil PV Generation proposed an additional 9.9 megawatt (MW) PV plant on the Wildebeestkuil site (now referred to as the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line) outside of all site sensitivities that were identified in 2016, and as such specialist studies have been commissioned to assess and verify the now two (2) solar PV plants and 132kV power lines under the new Gazetted specialist protocols[1].

It should be noted that a combined report has been compiled for both proposed solar PV plants and power lines (namely Wildbeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line). This is due to the fact that the proposed solar PV plants and power line corridors are located on the same properties, are identical in

[1] GOVERNMENT GAZETTE No. 43110, 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 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998, WHEN APPLYING FOR ENVIRONMENTAL AUTHORISATION, 20 MARCH 2020.

In terms of sections 24(5)(a), (h) and 44 of the National Environmental Management Act, 1998, prescribe general requirements for undertaking site sensitivity verification and for protocols for the assessment and minimum report content requirements of environmental impacts for environmental themes for activities requiring environmental authorisation, as contained in the Schedule hereto. When the requirements of a protocol apply, the requirements of Appendix 6 of the Environmental Impact Assessment Regulations, as amended, (EIA Regulations), promulgated under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), are replaced by these requirements. Each protocol applies exclusively to the environmental theme identified within its scope. Multiple themes may apply to a single application for environmental authorisation, and assessments for these themes must be undertaken in accordance with the relevant protocol, or where no specific protocol has been prescribed, in accordance with the requirements of the EIA Regulations.

nature and have the same associated impacts and recommended mitigation measures. Where certain findings and/or mitigation measures are project specific, this has been indicated in the relevant section of this report.

Project location

Wildebeestkuil PV Generation is proposing to construct two (2) solar PV plants, two (2) 132kV power lines and associated infrastructure approximately 4km east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, which falls within the Dr Kenneth Kaunda District Municipality in the North West Province of South Africa (hereafter referred to as the 'proposed developments').

The proposed solar PV plants will be located on the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;
- Portion 14 of the Farm Wildebeestkuil No. 59; and
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59.

The combined extent of the above-mentioned properties is approximately 115.5 hectares (ha).

The power line corridor alternatives associated with each proposed solar PV plant which were assessed as part of the respective BA processes traverse the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;
- Portion 14 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 5 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 7 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 29 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59;
- Portion 35 of the Farm Leeuwbosch No. 44;
- Portion 36 of the Farm Leeuwbosch No. 44;
- Portion 37 of the Farm Leeuwbosch No. 44; and
- Portion 38 of the Farm Leeuwbosch No. 44.

The proposed developments are located directly west of the Harvard Substation, where the current supply of electricity for the local areas and businesses is extracted from.

Wildebeestkuil 1 and Wildebeestkuil 2 Solar PV Plant - Solar PV Plant Components

As mentioned, Wildebeestkuil PV Generation is proposing to construct two (2) solar PV plants, two (2) 132kV power lines and associated infrastructure. The proposed developments will have total maximum generation capacities of up to approximately 9.9 megawatt (MW) respectively and will be referred to as the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line respectively. The overall objective of the proposed developments is to generate electricity (by capturing solar energy) to feed into the national electricity grid and "wheel" the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a National Energy Regulator of South Africa (NERSA)-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

A summary of the key components to be constructed for each proposed solar PV plant is provided below

The key components to be constructed for each proposed solar PV plant are listed below:

- Solar PV field (arrays) comprising multiple PV modules
- PV panel mountings. PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology
- Each PV module will be approximately 2.5m long and 1.2m wide and mounted on supporting structures above ground. The final design details will become available during the detailed design phase of the proposed developments, prior to the start of construction
- The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development

In addition, related infrastructure required are:

- Underground cabling (≈0.8m × 0.6 wide)
- Guard House (≈876m²)
- Temporary building zone (≈2994m²)
- Switching Substation (≈2000m²)
- Internal gravel roads (≈3.5m width)

- Upgrade to existing roads; and
- Site fencing (≈2.1m high)

In addition to the above, the electricity generated by the proposed solar PV plants will be fed into the national electricity grid via 132kV power lines, which will connect to the Leeudoringstad Solar Plant Substation (part of a separate BA process)[2]. It should be noted that each proposed solar PV plant will consist of one (1) associated 132kV power line. Corridors between approximately 60m and 150m wide were assessed for the proposed power line corridor route alternatives associated with each proposed solar PV plant (see section 1.2.3 and section 7). This is to allow for flexibility to route the power lines within the assessed corridors. As such, the selected preferred power lines will be routed within the assessed corridors. The final servitudes will be routed within the power line corridors, and it expected that the servitude swill not exceed 32m.

As mentioned, once fully developed, the intention is to generate electricity (by capturing solar energy) to feed into the national electricity grid and "wheel" the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a NERSA-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

The construction phase will be between 12 and 24 months and the operational lifespans will be approximately 20 years, depending on the length of the power purchase agreement with the relevant off taker.

1.2. BA ALTERNATIVES

1.2.1. Location alternatives

No site alternatives for these proposed developments are being considered as the placement of solar PV installations and power lines is dependent on several factors, all of which are favourable at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, solar resource site accessibility and current land use.

[2] Proposed Leeudoringstad Solar Plant Substation part of separate BA process and will be authorised under a separate EA.

1.2.2. Technology alternatives

No other activity / technology alternatives are being considered. Renewable energy development in South Africa is highly desirable from a social, environmental and development point of view. Based on the flat terrain, the climatic conditions and current land use being agricultural, it was determined that the proposed site would be best-suited for a solar PV plants and associated power lines, instead of any other type of renewable energy technology. It is generally preferred to install wind energy facilities (WEFs) on elevated ground. In addition, concentrated solar power (CSP) installations are not feasible because they have a high water requirement and the project site is located in a relatively arid area. There is also not enough rainfall in the area to justify a hydro-electric plant. Therefore, the only feasible technology alternative on this site is solar PV with associated power lines, and as such this is the only technology alternative being considered.

1.2.3. Layout alternatives

No design or layout alternatives for the PV development areas, Switching Substations, Guard houses and Temporary Building Zones (and all other associated infrastructure) are being considered or assessed as part of the current BA processes. Design and layout alternatives were considered and assessed as part of a previous BA process that was never completed, and as such the PV development areas, Switching Substations, Guard houses and Temporary Building Zones (and all other associated infrastructure) have been placed to avoid site sensitivities identified as part of a previous BA process as well as the current BA processes. Specialist studies were originally undertaken in 2016 and all current layouts and/or positions being proposed were selected based on the environmental sensitivities identified as part of these studies in 2016. All specialist studies which were undertaken in 2016 were however updated in 2020 (including ground-truthing, where required) to focus on the impacts of the layouts being proposed as part of the current projects. The results of the updated specialist assessments have informed the layouts being proposed as part of the current BA processes. The proposed layouts have therefore been informed by the identified environmental sensitive and/or “no-go” areas.

Three (3) power line corridor route alternatives for the proposed 132kV power line associated with each solar PV plant were however identified and assessed by the respective specialists as part of the current BA process. These alternatives essentially provide for different power line

route alignments contained within an assessment corridor. The power line corridor route alternatives were informed by the identified environmental sensitive and/or "no-go" areas. The power line corridor route alternatives work as follows:

WILDEBEESTKUIL 1 SOLAR PV PLANT & 132KV POWER LINE:

- **Power Line Corridor Option 1 -** This involves an overhead power line which will run north of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen as 'preferred' for the Leeudoringstad Solar Plant Substation site[3]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

- **Power Line Corridor Option 2A -** This involves an overhead power line which will run south of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen as 'preferred' for the Leeudoringstad Solar Plant Substation site[3]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

- **Power Line Corridor Option 2B -** This involves an underground power line which will run south of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen as 'preferred' for the Leeudoringstad Solar Plant Substation site[3]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

[3] 132kV power line corridor route associated with solar PV plant intrinsically linked to Leeudoringstad Solar Plant Substation site (part of separate on-going BA process). Leeudoringstad Solar Plant Substation site chosen as "preferred" by respective specialists as part of that separate BA process therefore informed connection point for power line corridor being proposed as part of this BA application.

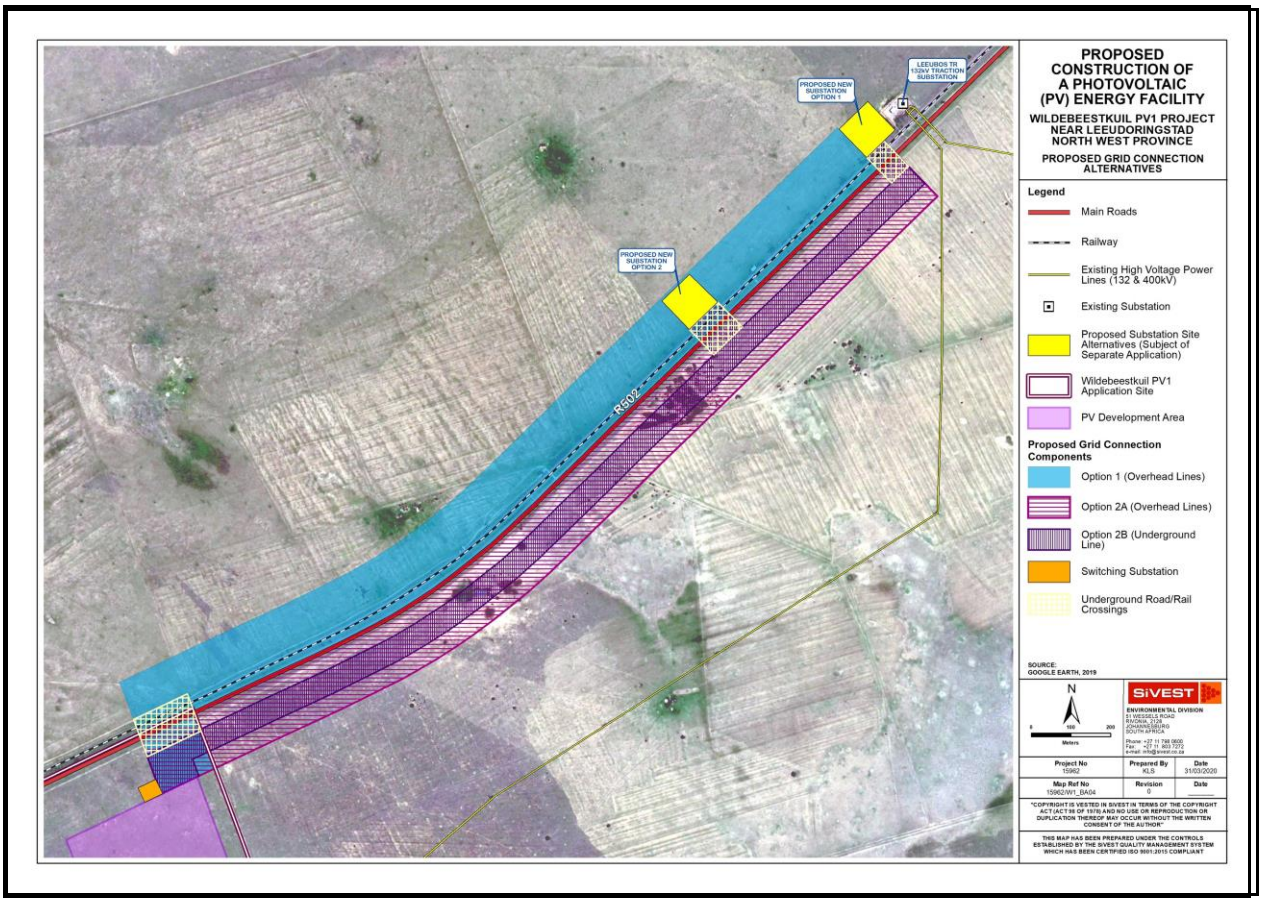
WILDEBEESTKUIL 2 SOLAR PV PLANT & 132KV POWER LINE:

- **Power Line Corridor Option 1 -** This involves an overhead power line which will run north of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation, depending on the alternative chosen as "preferred" for the Leeudoringstad Solar Plant Substation site[3]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

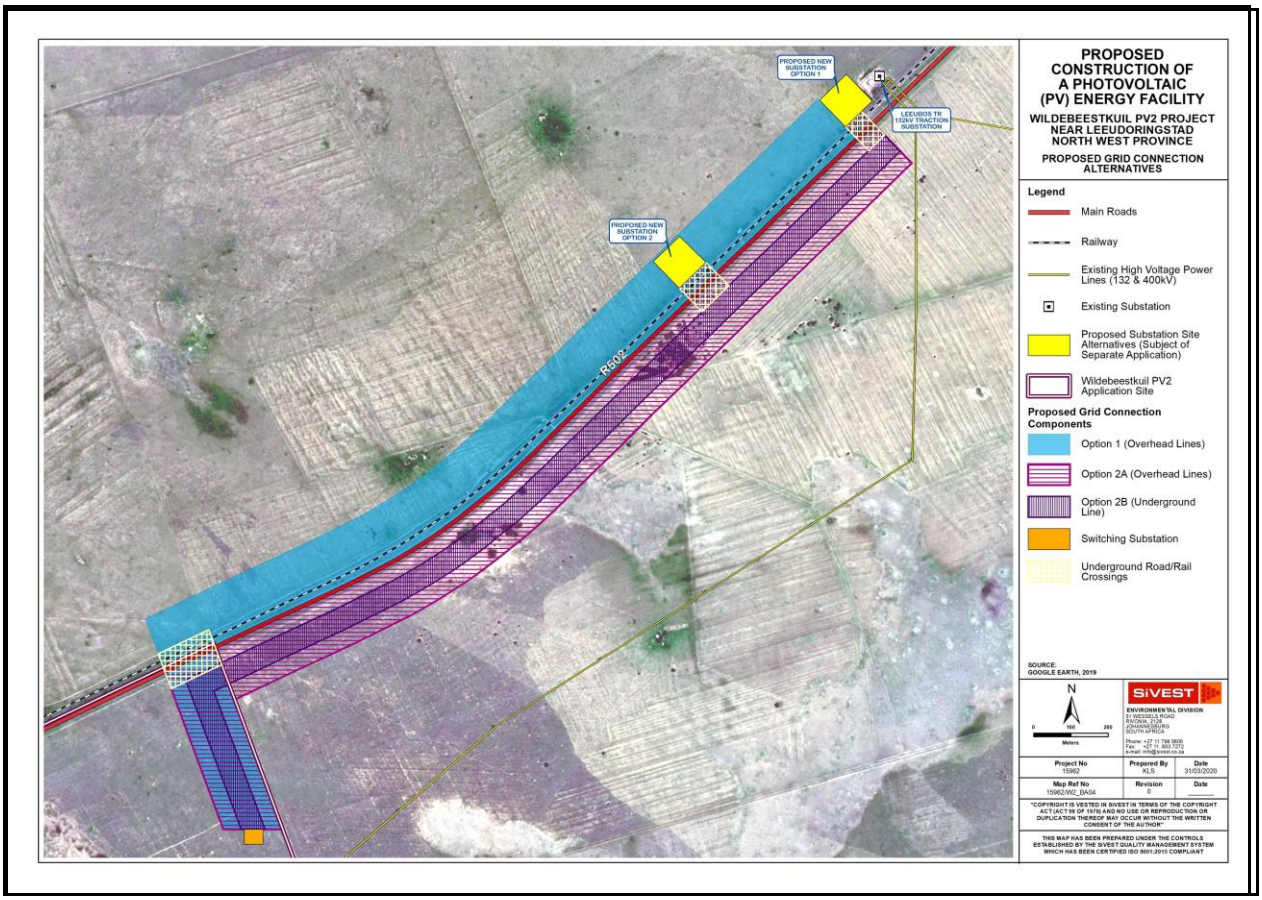
- **Power Line Corridor Option 2A -** This involves an overhead power line which will run south of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation, depending on the alternative chosen as "preferred" for the Leeudoringstad Solar Plant Substation site[3]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

- **Power Line Corridor Option 2B -** This involves an underground power line which will run south of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation, depending on the alternative chosen as "preferred" for the Leeudoringstad Solar Plant Substation site[3]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

See **Map 1** and **Map 2** below for maps showing the above-mentioned 132kV power line corridor route alternatives for each proposed solar PV plant.



Map 1: Map showing power line corridor route alternatives – Wildebeestkuil 1 Solar PV Plant & 132kV Power Line



Map 2: Map showing power line corridor route alternatives – Wildebeestkuil 1 Solar PV Plant & 132kV Power Line

1.2.4. The operational aspects of the activity

No operational alternatives were assessed in the BA, as none are available for solar PV installations and power lines.

1.2.5. 'No-go' alternative

The 'no-go' alternative is the option of not fulfilling the proposed projects. This alternative would result in no environmental impacts from the proposed projects on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the 'no-go' option would entail no development.

The 'no-go' option is a feasible option; however, this would prevent the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line from

contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

2. SPECIALIST TERMS OF REFERENCE

ARC-Soil, Climate and Water (ARC-ISCW) was requested by SiVEST SA (Pty) Ltd to provide baseline soil information, as well as impacts on agricultural potential, as part of a Scoping Level Assessment for two (2) proposed solar photovoltaic (PV) plants, 132kV power lines and associated infrastructure, near the town of Leeudoringstad in the North West Province. The overall objective of the solar PV plants and power lines is to generate electricity (by capturing solar energy) to feed into the national electricity grid and "wheel" the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a NERSA-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

It should be noted that a combined report has been compiled for both proposed solar PV plants and power lines (namely Wildbeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line). This is due to the fact that the proposed solar PV plants and power line corridors are located on the same properties, are identical in nature and have the same associated impacts and recommended mitigation measures. Where certain findings and/or mitigation measures are project specific, this has been indicated in the relevant section of this report.

2.1 Legislative and Policy Framework

In terms of the Subdivision of Agricultural Land Act (Act 70 of 1970), any application for change of land use must be approved by the Minister of Agriculture, while under the Conservation of Agricultural Resources Act (Act 43 of 1983) no degradation of natural land is permitted.

The following section summarises South African Environmental Legislation with regard to handling of topsoil to be considered for similar projects:

- The law on Conservation of Agricultural Resources (Act 43 of 1983) states that the degradation of the agricultural potential of soil is illegal.

- The Bill of Rights states that environmental rights exist primarily to ensure good health and well-being, and secondarily to protect the environment through reasonable legislation, ensuring the prevention of the degradation of resources.

- The Environmental right is furthered in the National Environmental Management Act (No. 107 of 1998), which prescribes three principals, namely the precautionary principle, the “polluter pays” principle and the preventive principle.

- It is stated in the above-mentioned act that the individual/group responsible for the degradation/pollution of natural resources is required to rehabilitate the polluted source.

- Soils and land capability are protected under the National Environmental Management Act 107 of 1998, the Environmental Conservation Act 73 of 1989, the Mineral and Petroleum Resources Development Act 28 of 2002 and the Conservation of Agricultural Resources Act 43 of 1983.

- The National Veld and Forest Fire Bill of 10 July 1998 and the Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act 36 of 1947 can also be applicable in some cases.

- The National Environmental Management Act 107 of 1998 requires that pollution and degradation of the environment be avoided, or, where they cannot be avoided, minimized and remedied.

- The Conservation of Agriculture Resources Act (Act 43 of 1983) requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

3 RECEIVING ENVIRONMENT[4]

3.1 Location

The study area is located approximately 4km east of the town of Leeudoringstad. As previously mentioned, the proposed solar PV plants will be located on the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;
- Portion 14 of the Farm Wildebeestkuil No. 59; and
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59.

The power line corridor alternatives associated with each proposed solar PV plant which were assessed as part of the respective BA processes traverse the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;
- Portion 14 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 5 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 7 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 29 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59;
- Portion 35 of the Farm Leeuwbosch No. 44;
- Portion 36 of the Farm Leeuwbosch No. 44;
- Portion 37 of the Farm Leeuwbosch No. 44; and
- Portion 38 of the Farm Leeuwbosch No. 44.

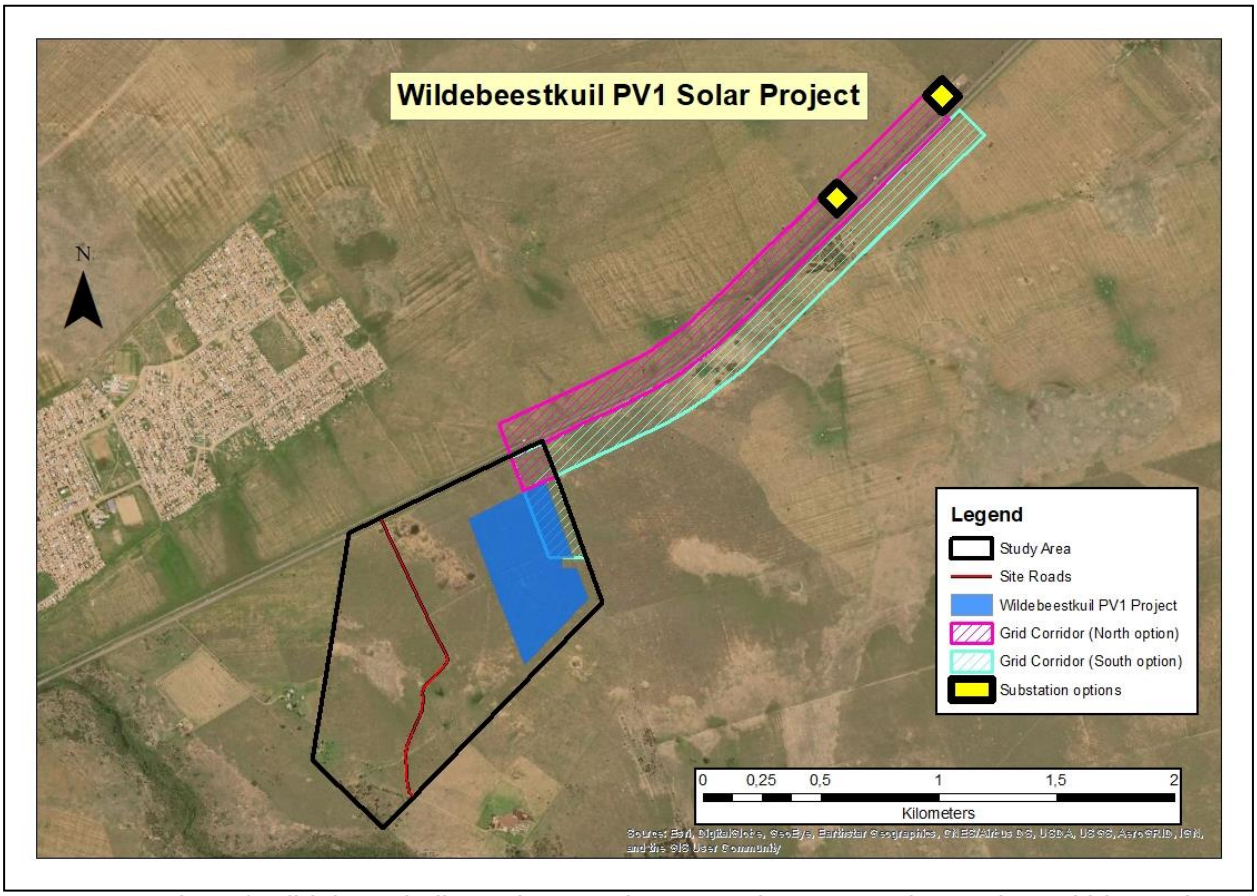
The area lies between latitudes 27^{o} 11' and 27^{o} 13' S and between longitudes 26^{o} 17' and 26^{o} 20' E (see Maps 3 and 4).

Within the broad project study area (shown by the black line), two (2) PV projects and 132kV power lines are proposed, namely Wildebeestkuil 1 Solar PV Plant & 132kV Power Line

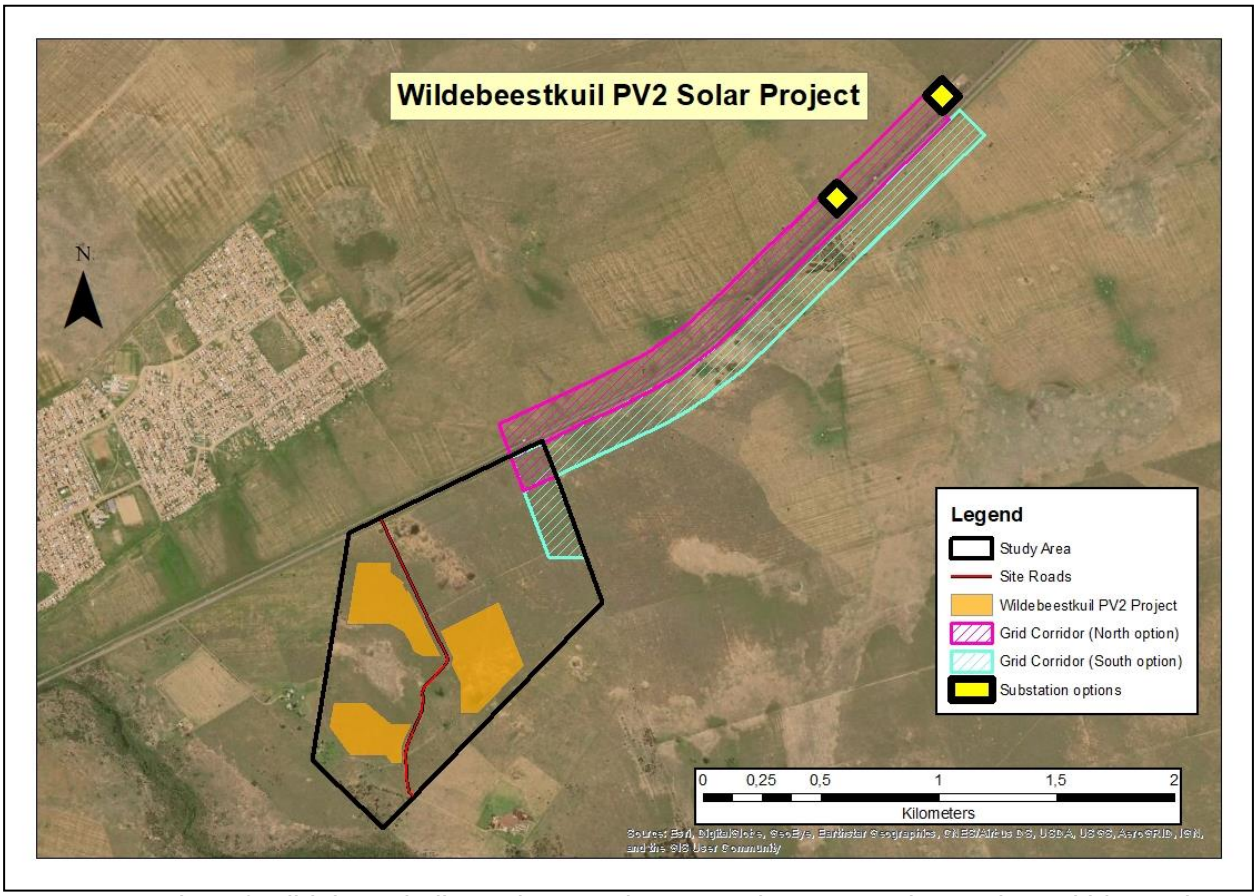
[4] Proposed solar PV plants and 132kV power line corridors are located on the same properties and are identical in nature. Receiving environment for both proposed solar PV plants and 132kV power lines will therefore be identical. Where certain information is project specific, this has been indicated in the relevant sub-section.

(shown in blue on Map 3) and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line (shown in orange on Map 4).

In addition, the proposed grid corridor, which allow the sites to connect to a substation serving the national grid (namely the Leeudoringstad Solar Plant Substation – part of a separate on-going BA process), is shown on each map. Here, alternative power line corridor routes either north or south of the national road are proposed for each solar PV plant. As mentioned, three (3) power line corridor route alternatives for the proposed 132kV power line associated with each solar PV plant were identified and assessed. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The power line corridor route alternatives are detailed in section 1.2.3 above.



Map 3: Location of Wildebeestkuil 1 Solar PV Plant & 132kV Power Line project within study area



Map 4: Location of Wildebeestkuil 2 Solar PV Plant & 132kV Power Line project within study area

3.2 Site Details

As mentioned, the combined extent of the properties which form part of the application site for the Wildebeestkuil solar PV plants (namely Portion 13; Portion 14 and Remainder of Portion 22 of the Farm Wildebeestkuil No. 59) is approximately 115 ha, and lies between 1 310 and 1 320 metres above sea level. The terrain of the area comprises virtually flat slopes of < 2%.

3.3 Climate

Climate data was obtained from the Agroclimatology database at ARC-ISCW (ARC-ISCW, 2011). The area has warm to hot, moist summers with cool to cold, dry winters. The climatic data is given in Table 1 below.

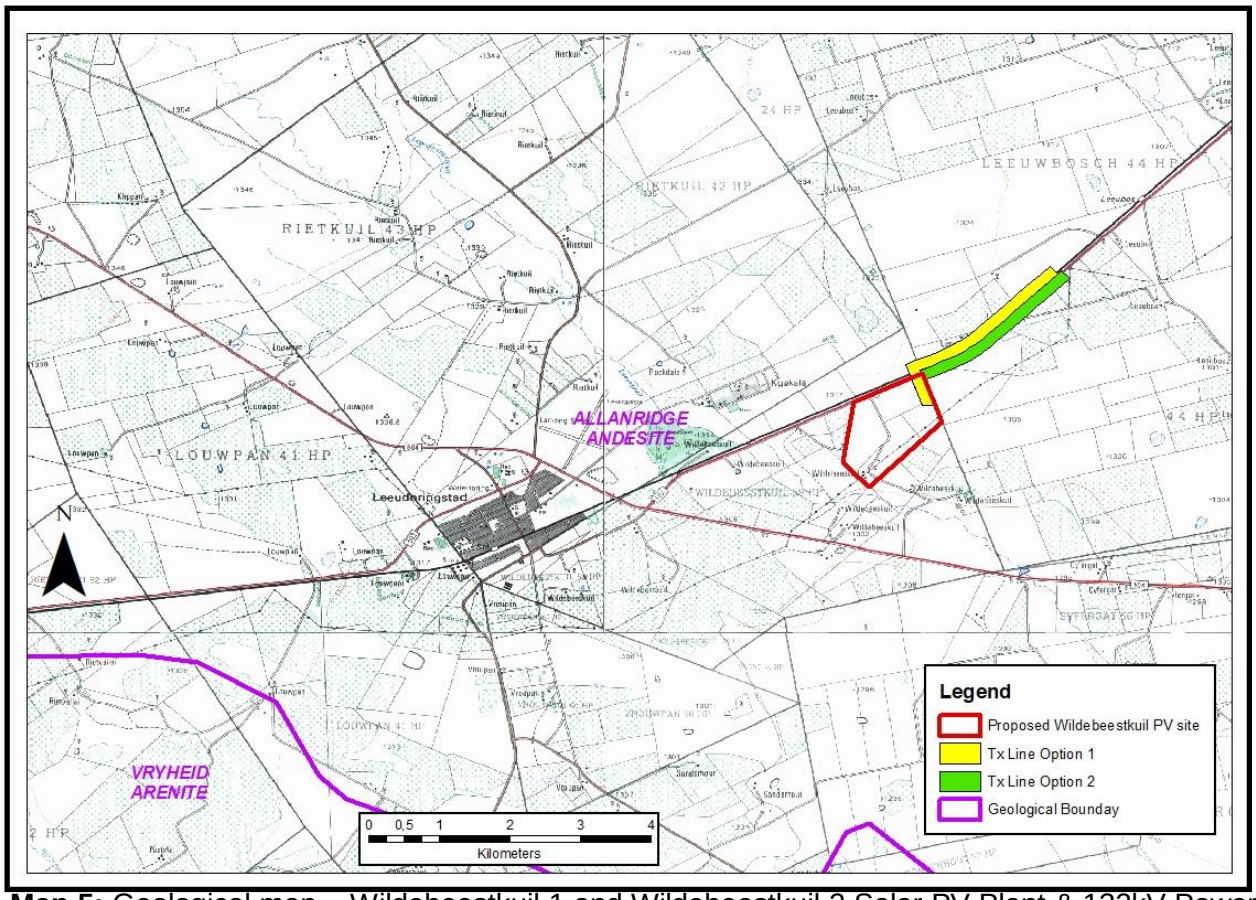
Table 1: Climate Data

Month	Average Rainfall (mm)	Average Min. Temp (°C)	Average Max. Temp (°C)	Average frost dates
Jan	96.4	15.8	29.8	Start date: 19/05 End date: 07/09 Days with frost: ±40
Feb	82.8	15.2	28.7	
Mar	83.2	13.3	26.8	
Apr	39.6	8.9	24.4	
May	17.8	3.6	21.6	
Jun	6.5	-0.1	18.8	
Jul	6.9	-0.3	18.7	**Heat units (hrs > 10°C)**
Aug	7.0	2.8	22.0	Summer (Oct-Mar): 2070 Winter (Apr-Sept): 533
Sep	15.4	7.2	25.4	
Oct	45.7	11.7	28.2	
Nov	76.7	13.3	28.5	
Dec	82.6	15.0	29.6	
Year	**560.6 mm**	**17.0 °C (Average)**		

The long-term average annual rainfall is 560.6 mm, of which 505.6 mm, or 83.5%, falls from October to March. Extreme temperatures recorded range from 39.2°C to -12.2°C.

3.4 Geology

The geology of the study area (see Map 5) consists predominantly of andesite of the Allanridge Formation (Geological Survey, 1981).



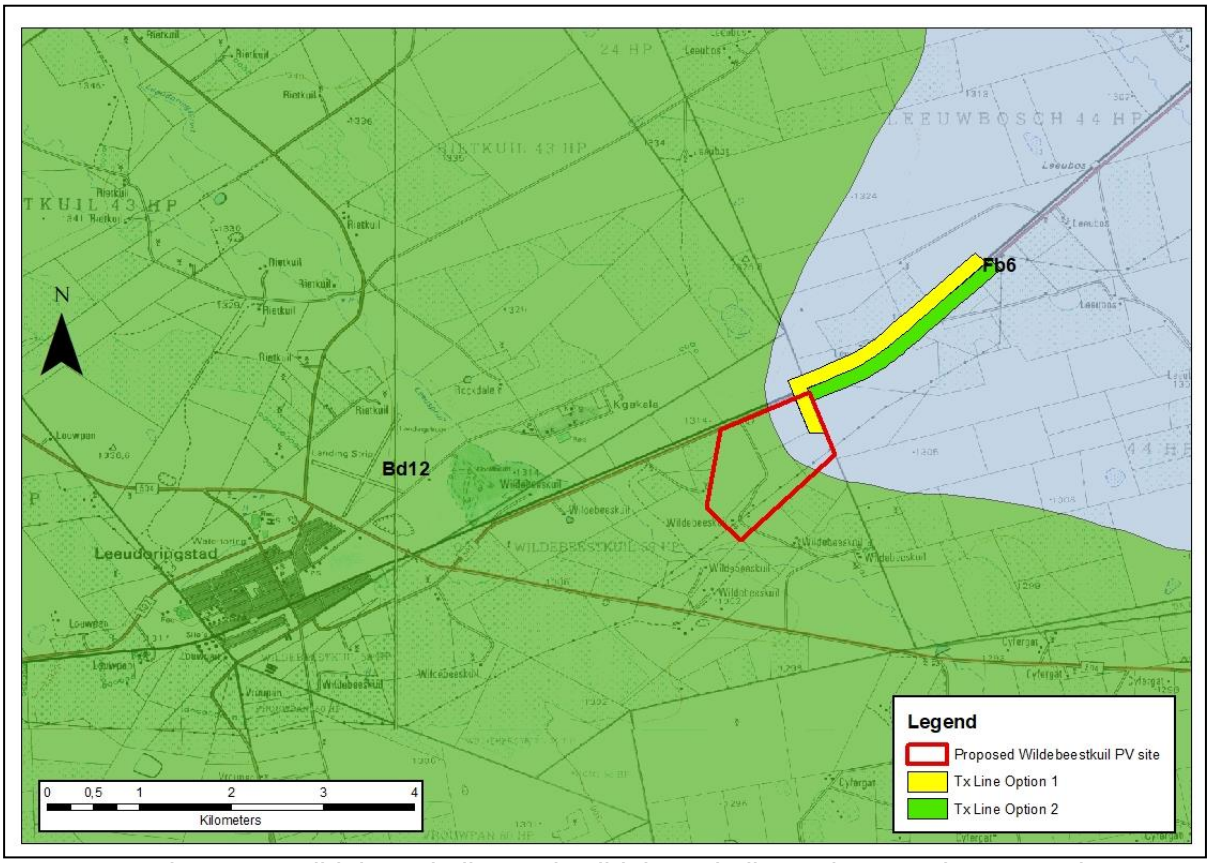
Map 5: Geological map – Wildebeestkuil 1 and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line

3.5 Soils

Existing soil information was obtained from the map sheet 2726 Kroonstad (Bruce & Schoeman, 1974) from the national Land Type Survey, published at a 1:250 000 scale. A land type is defined as an area with a uniform terrain type, macroclimate and broad soil pattern. The soils are classified according to MacVicar *et al.* (1977).

Based on the land type survey information, the area under investigation is covered by two (2) land types (as shown on Map 6), namely:

- **Bd12** (non-red apedal soils, with plinthic subsoil); and
- **Fb6** (miscellaneous soils, usually shallow, sometimes calcareous).



Map 6: Land types - Wildebeestkuil 1 and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line

A summary of the dominant soil characteristics of the land types occurring is given in Table 2 below. The colours used correspond to those used on Map 6.

The distribution of soils with high, medium and low agricultural potential within the land types is also given, with the dominant class shown in **highlighted bold** type (Table 2).

The soils are predominantly shallow, with much exposed rock. The prevailing dominant agricultural potential of the area is thus low to very low, defined mainly by the restricted rooting depth (Table 2). Where subsurface restrictions, such as rock or hard plinthite, are present at shallow depth (generally less than 450 mm from the surface), then the arable agricultural potential will be significantly restricted. More than 80% of the area has low potential arable soils and rock (Table 2).

These soils would be most suited to grazing of livestock, and the prevailing grazing potential of the area is moderate, at 10-12 ha/LSU (Schoeman & van der Walt, 2004).

> *It should be clearly noted that, since the information contained in the land type survey is of a reconnaissance nature, only the general dominance of the soils in the landscape can be given, and not the actual areas of occurrence within a specific land type. Also, other soils that were not identified due to the scale the land type survey may also occur.*

As can be seen from the locality maps (Maps 1 and 2 of this report), the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV & 132kV Power Line fall within different land type units, namely Fb6 and Bd12 respectively. While the details of the specific soils vary somewhat (Table 2), the overall occurrence of different agricultural potential classes does not vary significantly, as both mapping units are dominated by low potential soils, with little or no high potential soils in either vicinity. This is borne out by the lack of any cultivation or other agricultural activities on the site.

Table 2: Land types occurring (with soils in order of dominance) - Wildebeestkuil 1 and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line

Land Type	Dominant soils	Depth (mm)	Percent of land type	Characteristics	Agric. Potential (%)
Bb12	Clovelly 36, Glencoe 36	450-550	25.4%	Yellow-brown, weakly structured, sandy loam to sandy clay loam soils on hard rock or ferricrete.	High: 0.0 Mod: 25.7 **Low: 74.3**
	Glenrosa 13/1416/17, Mispah 10	100-250	15.9%	Grey-brown, weakly structured, sandy loam to sandy lay loam topsoil on hard to weathering rock or ferricrete	
	Avalon 36	650-750	13.6%	Yellow-brown, weakly structured, sandy loam to sandy clay loam soils on hard rock or ferricrete.	
Fb6	Glenrosa 16/17, Mispah 10/11	150-300	47.3%	Grey-brown, weakly structured, sandy loam to sandy clay loam topsoil on hard to weathering rock or ferricrete	High: 2.4 Mod: 13.2 **Low: 84.4**
	Rock	-	30.0%	Exposed surface rock outcrops	
	Arcadia 20	450-750	24.8%	Dark brown to black, swelling clay soils, usually calcareous	

It should be noted that the Agricultural Potential referred to in column 6 refers to **soil potential only**, *and does not take prevailing climatic conditions into account.*

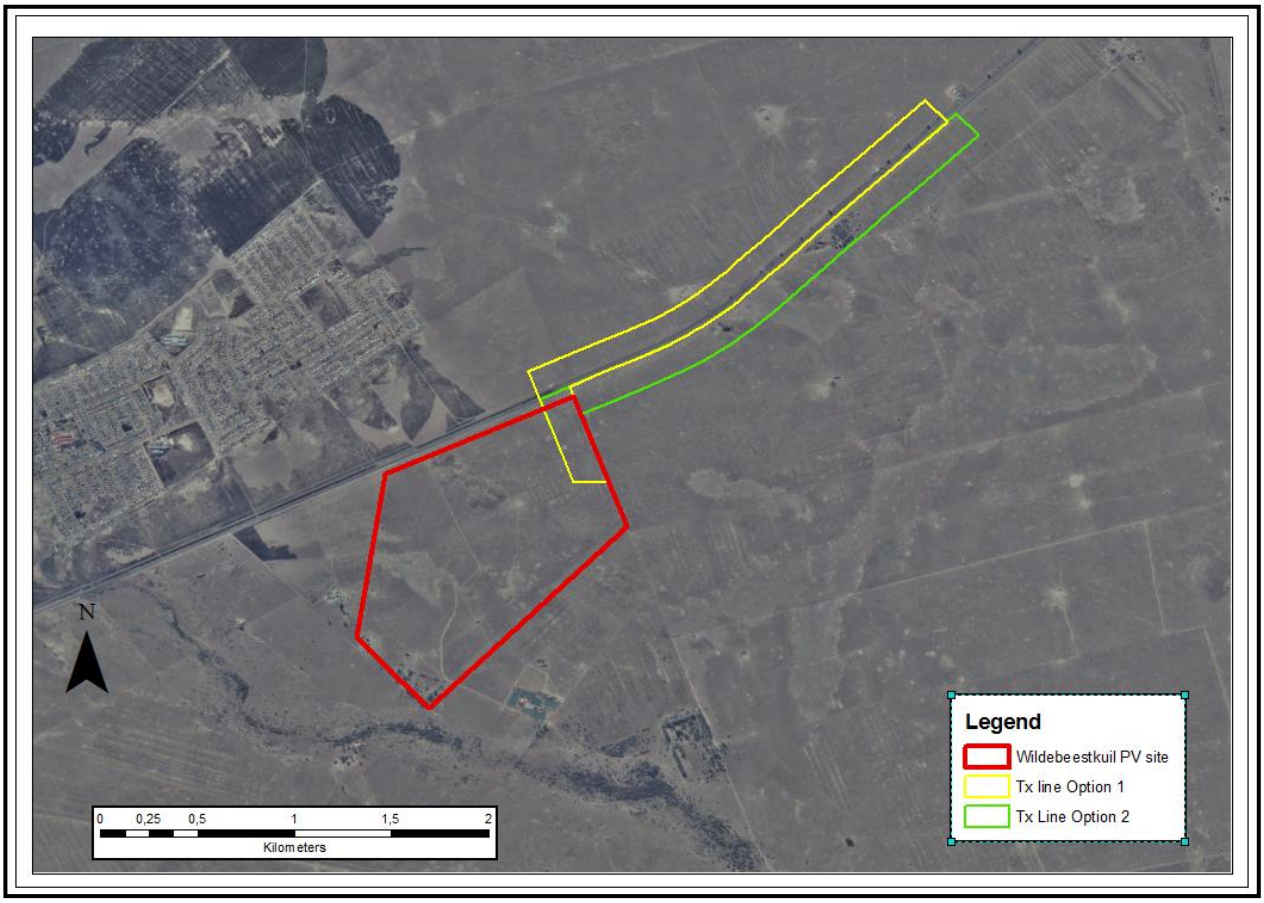
4 POTENTIAL IMPACTS

It should be noted that due to the fact that the proposed solar PV plants and 132kV power lines are located on the same properties and are identical in nature, the same impacts have been identified for both proposed developments. In addition, the recommended mitigation measures are applicable for both proposed solar PV plants and 132kV power lines. Where impacts and/or mitigation measures are project specific, this has been indicated.

The major potential impacts that would occur as a result of the construction of the solar plants, 132kV power lines and associated infrastructure (including related activities) would be:

- The loss of potentially productive agricultural land, along with a reduction in land capability, and
- Increased incidence of soil erosion, mainly by wind.

However, with a greater percentage of the soils having at best a low potential for agricultural production, the impact on the loss of land would be low (see Table 3). In addition, the Google Earth map shows that the existing land use in the proposed development areas shows no evidence of cultivation or other agricultural activities (see Map 7).



Map 7: Land use patterns - Wildebeestkuil 1 and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line

Where buildings and associated infrastructure are established, this impact is virtually permanent. The area that will be covered by the panels will remain unused and disturbed to some degree with regard to the frames holding the panels. Underground cabling is foreseen to add to the disturbance of the soil's natural state and thus deemed impactful on these soils. There may also be an increased hazard of soil erosion, due to disturbance. However,

due to the medium texture of the soils, as well as the virtually flat topography, this is not seen as significant if proper mitigation measures are taken.

Such mitigation would involve keeping the removal of surface vegetation to an absolute minimum, putting in soil conservation measures (ridges, culverts etc.) where necessary, and periodic monitoring of the immediate vicinity to ensure that no excessive erosion has commenced.

5 IMPACT METHODOLOGY

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

5.1 Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 3.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

5.2 Impact Rating System

The impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the various project stages, as follows:

- Planning;
- Construction;
- Operation; and
- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact is detailed.

Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

Table 3: Rating of impacts criteria

ENVIRONMENTAL PARAMETER		
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g. Surface Water).		
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
EXTENT (E)		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	**Site**	The impact will only affect the site
2	**Local/district**	Will affect the local area or district
3	**Province/region**	Will affect the entire province or region
4	**International and National**	Will affect the entire country
PROBABILITY (P)		
This describes the chance of occurrence of an impact		
1	**Unlikely**	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	**Possible**	The impact may occur (Between a 25% to 50% chance of occurrence).

3	**Probable**	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	**Definite**	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY (R)		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	**Completely reversible**	The impact is reversible with implementation of minor mitigation measures
2	**Partly reversible**	The impact is partly reversible but more intense mitigation measures are required.
3	**Barely reversible**	The impact is unlikely to be reversed even with intense mitigation measures.
4	**Irreversible**	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	**No loss of resource.**	The impact will not result in the loss of any resources.
2	**Marginal loss of resource**	The impact will result in marginal loss of resources.
3	**Significant loss of resources**	The impact will result in significant loss of resources.
4	**Complete loss of resources**	The impact is result in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	**Short term**	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	**Medium term**	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	**Long term**	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	**Permanent**	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	**Low**	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.

2	**Medium**	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	**High**	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	**Very high**	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

SIGNIFICANCE (S)

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.

The table below quantifies the impacts.

IMPORTANT – The information in the table below applies equally to the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line. There are no meaningful differences between the two (2) sites regarding soils and/or agricultural potential, at the scale of this investigation.

Table 4: Impact rating table for Wilderbeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line (including associated infrastructure) – All phases

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase																				
Soil and Agricultural Potential	Loss of agricultural land	1	3	2	2	3	2	26	-	Medium	**Avoid any cultivated and especially irrigated areas, if possible.**	1	3	2	2	3	1	24	-	Medium
	Soil erosion (wind or water) caused by surface disturbance	2	3	3	3	3	3	42	-	Medium	Avoid extensive vegetation removal; re-vegetate as soon as possible and maintain cover (irrigate if necessary)	1	2	1	2	1	2	14	-	Low
Operation Phase																				
Soil and Agricultural Potential	Loss of agricultural land	1	3	2	2	3	2	26	-	Medium	**Avoid any cultivated and especially irrigated areas, if possible.**	1	3	2	2	3	1	24	-	Medium
	Soil erosion (wind or water) caused by surface disturbance	2	3	3	3	3	4	56	-	High	Avoid extensive vegetation removal; re-vegetate as soon as possible and maintain cover (irrigate if necessary)	1	2	1	2	1	2	14	-	Low
Decommissioning Phase																				
Soil and Agricultural Potential	Loss of agricultural land	1	3	2	2	3	2	26	-	Medium	**Avoid any cultivated and especially irrigated areas, if possible.**	1	3	2	2	3	1	24	-	Medium

	Soil erosion (wind or water) caused by surface disturbance	2	3	3	3	3	3	42	-	Medium	Avoid extensive vegetation removal; re-vegetate as soon as possible and maintain cover (irrigate if necessary)	1	2	1	2	1	2	14	-	Low
Cumulative																				
Soil ecology and functioning	Proposed project can contribute to overall loss of soil health and productivity	2	3	3	3	3	4	56	-	Medium	**Minimise soil disturbance, re-vegetate all disturbed areas and monitor periodically (6-monthly or seasonally)**	1	3	2	2	2	2	20	-	Low

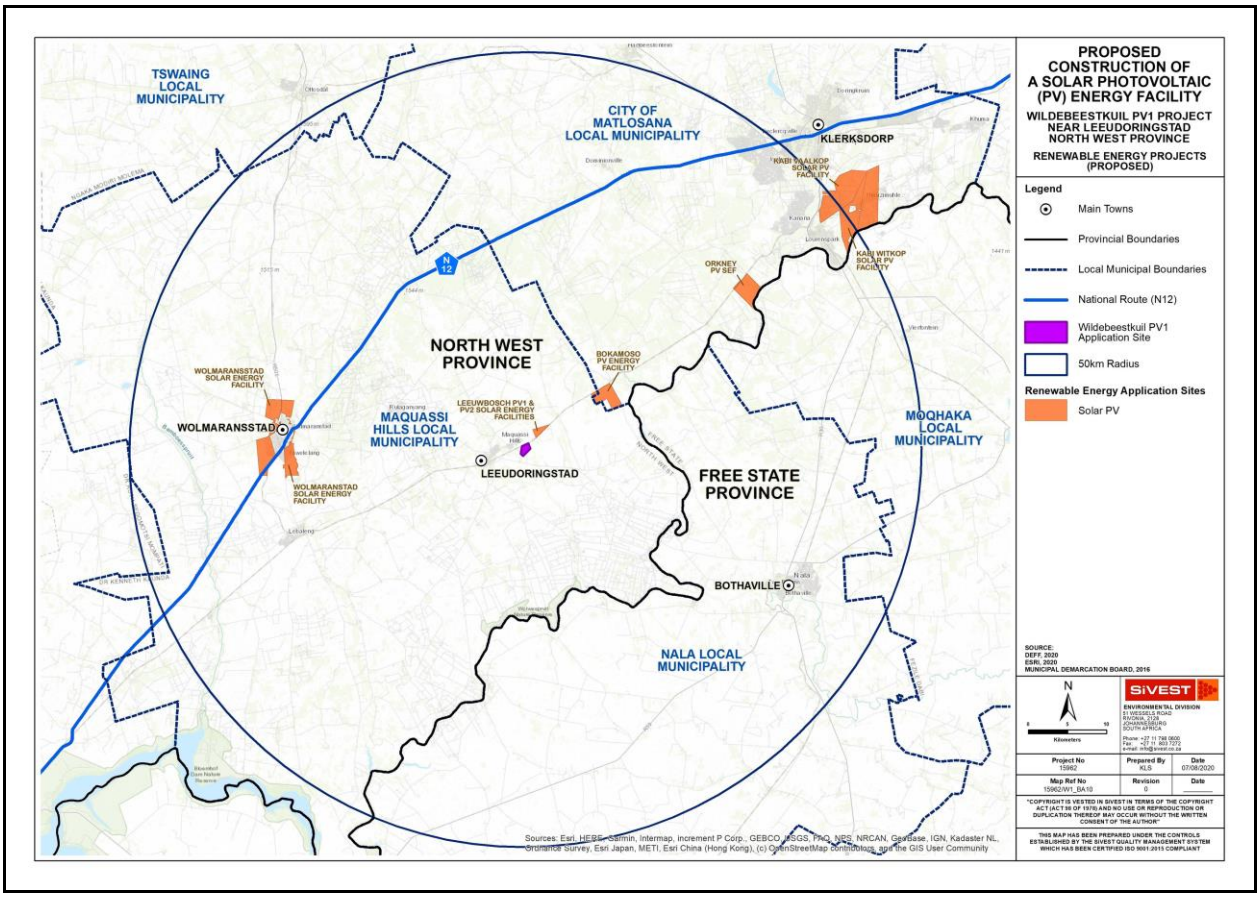
5.3 Cumulative Impact Assessment

Cumulative impact assessments must be undertaken for the proposed solar PV plants and power lines in order to determine the cumulative impact that will materialise should other Renewable Energy Facilities (REFs) and large-scale industrial developments be constructed within 50 km of the proposed developments (Maps 8 and 9).

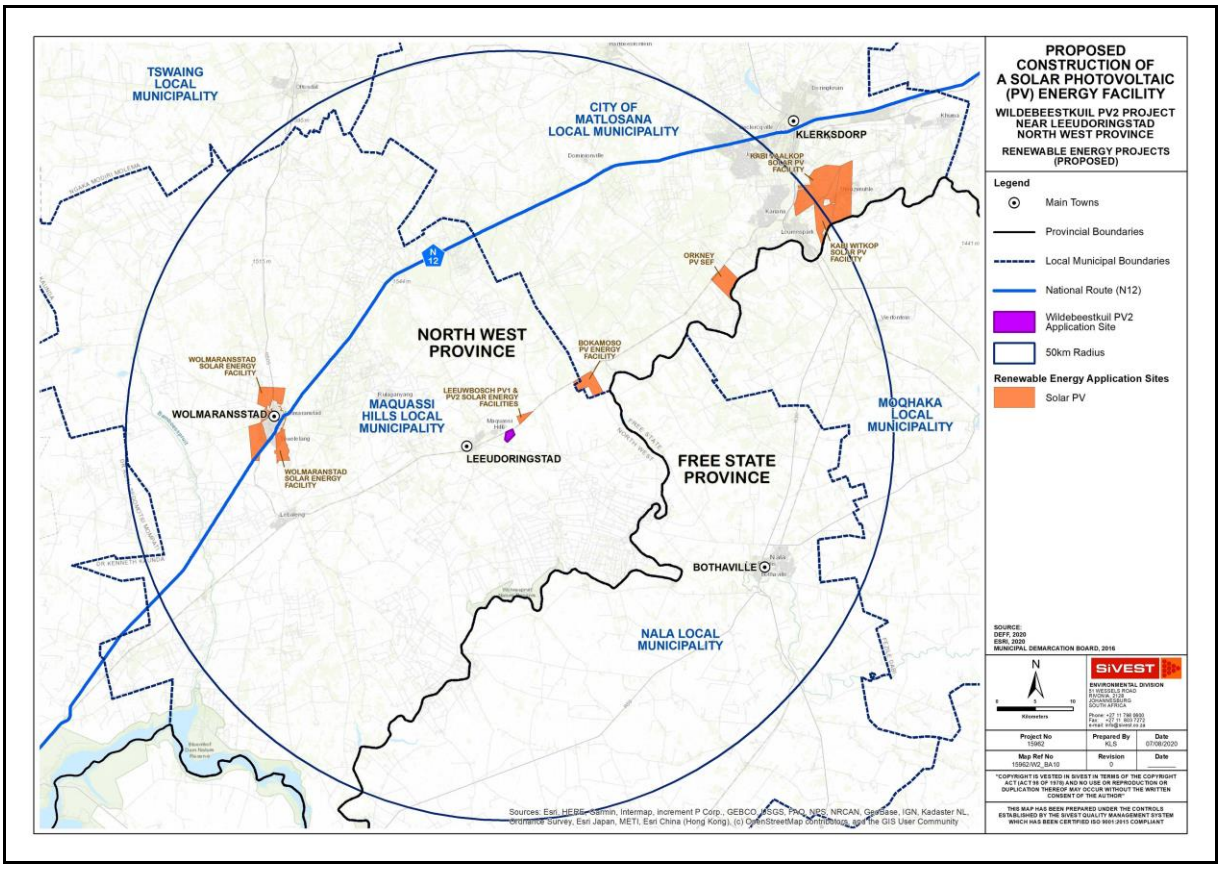
The area has seen a notable interest from developers of various renewable energy projects, which could be associated with the solar energy resource potential found in the region, proximity to the existing substation and its evacuation capacity, as well as other factors. Such developments, whether already approved or only proposed, need to be considered as they have the potential to create numerous cumulative impacts, whether positive or negative, if implemented. Table 5 below lists the projects that will need to be considered when examining the cumulative impacts.

Table 5: Proposed Renewable Energy Projects in the Area

Proposed Development	Reference Number	Current Status of BA / EIA	Proponent	Proposed Capacity	Farm Details
Leeuwbosch 1 Solar PV Plant Project	TBA	BA ongoing	Leeuwbosch PV Generation (Pty) Ltd	9.9MW	Farm Leeuwbosch 44
Leeuwbosch 2 Solar PV Plant Project	TBA	BA ongoing	Leeuwbosch PV Generation (Pty) Ltd	9.9MW	Farm Leeuwbosch 44
Wildebeestkuil 1 Solar PV Plant Project	TBA	BA ongoing	Wildebeestkuil PV Generation (Pty) Ltd	9.9MW	Farm Wildebeestkuil 59
Wildebeestkuil 2 Solar PV Plant Project	TBA	BA ongoing	Wildebeestkuil PV Generation (Pty) Ltd	9.9MW	Farm Wildebeestkuil 59
Bokamoso Solar Energy Facility	14/12/16/3/3/2/559	Project has received environmental authorisation	SunEdison	75MW	A portion of the farm Matjesspruit 145



Map 8: Renewable energy projects within 50km of Wilderbeestkuil 1 Solar PV Plant & 132kV Power Line



Map 9: Renewable energy projects within 50km of Wilderbeestkuil 2 Solar PV Plant & 132kV Power Line

Regarding the soil resource and agricultural potential, there will be little or no impacts on any specific site due to other developments in the vicinity. Virtually all impacts would be confined to site. The only impact that could occur from another site might be soil removal by wind, due to large-scale vegetation clearance that could produce a bare soil surface. However, this area (Leeudoringstad) is not identified as being susceptible to wind erosion.

The significance of the cumulative impacts associated with the proposed developments have been rated in Table 4 above according to the SiVEST Impact Rating Methodology. The impact assessment has revealed that cumulative impacts are expected to be low after the implementation of the recommended mitigation measures.

5.4 'No Go' Alternative

Consideration must be given to the 'no-go' option in the BA process. The 'no-go' option assumes that the site remains in its current state, i.e. there is no construction of solar PV plants, 132kV power line and associated infrastructure in the proposed project area and the *status quo* would proceed.

5.5 Sensitive areas

There are no especially sensitive areas regarding soils that can be identified at this stage. This is true for both the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line.

6 COMPARATIVE ASSESSMENT OF ALTERNATIVES

As mentioned, three (3) power line corridor route alternatives for the proposed 132kV power line associated with each solar PV plant were identified and assessed. These alternatives essentially provide for different power line route alignments contained within an assessment corridor (Maps 1 and 2). The three (3) power line corridor route alternatives associated with each solar PV plant were comparatively assessed from an agriculture and soils perspective. The results are provided in Table 6 below.

Table 6: Combined Comparative Assessment of Power Line Corridor Route Alternatives – Wildebeestkuil 1 and Wildebeestkuil 2

Key to Table 6

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Wildebeestkuil 1 Solar PV Plant & 132kV Power Line:

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Route Alternative		
Option 1	No preference	Prevailing low agricultural potential, reversible impacts and isolated nature of infrastructure
Option 2A	No preference	Prevailing low agricultural potential, reversible impacts and isolated nature of infrastructure
Option 2B	No preference	Prevailing low agricultural potential, reversible impacts and isolated nature of infrastructure

Wildebeestkuil 2 Solar PV Plant & 132kV Power Line:

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Route Alternative		
Option 1	No preference	Prevailing low agricultural potential, reversible impacts and isolated nature of infrastructure
Option 2A	No preference	Prevailing low agricultural potential, reversible impacts and isolated nature of infrastructure
Option 2B	No preference	Prevailing low agricultural potential, reversible impacts and isolated nature of infrastructure

Based on the comparative assessment of alternatives undertaken in the tables above, each of the project alternatives (PV Plant and grid corridors) are assessed as equally suitable.

7 CONCLUSION

As mentioned, a combined report has been compiled for both proposed solar PV plants and power lines (namely Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line). This is due to the fact that the proposed solar PV plants and power line corridors are located on the same properties, are identical in nature and have the same associated impacts and recommended mitigation measures.

The construction of the two (2) solar PV plants, 132kV power lines and associated infrastructure at the chosen site will have minimal impact on the loss of agricultural land, due to the small percentage of high potential agricultural land indicated by the Land Type survey information.

As far as the soils are concerned, **as long as the proposed mitigation measures are adhered to**, there should not be any significant cumulative impacts occurring, as any impact on agricultural potential will be contained to the specific site itself.

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APPENDIX

Specialist Terms of Reference

PROPOSED DEVELOPMENT OF THE 9.9MW WILDEBEESTKUIL 1 SOLAR PHOTOVOLTAIC (PV) PLANT, 132kV POWER LINE AND ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE NORTH WEST PROVINCE, MAQUASSI HILLS LOCAL MUNICIPALITY IN THE DR KENNETH KAUNDA DISTRICT MUNICIPALITY

TERMS OF REFERENCE (ToR) FOR SPECIALIST STUDIES

2 INTRODUCTION

The purpose of the Terms of Reference (ToR) is to provide the specialist team with a consistent approach to the specialist studies that are required as part of the Basic Assessment (BA) process being conducted in respect of the proposed solar photovoltaic (PV) plant and associated power line development. This will enable comparison of environmental impacts, efficient review, and collation of the specialist studies into the BA report, in accordance with the latest requirements of the EIA Regulations, 2014 (as amended).

3 PROCESS

In terms of the Environmental Impact Assessment (EIA) Regulations, which were published on 04 December 2014 and amended on 07 April 2017 [promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017], various aspects of the proposed development are considered listed activities under GNR 327 and GNR 324 (this project is considered a BA process due to energy capacity thresholds of under 20MW and vegetation clearance thresholds of under 20ha), which may have an impact on the environment and therefore require authorisation from the provincial competent authority, namely the North West Department of Economic Development, Environment, Conservation and Tourism (NW DEDECT), prior to the commencement of such activities.

4 PROJECT DESCRIPTION

4.1 Project history

The original BA process for the proposed Wildebeestkuil PV Generation (Pty) Ltd (hereafter referred to as "Wildebeestkuil PV Generation") solar photovoltaic (PV) plant was initiated in August 2016. All specialist studies were undertaken and subsequently all site sensitivities were identified. The specialist studies and draft basic assessment reports (DBARs) were completed and released for 30-day public review. The BA

was however put out on hold prior to submitting the final basic assessment reports (FBARs) to the Department of Environmental Affairs (DEA). In February 2017, the proposed capacity and layout of the solar PV plant was amended, and a new connection point and associated power line corridors were assessed. However, the project was put on hold prior to submitting the application forms to the DEA or commencing with the legislated public participation process. In August of 2020, Wildebeestkuil PV Generation proposed an additional 9.9MW PV plant on the Wildebeestkuil site (now referred to as the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line) outside of all site sensitivities that were identified in 2016, and as such specialist studies have been commissioned to assess and verify the now two (2) solar PV plants and 132kV power lines under the new Gazetted specialist protocols[5].

4.2 Project location

Wildebeestkuil PV Generation is proposing to construct a solar PV plant, 132kV power line and associated infrastructure approximately 4km east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, which falls within the Dr Kenneth Kaunda District Municipality in the North West Province of South Africa (hereafter referred to as the "proposed development") (Department Ref No.: To be Allocated). The proposed development will have a total maximum generation capacity of up to approximately 9.9 megawatt (MW) and will be referred to as the Wildebeestkuil 1 Solar PV Plant and 132kV Power Line. SiVEST Environmental Division (hereafter referred to as "SiVEST") has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the BA process for the proposed construction of the Wildebeestkuil 1 Solar PV Plant, 132kV power line and associated infrastructure. The overall objective of the solar PV plants and power lines is to generate electricity (by capturing solar energy) to feed into the national electricity grid and "wheel" the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a National Energy Regulator of South Africa (NERSA)-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

The proposed solar PV plant will be located on the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;

[5] GOVERNMENT GAZETTE No. 43110, 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 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998, WHEN APPLYING FOR ENVIRONMENTAL AUTHORISATION, 20 MARCH 2020.

In terms of sections 24(5)(a), (h) and 44 of the National Environmental Management Act, 1998, prescribe general requirements for undertaking site sensitivity verification and for protocols for the assessment and minimum report content requirements of environmental impacts for environmental themes for activities requiring environmental authorisation, as contained in the Schedule hereto. When the requirements of a protocol apply, the requirements of Appendix 6 of the Environmental Impact Assessment Regulations, as amended, (EIA Regulations), promulgated under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), are replaced by these requirements. Each protocol applies exclusively to the environmental theme identified within its scope. Multiple themes may apply to a single application for environmental authorisation, and assessments for these themes must be undertaken in accordance with the relevant protocol, or where no specific protocol has been prescribed, in accordance with the requirements of the EIA Regulations.

- Portion 14 of the Farm Wildebeestkuil No. 59; and
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59.

The combined extent of the above-mentioned properties is approximately 115.5 hectares (ha). The proposed solar PV plant and associated infrastructure assessed as part of this BA will however only occupy a portion of the above-mentioned properties.

The power line corridor alternatives associated with each proposed solar PV plant which were assessed as part of the respective BA processes traverse the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;
- Portion 14 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 5 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 7 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 29 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59;
- Portion 35 of the Farm Leeuwbosch No. 44;
- Portion 36 of the Farm Leeuwbosch No. 44;
- Portion 37 of the Farm Leeuwbosch No. 44; and
- Portion 38 of the Farm Leeuwbosch No. 44.

The proposed development is located directly west of the Harvard Substation, where the current supply of electricity for the local areas and businesses is extracted from.

4.3 Solar PV Plant Components

The key components to be constructed are listed below:

- Solar PV field (arrays) comprising multiple PV modules.
- PV panel mountings. PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology.
- Each PV module will be approximately 2.5m long and 1.2m wide and mounted on supporting structures above ground. The final design details will become available during the detailed design phase of the proposed development, prior to the start of construction.
- The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development.

In addition, related infrastructure required are:

- Underground cabling (≈0.8m × 0.6 wide)
- Permanent Guard House (≈876m²)
- Temporary building zone (≈2994m²)
- Switching Substation (≈2000m²)
- Internal gravel roads (≈3.5m width)
- Upgrade to existing roads; and

- Site fencing (≈2.1m high)

In addition to the above, the electricity generated by the proposed solar PV plant will be fed into the national electricity grid via a 132kV power line, which will connect to the Leeudoringstad Solar Plant Substation (part of a separate BA process)[6]. The proposed 132kV power line will consist of a series of towers anticipated to be located approximately 200m to 250m apart at this stage. The type of power line towers will be determined during the final design stages of the proposed development, prior to construction commencing. The height will vary based on the terrain, but will ensure minimum overhead line (OHL) line clearances with buildings and surrounding infrastructure. The exact location of the towers will be determined during the final design stages of the proposed development.

For the purpose of this BA, corridors between approximately 60m and 150m wide were assessed for the proposed power line corridor route alternatives (see **Section 4** below). This is to allow for flexibility to route the power lines within the assessed corridors. As such, the selected preferred power lines will be routed within the assessed corridors. The final servitudes will be routed within the power line corridors, and it expected that the servitude swill not exceed 32m.

Once fully developed, the intention is to generate electricity (by capturing solar energy) to feed into the national electricity grid and "wheel" the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a NERSA-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

The construction phase will be between 12 and 24 months and the operational lifespan will be approximately 20 years, depending on the length of the power purchase agreement with the relevant off taker.

5 BA ALTERNATIVES

5.1 Location alternatives

No site alternatives for the proposed developments are being considered as the placement of solar PV installations and power lines is dependent on several factors, all of which are favourable at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, solar resource site accessibility and current land use.

5.2 Technology alternatives

No other activity / technology alternatives are being considered. Renewable energy development in South Africa is highly desirable from a social, environmental and development point of view. Based on the flat terrain, the climatic conditions and current land use being agricultural, it was determined that the

[6] Proposed Leeudoringstad Solar Plant Substation part of separate BA process and will be authorised under a separate EA.

proposed site would be best-suited for a solar PV plant and associated power line, instead of any other type of renewable energy technology. It is generally preferred to install wind energy facilities (WEFs) on elevated ground. In addition, concentrated solar power (CSP) installations are not feasible because they have a high water requirement and the project site is located in a relatively arid area. There is also not enough rainfall in the area to justify a hydro-electric plant. Therefore, the only feasible technology alternative on this site is solar PV with associated power line, and as such this is the only technology alternative being considered.

5.3 Layout alternatives

No design or layout alternatives for the PV development area, Switching Substation, Guard house and Temporary Building Zone (and all other associated infrastructure) are being considered or assessed as part of the current BA process. Design and layout alternatives were considered and assessed as part of a previous BA process that was never completed, and as such the PV development area, Switching Substation, Guard house and Temporary Building Zone (and all other associated infrastructure) have been placed to avoid site sensitivities identified as part of a previous BA process as well as the current BA process. Specialist studies were originally undertaken in 2016 and all current layouts and/or positions being proposed were selected based on the environmental sensitivities identified as part of these studies in 2016. All specialist studies which were undertaken in 2016 were however updated in 2020 (including ground-truthing, where required) to focus on the impacts of the layout being proposed as part of the current project. The results of the updated specialist assessments have informed the layout being proposed as part of the current BA process. The proposed layout has therefore been informed by the identified environmental sensitive and/or “no-go” areas.

Three (3) power line corridor route alternatives for the proposed 132kV power line were however identified and assessed by the respective specialists as part of the current BA process. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The power line corridor route alternatives were informed by the identified environmental sensitive and/or “no-go” areas. The various power line corridor alternatives are described in **Section 5.10** below.

5.4 The operational aspects of the activity

No operational alternatives were assessed in the BA, as none are available for solar PV installations and power lines.

5.5 ‘No-go’ alternative

The “no-go” alternative is the option of not fulfilling the proposed project. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the “no-go” option would entail no development.

The “no-go” option is a feasible option; however, this would prevent the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

6 SPECIALIST REPORT REQUIREMENTS

The specialist assessments should include the following sections:

6.1 Project Description

The specialist report must include the project description as provided above.

6.2 Terms of Reference (ToR)

The specialist report must include an explanation of the Terms of Reference (ToR) applicable to the specialist study. In addition, a table must be provided at the beginning of the specialist report listing the requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended) and cross referencing these requirements with the relevant sections in the report. An MS Word version of this table will be provided by SiVEST.

6.3 Legal Requirements and Guidelines

The specialist report must include a thorough overview of all applicable best practice guidelines, relevant legislation and authority requirements.

6.4 Methodology

The report must include a description of the methodology applied in carrying out the specialist assessment.

6.5 Specialist Findings / Identification of Impacts

The report must present the findings of the specialist studies and explain the implications of these findings for the proposed development (e.g. permits, licenses etc.). This section of the report should also identify any sensitive and/or ‘no-go’ areas on the development site which should be avoided.

The reports should be accompanied with spatial datasets (shapefiles, KML) and accompanying text documents if required.

6.6 Impact Rating Methodology

The impacts of the proposed solar PV plant and 132kV power line (during the Construction, Operation and Decommissioning phases) are to be assessed and rated according to the methodology developed by SiVEST. Specialists will be required to make use of the impact rating matrix provided (in Excel format) for

this purpose. Please note that the significance of Cumulative Impacts should also be rated in this section. Both the methodology and the rating matrix will be provided by SiVEST.

Please be advised that this section must include mitigation measures aimed at minimising the impact of the proposed development.

6.7 Input to The Environmental Management Program (EMPr)

The report must include a description of the key monitoring recommendations for each applicable mitigation measure identified for each phase of the proposed development for inclusion in the Environmental Management Program (EMPr) or Environmental Authorisation (EA).

Please make use the Impact Rating Table (in Excel format) provided for each of the phases (i.e. Design, Construction, Operation and Decommissioning).

6.8 Cumulative Impact Assessment

Cumulative impact assessments must be undertaken for the proposed solar PV plant in order to determine the cumulative impact that will materialise should other Renewable Energy Facilities (REFs) and large-scale industrial developments be constructed within 50km of the proposed development.

The cumulative impact assessment must contain the following:

- A cumulative environmental impact statement noting whether the overall impact is acceptable; and
- A review of the specialist reports undertaken for other REFs and an indication of how the recommendations, mitigation measures and conclusion of the studies have been considered.

In order to assist the specialists in this regard, SiVEST will provide the following documentation / data:

- A summary table listing all REFs identified within 50km of the proposed solar PV plant;
- A map showing the location of the identified REFs;
- KML files; and
- Relevant EIA / BA reports that could be obtained.

The list of renewable energy facilities that must be assessed as part of the cumulative impact will be provided.

6.9 "No-Go" Alternative

Consideration must be given to the "no-go" option in the BA process. The "no-go" option assumes that the site remains in its current state, i.e. there is no construction of a Solar PV Plant, 132kV power line and associated infrastructure in the proposed project area and the status quo would proceed.

6.10 Comparative Assessment of Alternatives

As mentioned, layout alternatives, which subsequently informed the area for the potential erection of PV panels for the proposed solar PV plant, were identified and comparatively assessed as part of the BA process undertaken in 2016. Specialist studies were originally undertaken in 2016 and all current layouts and/or positions being proposed were selected based on the environmental sensitivities identified as part of these studies in 2016. All specialist studies which were undertaken in 2016 were however updated in 2020 (including ground-truthing, where required) to focus on the impacts of the layout being proposed as part of the current project. The results of the updated specialist assessments have informed the layout being proposed as part of the current BA process.

As the positions of the proposed PV development area, Switching Substation, Guard house and Temporary Building Zone (as well as all other associated infrastructure) have already been determined taking the identified environmental sensitive and/or "no-go" areas into consideration, the specialist is to update the comparative assessment as per the latest table provided by SiVEST.

Three (3) power line corridor route alternatives for the proposed 132kV power line were however identified and assessed by the respective specialists as part of the current BA process. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The power line corridor route alternatives were informed by the identified environmental sensitive and/or "no-go" areas. The various power line corridor route alternatives are described below.

1) Power Line Corridor Option 1:

This involves an overhead power line which will run north of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen as 'preferred' for the Leeudoringstad Solar Plant Substation site[7]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

2) Power Line Corridor Option 2A:

This involves an overhead power line which will run south of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen as 'preferred' for the Leeudoringstad Solar Plant Substation site[7]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

3) Power Line Corridor Option 2B:

[7] 132kV power line corridor route associated with solar PV plant intrinsically linked to Leeudoringstad Solar Plant Substation site (part of separate on-going BA process). Leeudoringstad Solar Plant Substation site chosen as "preferred" by respective specialists as part of that separate BA process therefore informed connection point for power line corridor being proposed as part of this BA application.

This involves an underground power line which will run south of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen as 'preferred' for the Leeudoringstad Solar Plant Substation site[7]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

The specialist is therefore also to undertake comparative assessment for the above-mentioned power line corridor alternatives as per the table provided by SiVEST.

Key

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Alternative	**Preference**	**Reasons (incl. potential issues)**
Power Line Corridor Route Alternative		
Option 1		
Option 2A		
Option 2B		

6.11 Conclusion / Impact Statement

The conclusion section of the specialist reports must include an **Impact Statement**, indicating whether any fatal flaws have been identified and ultimately whether the proposed development can be authorised or not (i.e. whether EA should be granted / issued or not).

6.12 Executive Summary

Specialists must provide an Executive Summary which summarises the findings of their report to allow for easy inclusion in the BA reports.

7 DELIVERABLES

All specialists will need to submit the following deliverables:

- 1 x Draft Specialist Report for inclusion in DBAR no later than 07 September 2020 and updated version based on EAP and applicant review no later than 11 September 2020;
- 1 x Final Specialist Report for inclusion in FBAR (should updates and/or revisions be required);

- A copy of the Specialist Declaration of Interest (DoI) form, containing original signatures. This form will be provided to the specialists. ***Please note that the undertaking / affirmation under oath section of the report must be signed by a Commissioner of Oaths***; and
- All data relating to the studies, such as shape files, photos and maps (see **Section 7** below).

8 GENERAL SUBMISSION REQUIREMENTS

Please ensure that your specialist report includes the following:

- A detailed description of the study's methodology; indication of the locations and descriptions of the development footprint, and all other associated infrastructures that they have assessed and are recommending for authorisations;
- Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the correct season and providing that as a limitation will not be allowed;
- All specialist studies must be final, and provide detailed / practical mitigation measures for the preferred alternative and recommendations, and must not recommend further studies to be completed post EA;
- Should a specialist recommend specific mitigation measures, these must be clearly indicated;
- Regarding cumulative impacts:
    - Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land.
    - A detailed process flow to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project.
    - Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology used in the process.
    - The significance rating must also inform the need and desirability of the proposed development.
    - A cumulative impact environmental statement on whether the proposed development must proceed.
- The report must in line with the DEA Screening Tool Specialist Theme Protocols (As gazetted 20 March 2020) if they apply. If they do not, the report must be written in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended);
- A table at the beginning of your report cross referencing how the requirements for specialist according to Appendix 6 of the EIA Regulations, 2014 (as amended) has been adhered to. An MS Word version will be provided;
- A thorough overview of all applicable legislation, policies, guidelines. etc.;
- Identification of sensitive and/or “no-go” areas to be avoided;
- Please note that the Department considers a “no-go” area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure is allowed in the “no-go” areas;

- Should the specialist definition of “no-go” area differ from the Departments definition; this must be clearly indicated. The specialist must also indicate the “no-go” area's buffer if applicable;
- Recommend mitigation measures in order to minimise the impact of the proposed development;
- Provide implications of specialist findings for the proposed development (e.g. permits, licenses etc.);
- Specify if any further assessment will be required;
- Include an Impact Statement, concluding whether any fatal flaws have been identified and ultimately whether the proposed development can be authorised or not (i.e. whether EA should be granted / issued or not); and
- A copy of the Specialist Declaration of Interest (DoI) form, containing original signatures, must be appended to all Draft and Final Reports. This form will be provided to the specialists. ***Please note that the undertaking / affirmation under oath section of the report must be signed by a Commissioner of Oaths.***

9 DEADLINES AND REPORT SUBMISSION

- Draft Specialist Report for inclusion in DBAR no later than 07 September 2020 and updated version based on EAP and applicant review no later than 11 September 2020.
- Any changes arising based on stakeholder engagement no later than 16 October 2020

10 REPORT / DATA FORMATS

- All specialist reports must be provided in MS Word format;
- Where maps have been inserted into the report, SiVEST will require a separate map set in PDF format for inclusion in our submission;
- Where figures and/or photos have been inserted into the report, SiVEST will require the original graphic in .jpg format for inclusion in our submission; and
- ***Delineated areas of sensitivity must be provided in either ESRI shape file format or Google Earth KML format. Sensitivity classes must be included in the attribute tables with a clear indication of which areas are “No-Go” areas.***

11 SPECIALIST SPECIFIC ISSUES

Soils and Agricultural Potential

- Describe the existing environment in terms of soils, geology, land-use and agricultural potential. Significant soils and agricultural features or disturbances should be identified, as well as sensitive features and receptors within the project area. The description must include surrounding agricultural land uses and activities, to convey the local agricultural context;
- Describe and map soil types (soil forms), soil characteristics (soil depth, soil colour, limiting factors, and clay content of the top and sub soil layers), and degradation and erodibility of soils etc. to the extent necessary to inform this assessment;
- Varying sensitivities of the soils and agricultural potential must be mapped and highlighted;

- The assessment is to be based on existing information, and professional experience and field work conducted by the specialist, as considered necessary and in accordance with relevant legislated requirements;
- Identify and assess the potential impacts of the proposed development on loss of agricultural land, soils and agriculture, including impacts of associated infrastructure, such as the buildings, fencing etc. and provide relevant mitigation measures to include in the environmental management plan;
- Identify any protocols, legal and permit requirements relating to soil and agricultural potential impacts that are relevant to this project and the implications thereof;
- Map sensitivity of the site and clearly show no-go areas i.e. existing irrigated fields/ cultivated lands; and
- The report needs to fulfil the terms of reference for an agricultural study as set out in the National Department of Agriculture's document, Regulations for the evaluation and review of applications pertaining to renewable energy on agricultural land, dated September 2011, with an appropriate level of detail for the agricultural suitability and soil variation on site (which may therefore be less than the standardised level of detail stipulated in the above regulations).

PROPOSED DEVELOPMENT OF THE 9.9MW WILDEBEESTKUIL 2 SOLAR PHOTOVOLTAIC (PV) PLANT, 132kV POWER LINE AND ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE NORTH WEST PROVINCE, MAQUASSI HILLS LOCAL MUNICIPALITY IN THE DR KENNETH KAUNDA DISTRICT MUNICIPALITY

TERMS OF REFERENCE (ToR) FOR SPECIALIST STUDIES

12 INTRODUCTION

The purpose of the Terms of Reference (ToR) is to provide the specialist team with a consistent approach to the specialist studies that are required as part of the Basic Assessment (BA) process being conducted in respect of the proposed solar photovoltaic (PV) plant and associated power line development. This will enable comparison of environmental impacts, efficient review, and collation of the specialist studies into the BA report, in accordance with the latest requirements of the EIA Regulations, 2014 (as amended).

13 PROCESS

In terms of the Environmental Impact Assessment (EIA) Regulations, which were published on 04 December 2014 and amended on 07 April 2017 [promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017], various aspects of the proposed development are considered listed activities under GNR 327 and GNR 324 (this project is considered a BA process due to energy capacity thresholds of under 20MW and vegetation clearance thresholds of under 20ha), which may have an impact on the environment and therefore require authorisation from the provincial competent authority, namely the North West Department of Economic Development, Environment, Conservation and Tourism (NW DEDECT), prior to the commencement of such activities.

14 PROJECT DESCRIPTION

14.1 Project history

The original BA process for the proposed Wildebeestkuil PV Generation (Pty) Ltd (hereafter referred to as “Wildebeestkuil PV Generation”) solar photovoltaic (PV) plant was initiated in August 2016. All specialist studies were undertaken and subsequently all site sensitivities were identified. The specialist studies and draft basic assessment reports (DBARs) were completed and released for 30-day public review. The BA

was however put out on hold prior to submitting the final basic assessment reports (FBARs) to the Department of Environmental Affairs (DEA). In February 2017, the proposed capacity and layout of the solar PV plant was amended, and a new connection point and associated power line corridors were assessed. However, the project was put on hold prior to submitting the application forms to the DEA or commencing with the legislated public participation process. In August of 2020, Wildebeestkuil PV Generation proposed an additional 9.9MW PV plant on the Wildebeestkuil site (now referred to as the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line) outside of all site sensitivities that were identified in 2016, and as such specialist studies have been commissioned to assess and verify the now two (2) solar PV plants and 132kV power lines under the new Gazetted specialist protocols[8].

14.2 Project location

Wildebeestkuil PV Generation is proposing to construct a solar PV plant, 132kV power line and associated infrastructure approximately 4km east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, which falls within the Dr Kenneth Kaunda District Municipality in the North West Province of South Africa (hereafter referred to as the "proposed development") (Department Ref No.: To be Allocated). The proposed development will have a total maximum generation capacity of up to approximately 9.9 megawatt (MW) and will be referred to as the Wildebeestkuil 2 Solar PV Plant and 132kV Power Line. SiVEST Environmental Division (hereafter referred to as "SiVEST") has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the BA process for the proposed construction of the Wildebeestkuil 2 Solar PV Plant, 132kV power line and associated infrastructure. The overall objective of the solar PV plants and power lines is to generate electricity (by capturing solar energy) to feed into the national electricity grid and "wheel" the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a National Energy Regulator of South Africa (NERSA)-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

The proposed solar PV plant will be located on the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;

[8] GOVERNMENT GAZETTE No. 43110, 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 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998, WHEN APPLYING FOR ENVIRONMENTAL AUTHORISATION, 20 MARCH 2020.

In terms of sections 24(5)(a), (h) and 44 of the National Environmental Management Act, 1998, prescribe general requirements for undertaking site sensitivity verification and for protocols for the assessment and minimum report content requirements of environmental impacts for environmental themes for activities requiring environmental authorisation, as contained in the Schedule hereto. When the requirements of a protocol apply, the requirements of Appendix 6 of the Environmental Impact Assessment Regulations, as amended, (EIA Regulations), promulgated under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), are replaced by these requirements. Each protocol applies exclusively to the environmental theme identified within its scope. Multiple themes may apply to a single application for environmental authorisation, and assessments for these themes must be undertaken in accordance with the relevant protocol, or where no specific protocol has been prescribed, in accordance with the requirements of the EIA Regulations.

- Portion 14 of the Farm Wildebeestkuil No. 59; and
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59.

The combined extent of the above-mentioned properties is approximately 115.5 hectares (ha). The proposed solar PV plant and associated infrastructure assessed as part of this BA will however only occupy a portion of the above-mentioned properties.

The power line corridor alternatives associated with each proposed solar PV plant which were assessed as part of the respective BA processes traverse the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;
- Portion 14 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 5 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 7 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 29 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59;
- Portion 35 of the Farm Leeuwbosch No. 44;
- Portion 36 of the Farm Leeuwbosch No. 44;
- Portion 37 of the Farm Leeuwbosch No. 44; and
- Portion 38 of the Farm Leeuwbosch No. 44.

The proposed development is located directly west of the Harvard Substation, where the current supply of electricity for the local areas and businesses is extracted from.

14.3 Solar PV Plant Components

The key components to be constructed are listed below:

- Solar PV field (arrays) comprising multiple PV modules.
- PV panel mountings. PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology.
- Each PV module will be approximately 2.5m long and 1.2m wide and mounted on supporting structures above ground. The final design details will become available during the detailed design phase of the proposed development, prior to the start of construction.
- The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development.

In addition, related infrastructure required are:

- Underground cabling (≈0.8m × 0.6 wide)
- Permanent Guard House (≈876m²)
- Temporary building zone (≈2994m²)
- Switching Substation (≈2000m²)
- Internal gravel roads (≈3.5m width)
- Upgrade to existing roads; and

- Site fencing (≈2.1m high)

In addition to the above, the electricity generated by the proposed solar PV plant will be fed into the national electricity grid via a 132kV power line, which will connect to the Leeudoringstad Solar Plant Substation (part of a separate BA process)[9]. The proposed 132kV power line will consist of a series of towers anticipated to be located approximately 200m to 250m apart at this stage. The type of power line towers will be determined during the final design stages of the proposed development, prior to construction commencing. The height will vary based on the terrain, but will ensure minimum overhead line (OHL) line clearances with buildings and surrounding infrastructure. The exact location of the towers will be determined during the final design stages of the proposed development.

For the purpose of this BA, corridors between approximately 60m and 150m wide were assessed for the proposed power line corridor route alternatives (see **Section 4** below). This is to allow for flexibility to route the power lines within the assessed corridors. As such, the selected preferred power lines will be routed within the assessed corridors. The final servitudes will be routed within the power line corridors, and it expected that the servitude swill not exceed 32m.

Once fully developed, the intention is to generate electricity (by capturing solar energy) to feed into the national electricity grid and "wheel" the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a NERSA-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

The construction phase will be between 12 and 24 months and the operational lifespan will be approximately 20 years, depending on the length of the power purchase agreement with the relevant off taker.

15 BA ALTERNATIVES

15.1 Location alternatives

No site alternatives for the proposed developments are being considered as the placement of solar PV installations and power lines is dependent on several factors, all of which are favourable at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, solar resource site accessibility and current land use.

15.2 Technology alternatives

No other activity / technology alternatives are being considered. Renewable energy development in South Africa is highly desirable from a social, environmental and development point of view. Based on the flat terrain, the climatic conditions and current land use being agricultural, it was determined that the

[9] Proposed Leeudoringstad Solar Plant Substation part of separate BA process and will be authorised under a separate EA.

proposed site would be best-suited for a solar PV plant and associated power line, instead of any other type of renewable energy technology. It is generally preferred to install wind energy facilities (WEFs) on elevated ground. In addition, concentrated solar power (CSP) installations are not feasible because they have a high water requirement and the project site is located in a relatively arid area. There is also not enough rainfall in the area to justify a hydro-electric plant. Therefore, the only feasible technology alternative on this site is solar PV with associated power line, and as such this is the only technology alternative being considered.

15.3 Layout alternatives

No design or layout alternatives for the PV development area, Switching Substation, Guard house and Temporary Building Zone (and all other associated infrastructure) are being considered or assessed as part of the current BA process. Design and layout alternatives were considered and assessed as part of a previous BA process that was never completed, and as such the PV development area, Switching Substation, Guard house and Temporary Building Zone (and all other associated infrastructure) have been placed to avoid site sensitivities identified as part of a previous BA process as well as the current BA process. Specialist studies were originally undertaken in 2016 and all current layouts and/or positions being proposed were selected based on the environmental sensitivities identified as part of these studies in 2016. All specialist studies which were undertaken in 2016 were however updated in 2020 (including ground-truthing, where required) to focus on the impacts of the layout being proposed as part of the current project. The results of the updated specialist assessments have informed the layout being proposed as part of the current BA process. The proposed layout has therefore been informed by the identified environmental sensitive and/or “no-go” areas.

Three (3) power line corridor route alternatives for the proposed 132kV power line were however identified and assessed by the respective specialists as part of the current BA process. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The power line corridor route alternatives were informed by the identified environmental sensitive and/or “no-go” areas. The various power line corridor alternatives are described in **Section 5.10** below.

15.4 The operational aspects of the activity

No operational alternatives were assessed in the BA, as none are available for solar PV installations and power lines.

15.5 ‘No-go’ alternative

The “no-go” alternative is the option of not fulfilling the proposed project. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the “no-go” option would entail no development.

The “no-go” option is a feasible option; however, this would prevent the Wildebeestkuil 2 Solar PV Plant & 132kV Power Line from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

16 SPECIALIST REPORT REQUIREMENTS

The specialist assessments should include the following sections:

16.1 Project Description

The specialist report must include the project description as provided above.

16.2 Terms of Reference (ToR)

The specialist report must include an explanation of the Terms of Reference (ToR) applicable to the specialist study. In addition, a table must be provided at the beginning of the specialist report listing the requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended) and cross referencing these requirements with the relevant sections in the report. An MS Word version of this table will be provided by SiVEST.

16.3 Legal Requirements and Guidelines

The specialist report must include a thorough overview of all applicable best practice guidelines, relevant legislation and authority requirements.

16.4 Methodology

The report must include a description of the methodology applied in carrying out the specialist assessment.

16.5 Specialist Findings / Identification of Impacts

The report must present the findings of the specialist studies and explain the implications of these findings for the proposed development (e.g. permits, licenses etc.). This section of the report should also identify any sensitive and/or ‘no-go’ areas on the development site which should be avoided.

The reports should be accompanied with spatial datasets (shapefiles, KML) and accompanying text documents if required.

16.6 Impact Rating Methodology

The impacts of the proposed solar PV plant and 132kV power line (during the Construction, Operation and Decommissioning phases) are to be assessed and rated according to the methodology developed by SiVEST. Specialists will be required to make use of the impact rating matrix provided (in Excel format) for

this purpose. Please note that the significance of Cumulative Impacts should also be rated in this section. Both the methodology and the rating matrix will be provided by SiVEST.

Please be advised that this section must include mitigation measures aimed at minimising the impact of the proposed development.

16.7 Input to The Environmental Management Program (EMPr)

The report must include a description of the key monitoring recommendations for each applicable mitigation measure identified for each phase of the proposed development for inclusion in the Environmental Management Program (EMPr) or Environmental Authorisation (EA).

Please make use the Impact Rating Table (in Excel format) provided for each of the phases (i.e. Design, Construction, Operation and Decommissioning).

16.8 Cumulative Impact Assessment

Cumulative impact assessments must be undertaken for the proposed solar PV plant in order to determine the cumulative impact that will materialise should other Renewable Energy Facilities (REFs) and large-scale industrial developments be constructed within 50km of the proposed development.

The cumulative impact assessment must contain the following:

- A cumulative environmental impact statement noting whether the overall impact is acceptable; and
- A review of the specialist reports undertaken for other REFs and an indication of how the recommendations, mitigation measures and conclusion of the studies have been considered.

In order to assist the specialists in this regard, SiVEST will provide the following documentation / data:

- A summary table listing all REFs identified within 50km of the proposed solar PV plant;
- A map showing the location of the identified REFs;
- KML files; and
- Relevant EIA / BA reports that could be obtained.

The list of renewable energy facilities that must be assessed as part of the cumulative impact will be provided.

16.9 “No-Go” Alternative

Consideration must be given to the “no-go” option in the BA process. The “no-go” option assumes that the site remains in its current state, i.e. there is no construction of a Solar PV Plant, 132kV power line and associated infrastructure in the proposed project area and the status quo would proceed.

16.10 Comparative Assessment of Alternatives

As mentioned, layout alternatives, which subsequently informed the area for the potential erection of PV panels for the proposed solar PV plant, were identified and comparatively assessed as part of the BA process undertaken in 2016. Specialist studies were originally undertaken in 2016 and all current layouts and/or positions being proposed were selected based on the environmental sensitivities identified as part of these studies in 2016. All specialist studies which were undertaken in 2016 were however updated in 2020 (including ground-truthing, where required) to focus on the impacts of the layout being proposed as part of the current project. The results of the updated specialist assessments have informed the layout being proposed as part of the current BA process.

As the positions of the proposed PV development area, Switching Substation, Guard house and Temporary Building Zone (as well as all other associated infrastructure) have already been determined taking the identified environmental sensitive and/or "no-go" areas into consideration, the specialist is to update the comparative assessment as per the latest table provided by SiVEST.

Three (3) power line corridor route alternatives for the proposed 132kV power line were however identified and assessed by the respective specialists as part of the current BA process. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The power line corridor route alternatives were informed by the identified environmental sensitive and/or "no-go" areas. The various power line corridor route alternatives are described below.

1) Power Line Corridor Option 1:

This involves an overhead power line which will run north of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation, depending on the alternative chosen as "preferred" for the Leeudoringstad Solar Plant Substation site[10]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

2) Power Line Corridor Option 2A:

This involves an overhead power line which will run south of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation, depending on the alternative chosen as "preferred" for the Leeudoringstad Solar Plant Substation site[10]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

[10] 132kV power line corridor route associated with solar PV plant intrinsically linked to Leeudoringstad Solar Plant Substation site (part of separate on-going BA process). Leeudoringstad Solar Plant Substation site chosen as "preferred" by respective specialists as part of that separate BA process therefore informed connection point for power line corridor being proposed as part of this BA application.

3) Power Line Corridor Option 2B:

This involves an underground power line which will run south of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation, depending on the alternative chosen as "preferred" for the Leeudoringstad Solar Plant Substation site[10]. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

The specialist is therefore also to undertake comparative assessment for the above-mentioned power line corridor alternatives as per the table provided by SiVEST.

Key

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Route Alternative		
Option 1		
Option 2A		
Option 2B		

16.11 Conclusion / Impact Statement

The conclusion section of the specialist reports must include an **Impact Statement**, indicating whether any fatal flaws have been identified and ultimately whether the proposed development can be authorised or not (i.e. whether EA should be granted / issued or not).

16.12 Executive Summary

Specialists must provide an Executive Summary which summarises the findings of their report to allow for easy inclusion in the BA reports.

17 DELIVERABLES

All specialists will need to submit the following deliverables:

- 1 x Draft Specialist Report for inclusion in DBAR no later than 07 September 2020 and updated version based on EAP and applicant review no later than 11 September 2020;

- 1 x Final Specialist Report for inclusion in FBAR (should updates and/or revisions be required);
- A copy of the Specialist Declaration of Interest (DoI) form, containing original signatures. This form will be provided to the specialists. ***Please note that the undertaking / affirmation under oath section of the report must be signed by a Commissioner of Oaths***; and
- All data relating to the studies, such as shape files, photos and maps (see **Section 7** below).

18 GENERAL SUBMISSION REQUIREMENTS

Please ensure that your specialist report includes the following:

- A detailed description of the study's methodology; indication of the locations and descriptions of the development footprint, and all other associated infrastructures that they have assessed and are recommending for authorisations;
- Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the correct season and providing that as a limitation will not be allowed;
- All specialist studies must be final, and provide detailed / practical mitigation measures for the preferred alternative and recommendations, and must not recommend further studies to be completed post EA;
- Should a specialist recommend specific mitigation measures, these must be clearly indicated;
- Regarding cumulative impacts:
    - Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land.
    - A detailed process flow to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project.
    - Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology used in the process.
    - The significance rating must also inform the need and desirability of the proposed development.
    - A cumulative impact environmental statement on whether the proposed development must proceed.
- The report must in line with the DEA Screening Tool Specialist Theme Protocols (As gazetted 20 March 2020) if they apply. If they do not, the report must be written in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended);
- A table at the beginning of your report cross referencing how the requirements for specialist according to Appendix 6 of the EIA Regulations, 2014 (as amended) has been adhered to. An MS Word version will be provided;
- A thorough overview of all applicable legislation, policies, guidelines. etc.;
- Identification of sensitive and/or “no-go” areas to be avoided;

- Please note that the Department considers a “no-go” area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure is allowed in the “no-go” areas;
- Should the specialist definition of “no-go” area differ from the Departments definition; this must be clearly indicated. The specialist must also indicate the “no-go” area's buffer if applicable;
- Recommend mitigation measures in order to minimise the impact of the proposed development;
- Provide implications of specialist findings for the proposed development (e.g. permits, licenses etc.);
- Specify if any further assessment will be required;
- Include an Impact Statement, concluding whether any fatal flaws have been identified and ultimately whether the proposed development can be authorised or not (i.e. whether EA should be granted / issued or not); and
- A copy of the Specialist Declaration of Interest (DoI) form, containing original signatures, must be appended to all Draft and Final Reports. This form will be provided to the specialists. ***Please note that the undertaking / affirmation under oath section of the report must be signed by a Commissioner of Oaths.***

19 DEADLINES AND REPORT SUBMISSION

- Draft Specialist Report for inclusion in DBAR no later than 07 September 2020 and updated version based on EAP and applicant review no later than 11 September 2020.
- Any changes arising based on stakeholder engagement no later than 16 October 2020

20 REPORT / DATA FORMATS

- All specialist reports must be provided in MS Word format;
- Where maps have been inserted into the report, SiVEST will require a separate map set in PDF format for inclusion in our submission;
- Where figures and/or photos have been inserted into the report, SiVEST will require the original graphic in .jpg format for inclusion in our submission; and
- ***Delineated areas of sensitivity must be provided in either ESRI shape file format or Google Earth KML format. Sensitivity classes must be included in the attribute tables with a clear indication of which areas are “No-Go” areas.***

21 SPECIALIST SPECIFIC ISSUES

Soils and Agricultural Potential

- Describe the existing environment in terms of soils, geology, land-use and agricultural potential. Significant soils and agricultural features or disturbances should be identified, as well as sensitive features and receptors within the project area. The description must include surrounding agricultural land uses and activities, to convey the local agricultural context;

- Describe and map soil types (soil forms), soil characteristics (soil depth, soil colour, limiting factors, and clay content of the top and sub soil layers), and degradation and erodibility of soils etc. to the extent necessary to inform this assessment;
- Varying sensitivities of the soils and agricultural potential must be mapped and highlighted;
- The assessment is to be based on existing information, and professional experience and field work conducted by the specialist, as considered necessary and in accordance with relevant legislated requirements;
- Identify and assess the potential impacts of the proposed development on loss of agricultural land, soils and agriculture, including impacts of associated infrastructure, such as the buildings, fencing etc. and provide relevant mitigation measures to include in the environmental management plan;
- Identify any protocols, legal and permit requirements relating to soil and agricultural potential impacts that are relevant to this project and the implications thereof;
- Map sensitivity of the site and clearly show no-go areas i.e. existing irrigated fields/ cultivated lands; and
- The report needs to fulfil the terms of reference for an agricultural study as set out in the National Department of Agriculture's document, Regulations for the evaluation and review of applications pertaining to renewable energy on agricultural land, dated September 2011, with an appropriate level of detail for the agricultural suitability and soil variation on site (which may therefore be less than the standardised level of detail stipulated in the above regulations).