DRAFT BASIC ASSESSMENT REPORT

THE PROPOSED DEVELOPMENT OF THE SPRINGHAAS SOLAR PV FACLITIES CONSISTING OF SEVEN (7) NEW SOLAR PHOTOVOLTAIC FACILITIES WITH ASSOCIATED INFRASTRUCTURE NEAR DEALESVILLE, BLOEMFONTEIN, FREE STATE

GE39159

April 2022

DFFE REF:

Springhaas Solar Facility 1: 14/12/16/3/3/1/2523
Springhaas Solar Facility 3: 14/12/16/3/3/1/2524
Springhaas Solar Facility 4: 14/12/16/3/3/1/2525
Springhaas Solar Facility 5: 14/12/16/3/3/1/2526
Springhaas Solar Facility 6: 14/12/16/3/3/1/2527
Springhaas Solar Facility 8: 14/12/16/3/3/1/2528
Springhaas Solar Facility 9: 14/12/16/3/3/1/2529

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Abbreviations / Acronyms / Definitions

List of Abbreviations and Acronyms	
AOI	Area of Influence
BA	Basic Assessment
BAR	Basic Assessment Report
BESS	Battery Energy Storage System
BOD	Biological Oxygen Demand
CA	Competent Authority
CBA	Critical Biodiversity Area
CR	Critically Endangered
CRR	Comments and Responses Report
DAFF	Department of Agriculture, Forestry and Fisheries
DBAR	Draft Basic Assessment Report
DFFE	Department of Forestry, Fisheries and the Environment
DWAF	Department of Water and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme
ESA	Ecological Support Areas
FBAR	Final Basic Assessment Report
FEPA	Freshwater Ecosystem Priority Area
FRAI	Fish Response Assessment Index
FSR	Final Scoping Report
GNR	Government Notice Regulation
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
HRA	Heritage Resources Authority
HRU	Hydrological Response Unit
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IGRD	Intermediate Groundwater Reserve Determination
IHI	Index of Habitat Integrity
IHAS	Integrated Habitat Assessment System
IEM	Integrated Environmental Management
IWWMP	Integrated Water and Waste Management Plan

IWMP	Integrated Waste Management Plan
mamsl	Meters above mean sea level
MIRAI	Macroinvertebrate Response Assessment Index
MoU	Memorandum of Understanding
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act 2004 (Act 39 of 2004)
NEM: BA	National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM:WA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NLM	Newcastle Local Municipality
NBA	National Biodiversity Assessment
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OHSA	Occupational Health and Safety Act 1993 (Act No. 85 of 1993)
PAIA	Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)
PES	Present Ecological State
PoS	Plan of Study
PPP	Public Participation Process
QDGC	Quarter Degree Grid Cell
RSA	Republic of South Africa
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SASS5	South African Scoring System version 5
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SPH	Springhaas
SPLUMA	Spatial Planning and Land Use Management Act
S&EIR	Scoping and Environmental Impact Reporting
SWMP	Stormwater Management Plan
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
ToR	Terms of Reference
WMA	Water Management Area
WML	Water Management Licence
WUA	Water Use Authorisation
WUL	Water Use Licence
WULA	Water Use License Application

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Background

The development of seven solar PV facilities and associated infrastructure is proposed on a site near Dealesville, Bloemfontein in the Free State Province. All seven facilities are wholly located in the Kimberley Renewable Energy Development Zone (REDZ), REDZ 5.

In terms of the Environmental Impact Assessment Regulations of 2024 (as amended) each solar PV facility requires an Environmental Authorisation (EA) prior to construction. The application for EA follows the Basic Assessment Process as all facilities are wholly located in a REDZ.

GIBB Environmental has been appointed as an Independent Environmental Assessment Practitioner (EAP) to undertake the Basic Assessment, manage the specialist studies and apply for the necessary Environmental Authorisation (EA) for each of the seven facilities.

Project Description

The facilities details are as follows:

- Springhaas Solar Facility 1 (SPH1): Capacity of up to 250MWac
- Springhaas Solar Facility 3 (SPH3): Capacity of up to 150MWac
- Springhaas Solar Facility 5 (SPH4): Capacity of up to 150MWac
- Springhaas Solar Facility 3 (SPH5): Capacity of up to 150MWac
- Springhaas Solar Facility 6 (SPH6): Capacity of up to 250MWac
- Springhaas Solar Facility 8 (SPH8): Capacity of up to 150MWac
- Springhaas Solar Facility 9 (SPH9): Capacity of up to 150MWac

Site Sensitivity

A site sensitivity assessment has been undertaken by the specialist team. The sensitivities on site range from low to very high. The majority of high sensitivity areas have been avoided by the facility layouts.

Theme	SPH1	SPH3	SPH4	SPH5	SPH6	SPH8	SPH9
Agricultural	**Low - medium**	**Low - medium**	**Low – medium**	**Low – medium**	**Low**	**Low - medium**	**Low**
Animal species*	**Medium**	**Medium**	**High**	**Medium**	**Medium/ High**	**Medium**	**Medium**
Aquatic biodiversity	**Low**	**Low**	**High**	**Low**	**Low**	**Low**	**Low**
Archaeological and cultural heritage theme	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Avian	**Low - medium**	**Low - medium**	**Low - medium**	**Low - medium**	**Low - medium**	**Low - medium**	**Low - medium**
Bats	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Landscape	**Medium**	**Medium**	**Medium**	**Low**	**Medium**	**Medium**	**Low**
Palaeontology	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Plant species	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Terrestrial biodiversity*	**Medium**	**Medium**	**High**	**Medium**	**Medium/ High**	**Medium**	**Medium**

*Note, the table shows the facility rating provided by the specialist for the facility as a whole or the highest rated sensitivity, e.g. SPH4 contains low, medium and high sensitivity areas from a terrestrial biodiversity perspective so the facility is rated as high sensitivity for this theme.

Need and Desirability

The proposed development is well aligned with the objectives of applicable South African legislation and policies ranging from international to local levels of governance. The proposed facilities would serve to aid in meeting national renewable energy generation targets through development which incorporates sustainable development principles and does not compromise any sensitive environmental aspects of the area.

Impact Assessment

A team of specialist were appointed to provide input and guidance to the BA process. All of the direct and indirect impacts from all project phases can be mitigation to very low or low significance. The cumulative impact of habitat loss for fauna and avifauna is rated as moderate negative.

Public Participation Process

The draft Basic Assessment Report (DBAR) will be released for a 30 day commenting period for I&APs. Comments received will be incorporated into the final Basic Assessment Report (FBAR).

Concluding Remarks

No fatal flaws were identified with any of the seven proposed Springhaas Solar PV facilities. It is the recommendation of the EAP that all 7 applications be approved subject to the mitigation measures and Environmental Management Programme (EMPr) being implemented.

1 Introduction

1.1 Background

GIBB Environmental (Pty) Ltd (GIBB) has been appointed as the independent Environmental Assessment Practitioner (EAP) by the Applicant to undertake the required Environmental Basic Assessment (BA) process and compile an associated Environmental Management Programme (EMPr) as part of the application for Environmental Authorisation (EA) for the proposed Springhaas Solar Photovoltaic (PV) Development Project in the Tokologo Local Municipality, within the Lejweleputswa District Municipality, Free State Province. The Springhaas Solar PV facility consists of seven (7) individual solar PV facilities namely:

- Springhaas Solar Facility 1 (SPH1)
- Springhaas Solar Facility 3 (SPH3)
- Springhaas Solar Facility 4 (SPH4)
- Springhaas Solar Facility 5 (SPH5)
- Springhaas Solar Facility 6 (SPH6)
- Springhaas Solar Facility 8 (SPH8)
- Springhaas Solar Facility 9 (SPH9)

SPH1 and SPH6 will each have a capacity of up to 250MWac, the remaining five facilities (SPH3, SPH4, SPH5, SPH8 and SPH9) would have a capacity of up to 150MVac.

An application for EA by way of a BA Process is being conducted for this project, based on the triggering of Listed Activities within the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended (NEMA), and the Environmental Impact Assessment (EIA) Regulations, 2014 - Government Notice R983, R984 and R985 (as amended). As stipulated in Government Notice 114 of 2018, if the large scale wind or solar facility is located fully within a Renewable Energy Development Zone (REDZ) and triggers activities in Environmental Impact Assessment Regulations Listing Notice 2 of 2014 (as amended), the basic assessment procedure must be followed. The Springhaas Solar PV facilities are located within the Kimberley renewable energy development zone (REDZ), REDZ 5.

This BA Process thus considers the potential impacts associated with the proposed developments and in so doing identifies key decision-making factors for the Competent Authority (CA), (i.e. Department of Forestry, Fisheries and the Environment (DFFE)). The process further proposes measures to mitigate the impacts of the proposed project on the receiving environment. This document comprises the Draft Basic Assessment Report (DBAR) compiled as part of the BA process for the EA application.

The purpose of the DBAR is to document findings and present them to the public, Interested and Affected Parties (I&APs) and other stakeholders for their review and comment. All the comments/inputs received during the public review period of the DBAR will be captured and responded to as part of the Comments and Responses Report (CRR) that will be appended to the Final Basic Assessment Report (FBAR). Following the conclusion of the public review period

on the DBAR, the FBAR will be prepared and submitted to the DFFE for their review and decision-making with a CRR.

The objectives of the BAR are further to:

- Determine the policy and legislative context within which the activity is located and document how the proposed developments comply with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed developments, including the need and desirability of the activity in the context of the preferred location;
- Identify the best location for components of the developments within the preferred site, based on the lowest level of environmental sensitivity identified during the assessment;
- Identify, assess, and rank the impacts the development will impose on the preferred location through the life of the development;
- Identify suitable measures to avoid, manage or mitigate identified impacts; and
- Identify residual risks that need to be managed and monitored.

Figure 1-1 is a diagram that highlights the phases in the project where I&AP's have the opportunity to participate within the process and the relevant timeframes for a REDZ project.

1.2 Project Description

The Springhaas Solar Development will consist of seven (7) new Solar PV Facilities, with associated infrastructure, on a site measuring approximately 4,500 Ha in extent (see **Table 1-1**).

The Springhaas PV project comprises the following facilities:

Table 1-1: Facility names and reference numbers

Facility name	Capacity	Applicant	DFFE reference no.
Springhaas Solar Facility 1 (SPH1)	Up to 250MWac	Springhaas Solar Facility 1 (Pty) Ltd	14/12/16/3/3/1/2523
Springhaas Solar Facility 3 (SPH3)	Up to 150MWac	Springhaas Solar Facility 3 (Pty) Ltd	14/12/16/3/3/1/2524
Springhaas Solar Facility 4 (SPH4)	Up to 150MWac	Springhaas Solar Facility 4 (Pty) Ltd	14/12/16/3/3/1/2525
Springhaas Solar Facility 5 (SPH5)	Up to 150MWac	Springhaas Solar Facility 5 (Pty) Ltd	14/12/16/3/3/1/2526
Springhaas Solar Facility 6 (SPH6)	Up to 250MWac	Springhaas Solar Facility 6 (Pty) Ltd	14/12/16/3/3/1/2527
Springhaas Solar Facility 8 (SPH8)	Up to 150MWac	Springhaas Solar Facility 8 (Pty) Ltd	14/12/16/3/3/1/2528
Springhaas Solar Facility 9 (SPH9)	Up to 150MWac	Springhaas Solar Facility 9 (Pty) Ltd	14/12/16/3/3/1/2529

Each of the above seven (7) facilities will require a stand-alone EA, thus requiring separate applications.

The project approach is to submit seven (7) separate applications concurrently, but to combine the reporting and public participation process (PPP) for the statutory BA process required to obtain the EAs. This approach has been approved by the CA, DFFE, as agreed upon during the Pre-application meeting held 16 November 2021 (refer to meeting minutes in **Appendix B**).

A summary of the associated infrastructure and various components is included in **Table 1-2** below (filled cell indicates the components relevant to the facility). The following sections provide a detailed overview on the project description of each of the seven (7) facilities.

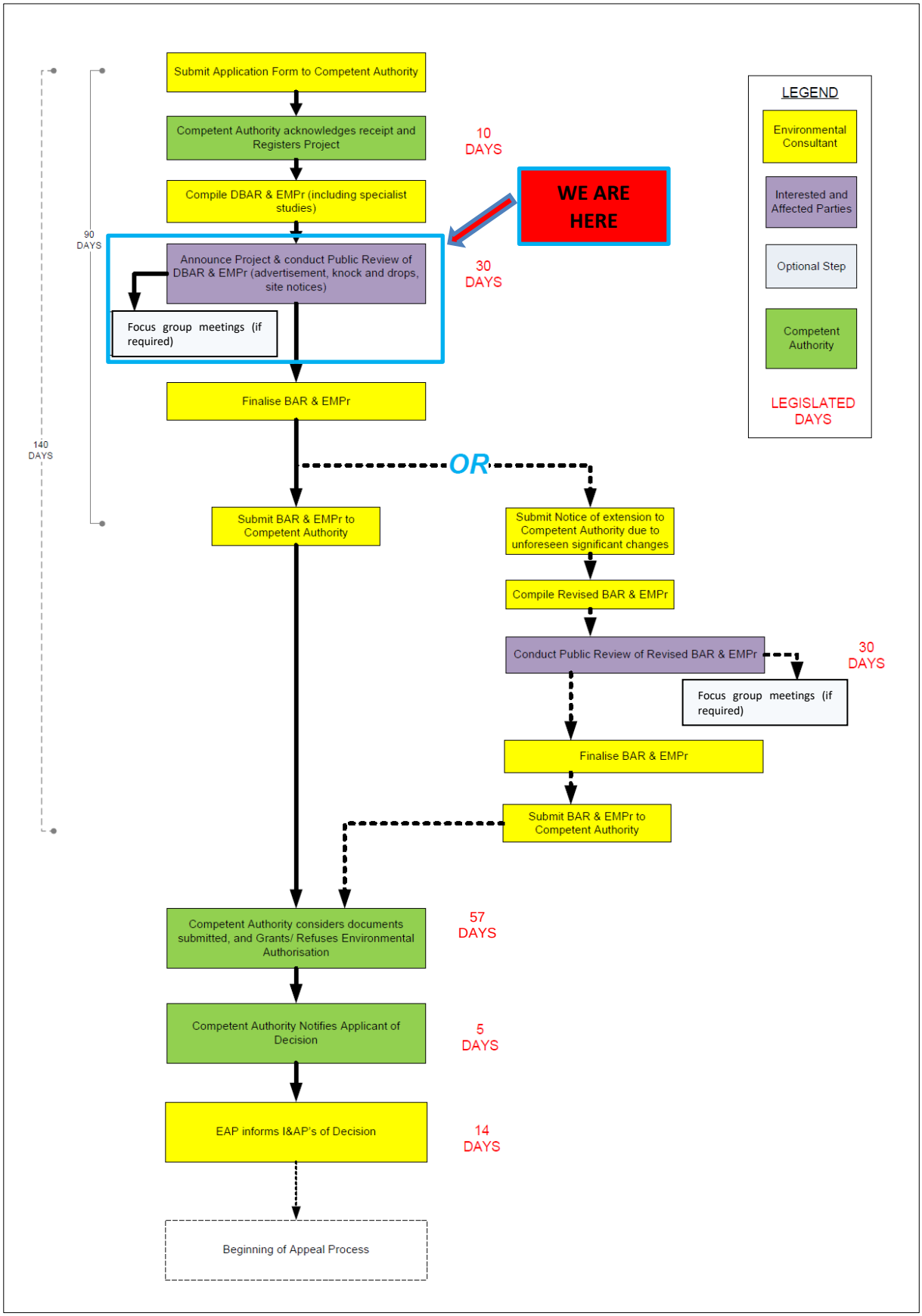


Figure 1-1: Flow diagram of the public participation stages of the BA process

Table 1-2: Associated Infrastructure of the seven (7) solar PV facilities

Infrastructure	Facilities						
	SPH 1	SPH 3	SPH 4	SPH 5	SPH 6	SPH8	SPH9
Solar Field/Arrays							
Internal Roads							
Main Access Road		There are 2 for this facility, 1 is temporary					
Electrical infrastructure complex (with sub-station, and battery energy storage system infrastructure)	2 x alternatives						
Auxiliary buildings (including Operation and Maintenance buildings, admin buildings, workshops, gatehouse, security building, control centre, offices, visitor centre, warehouses, etc.)							
Collector Sub-station							
Temporary laydown area		2 x alternatives					
Perimeter Fencing							

Each facility will have a different sized footprint. The footprints shown below have been calculated using GIS software. These footprints may change slightly once the facilities are surveyed by a professional land surveyor. The figures in the table show the approximate maximum footprint per component.

Table 1-3: Approximate footprint of solar PV facilities

Infrastructure	Facilities (approximate footprint in Ha)						
	SPH 1	SPH 3	SPH 4	SPH 5	SPH 6	SPH8	SPH9
Footprint of Facility Components							
Solar Field/Arrays	374Ha	183Ha	232Ha	153Ha	375Ha	224Ha	184Ha
Internal Roads	15Ha	8Ha	12Haa	7Ha	16Ha	10Ha	9Ha
Main Access Road (external access road)	3Ha	4Ha	5Ha	5Ha	5Ha	5Ha	5Ha
Electrical infrastructure compound	8Ha**	2Ha	2Ha	2Ha	4Ha	2Ha	2Ha
Auxiliary buildings	1Ha	0.5Ha	0.5Ha	0.5Ha	1Ha	0.5Ha	0.5Ha
Collector Sub-station	N/A	2Ha	2Ha	N/A	N/A	2Ha	N/A
Temporary laydown area	17Ha	Alt 1 – 9.5Ha Alt 2 – 14.5Ha Combined – 24Ha	6Ha	8Ha	19Ha	8Ha	4Ha
Perimeter Fencing	2Ha	1Ha	1Ha	1Ha	2Ha	2Ha	2Ha
Facilities (approximate footprint in Ha)							
Total*	**419Ha**	**225Ha**	**261Ha**	**177Ha**	**427Ha**	**253Ha**	**207Ha**
Fenced Area	**439Ha**	**238Ha**	**337Ha**	**193Ha**	**462Ha**	**304Ha**	**253Ha**

**Note, the total footprint has been rounded up to allow for any inaccuracies in the calculation of footprints.*
***Note, two alternative locations (4Ha footprint each) are proposed for the electrical infrastructure compound. If only one site is approved the footprint of the second one would be used for solar PV panels.*

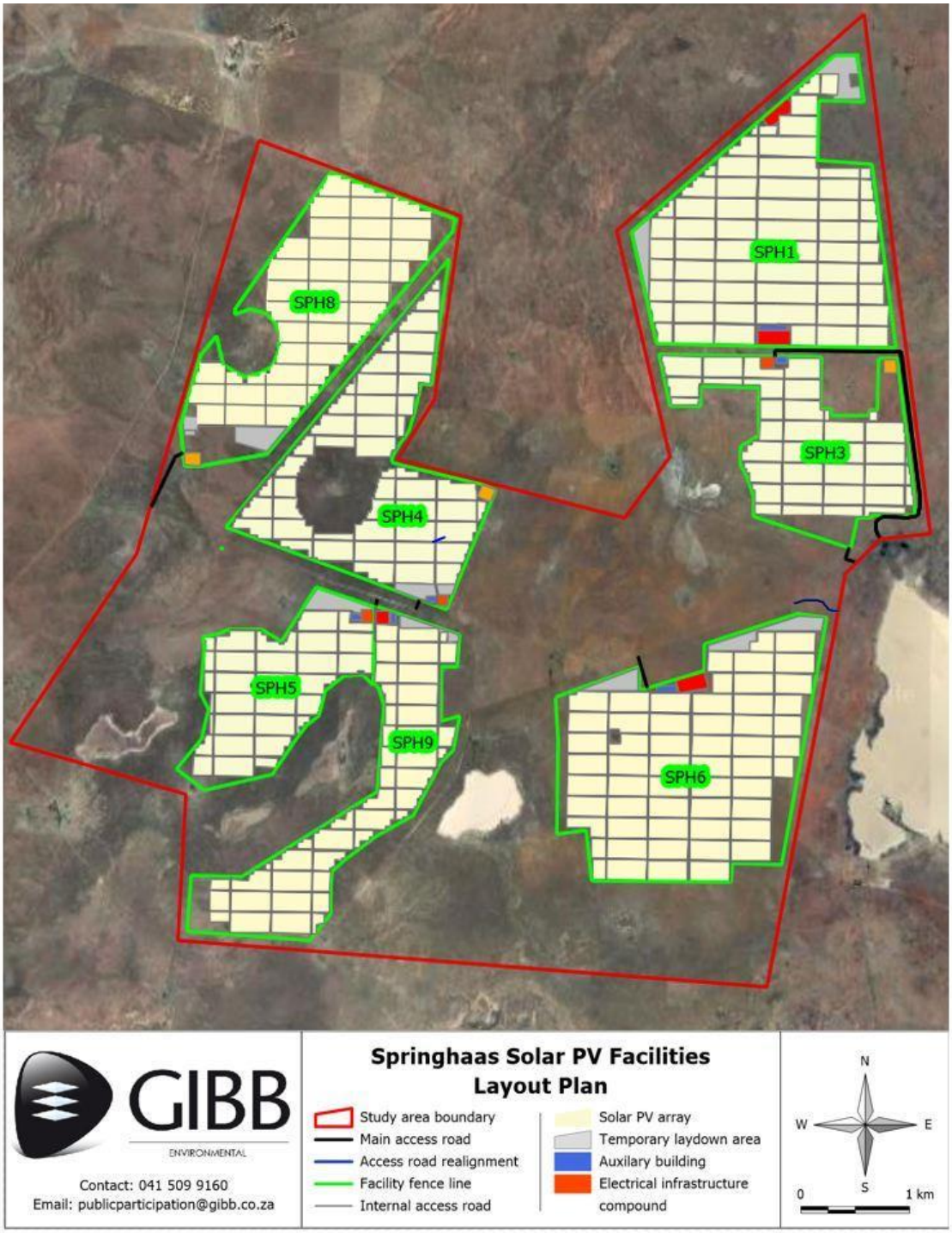


Figure 1-2: Proposed Solar PV Facility Layouts

1.2.1 Site Location

All seven of the proposed Springhaas Solar PV facilities are located south-west of Dealesville, Free State within the jurisdiction of the Tokologo Local Municipality, within the Lejweleputswa District Municipality. All sites are located within the Kimberley REDZ (REDZ 5) and they are also located within the Central Strategic Transmission Corridor.

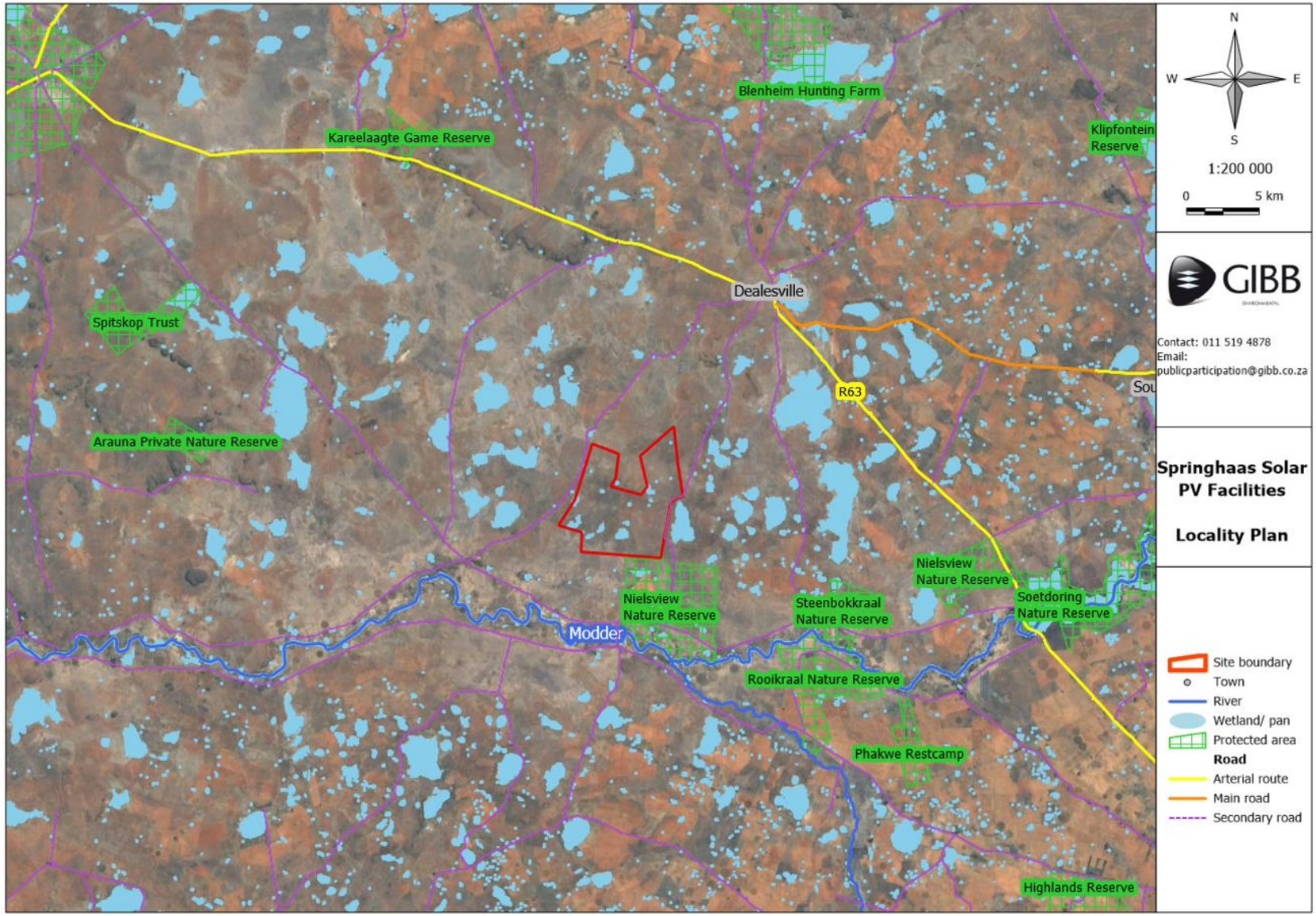


Figure 1-3: Locality Map of the Proposed Development

1.2.2 Baseline Sensitivity Assessment

A development area has been identified for the proposed development. Within this identified development area, a development footprint has been defined in a manner which has considered the environmental sensitivities present on the affected property and intentionally remains outside of highly sensitive areas. All affected properties in their entirety have been considered in this BA process (which includes the independent specialists' assessments undertaken hereunder) and assessed in terms of the suitability from an environmental and social perspective. Where specialist studies were undertaken according to gazetted protocols and best practice guidelines the area of influence has also been assessed to consider potential impacts to the area surrounding the development area.

1.2.3 Springhaas Solar Facility 1 and Associated Infrastructure

Springhaas Solar Facility 1 (Pty) Ltd (i.e. the Applicant) proposes the development of Springhaas Facility 1, a PV solar energy generation facility, of up to 250MWac in capacity, and associated infrastructure located on farms Lorraine no. 1182, Alsace No. 1181, and Oertel's Rest No. 1184.

The co-ordinates for the corner points of as indicated in **Figure 1-4** are shown in **Table 1-4.**

Table 1-4: Springhaas Facility 1 Corner Point and Main Access Road Co-ordinates

Springhaas Facility 1

Corner point	Latitude	Longitude
A	28°45'44.50"S	25°41'42.83"E
B	28°45'58.66"S	25°41'44.96"E
C	28°45'58.50"S	25°41'29.41"E
D	28°46'16.92"S	25°41'29.07"E
E	28°46'17.72"S	25°41'47.80"E
F	28°47'14.17"S	25°41'56.55"E
G	28°47'13.68"S	25°41'14.19"E
H	28°47'13.36"S	25°40'32.99"E
I	28°46'38.95"S	25°40'23.95"E
J	28°45'44.37"S	25°41'34.66"E

Main Access Road

Location	Latitude	Longitude
Start	28°48'12.37"S	25°41'51.45"E
Middle	28°47'29.24"S	25°42'0.62"E
End	28°47'13.53"S	25°41'13.67"E

The proposed facility would comprise the following:

- Solar Field/Solar Arrays (Note that the foundations, mounting structures and module types would be confirmed during detail design, however, would remain within the proposed development footprint and be up to approximately 3.5m in height)
- Associated internal underground electrical reticulation (i.e. low- and medium voltage lines);

- Internal access roads (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 5m);
- Main Access road (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 8m);
- On site electrical infrastructure compound (contained within the proposed up to 4Ha footprint) (note that there are two alternative locations for assessment as indicated in **Figure 1-4**) consisting of:
    - On site substation and associated infrastructure;
    - Additional collector infrastructure; and /or
    - Battery Energy Storage System (BESS).
- Perimeter fencing; and
- Auxiliary buildings (including, but not limited to, Operation and Maintenance (O&M) buildings, admin buildings, workshops, gatehouse, security building, control centre, offices, visitor centre, warehouses, etc.).

A temporary laydown area would also be established during the construction period with the location and extent thereof provided in the indicative layout.

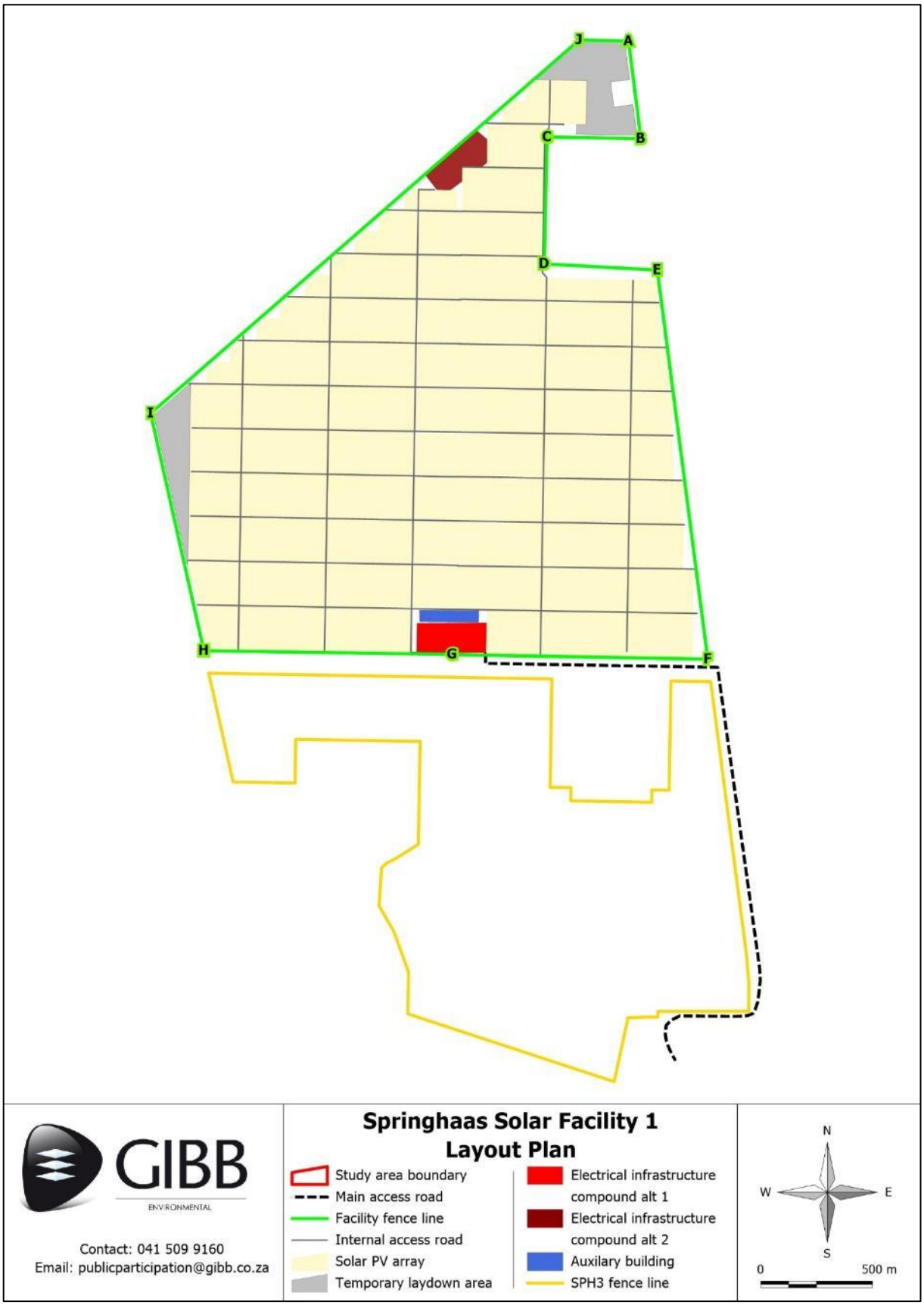


Figure 1-4: Springhaas Facility 1 Layout Plan

(a) Site Access

The proposed facility would be accessed via an existing unnamed farm road, located to the south-east of the proposed facility. The details of the access would be as per the recommendations in the Transport Impact Assessment.

Existing farm roads will be utilised as far as reasonably possible and upgraded where necessary. New internal service roads will need to be established and these would either comprise farm (compacted dirt/gravel) roads or be paved (see layout).

(b) Services

The operations of the proposed facility would require some servicing, noting that the operational electrical requirements would be nominal and would be supplied by the facility on site. Confirmation of the availability of municipal services is provided in **Appendix G**. Where there is no capacity for the municipality to provide services it is the intention to make use of private contractors. A letter to this effect is provided in **Appendix G.**

(i) Water

Water would be required for sanitation use by operational staff, for washing the panels, as well as dust control on internal roads (where necessary). Water would ideally be sourced from the local municipality, in terms of a Service Level Agreement established between the Municipality and the Applicant. If this is not possible, then further options will be investigated. Where required, a storage tank (i.e. Jo-Jo tank) of up to approximately 10,000L may be used on site for temporary water storage.

The construction phase would also require water and sanitation, with these aspects being the primary responsibility of the Contractor. However, it would be preferable for water to be sourced from the local Municipality (where available), with alternative arrangements (for example, bringing water in with trucks) being made where necessary.

(ii) Sewerage

Sanitation requirements would be minimal, given that there would not be many operational staff. Sanitation for auxiliary buildings would be connected to the existing municipal sewage system. If the Municipality does not approve or have capacity for such a connection, sewage would be stored in the conservancy tank and collected either by a honey-sucker truck or by a service provider (Contractor) for treatment at a licensed disposal site. Alternatively, a standalone system would be used (i.e. portable toilets) which would be regularly serviced by an independent contractor. Note that it is not intended to make use of soakaways or on-site treatment solutions.

(iii) Solid Waste Management

Refuse/solid waste produced would also be nominal (approximately two wheelie bins per week) and would ideally be removed by the Municipality, however, if this is not possible, the Operator would employ private contractors to remove the refuse and dispose of it appropriately. In the construction and operational phase, solid waste would also be produced and would be managed in accordance with the requirements in the Environmental Management Programme (EMPr).

(iv) Electrical

In terms of connection to the grid, the proposed facility falls within approximately 4 969 m of the existing 765 kV Eskom Beta Sub-station. Grid connection alternatives are available (from a technical perspective) and application for grid connection will be made through a separate process.

(v) Stormwater

A baseline hydrological study and stormwater management strategy (**Appendix 7 of the EMPr, Appendix I**) has been prepared for the facility. SPH1 is located outside the 1:100 year floodline of the pans on site. Stormwater management measures include collection of stormwater from hardened areas such as the electrical infrastructure compound and auxiliary buildings and transfer to stormwater control infrastructure which mimic the pre-development natural stormwater flows on site. This infrastructure may include:

- Grass swales next to hardened areas to mimic sheet flow instead of concentrating the follow of stormwater
- Grass swales next to gravel roads
- Infiltration strips
- Storage tanks and gutter systems for on-site temporary water storage for cleaning panels. Appropriate overflow systems must be considered.

Alternatives associated with this facility are discussed in **section 3.**

1.2.4 Springhaas Solar Facility 3 and Associated Infrastructure

Springhaas Solar Facility 3 (Pty) Ltd (i.e. the Applicant) proposes the development of Springhaas 3, a PV solar energy generation facility, of up to 150MWac in capacity, and associated infrastructure on farms Alsace No. 1181 and Oertel's Rest No. 1184.

The proposed facility would comprise the following:

- Solar Field/Solar Arrays (Note that the foundations, mounting structures and module types would be confirmed during detail design, however, would remain within the proposed development footprint and be up to approximately 3.5m in height);
- Associated internal underground electrical reticulation (i.e. low- and medium voltage lines);
- Internal access roads (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 5m);
- Main Access roads (noting that existing farm roads would be used as far as possible, and the road widths would be up to approximately 8m- there would be two roads, the primary operational access, as well as a temporary construction access);
- On site electrical infrastructure compound (contained within the proposed up to 2Ha footprint) consisting of:
    - On site substation and associated infrastructure;
    - Additional collector infrastructure; and /or
    - Battery Energy Storage System (BESS).
- On site collector sub-station (of up to 400kV) and associated step-up infrastructure (it would collect multiple 132kV overhead lines and potentially step-up to 400kV (if

required)), consolidated overhead lines would leave the collector sub-station for connection to any one of the proposed grid connection options (which would then connect to the Eskom grid), but note that grid connection and associated 132kV lines would be applied for under a separate application;

- Perimeter fencing; and
- Auxiliary buildings (including, but not limited to, Operation and Maintenance (O&M) buildings, admin buildings, workshops, gatehouse, security building, control centre, offices, visitor centre, warehouses, etc.).

A temporary laydown area would also be established during the construction period with the location and extent thereof provided in the indicative layout. Two locations for the temporary laydown area have been assessed in this process (refer to **section 3**).

The co-ordinates for the corner points of as indicated in **Figure 1-6** are shown in **Table 1-6.**

Table 1-5: Springhaas Facility 3 Corner Point Co-ordinates

Corner point	Latitude	Longitude
A	28°47'17.42"S	25°41'57.05"E
B	28°47'56.91"S	25°42'3.23"E
C	28°48'1.14"S	25°42'3.68"E
D	28°48'5.25"S	25°42'3.67"E
E	28°48'5.35"S	25°41'48.61"E
F	28°48'6.17"S	25°41'48.60"E
G	28°48'6.16"S	25°41'47.07"E
H	28°48'6.29"S	25°41'43.67"E
I	28°48'15.58"S	25°41'41.43"E
J	28°48'5.91"S	25°41'7.16"E
K	28°47'59.84"S	25°41'7.23"E
L	28°47'54.03"S	25°41'4.80"E
M	28°47'50.26"S	25°41'2.28"E
N	28°47'44.74"S	25°41'2.66"E
O	28°47'44.05"S	25°41'3.47"E
P	28°47'43.33"S	25°41'5.07"E
Q	28°47'41.29"S	25°41'8.74"E
R	28°47'26.34"S	25°41'8.93"E
S	28°47'26.14"S	25°40'48.31"E
T	28°47'32.48"S	25°40'48.23"E
U	28°47'32.38"S	25°40'37.96"E
V	28°47'16.61"S	25°40'33.83"E
W	28°47'17.17"S	25°41'30.72"E
X	28°47'32.90"S	25°41'30.52"E
Y	28°47'32.93"S	25°41'33.98"E
Z	28°47'34.85"S	25°41'33.96"E
AA	28°47'34.98"S	25°41'47.38"E
AB	28°47'33.19"S	25°41'47.39"E
AC	28°47'33.22"S	25°41'50.27"E
AD	28°47'17.36"S	25°41'50.47"E

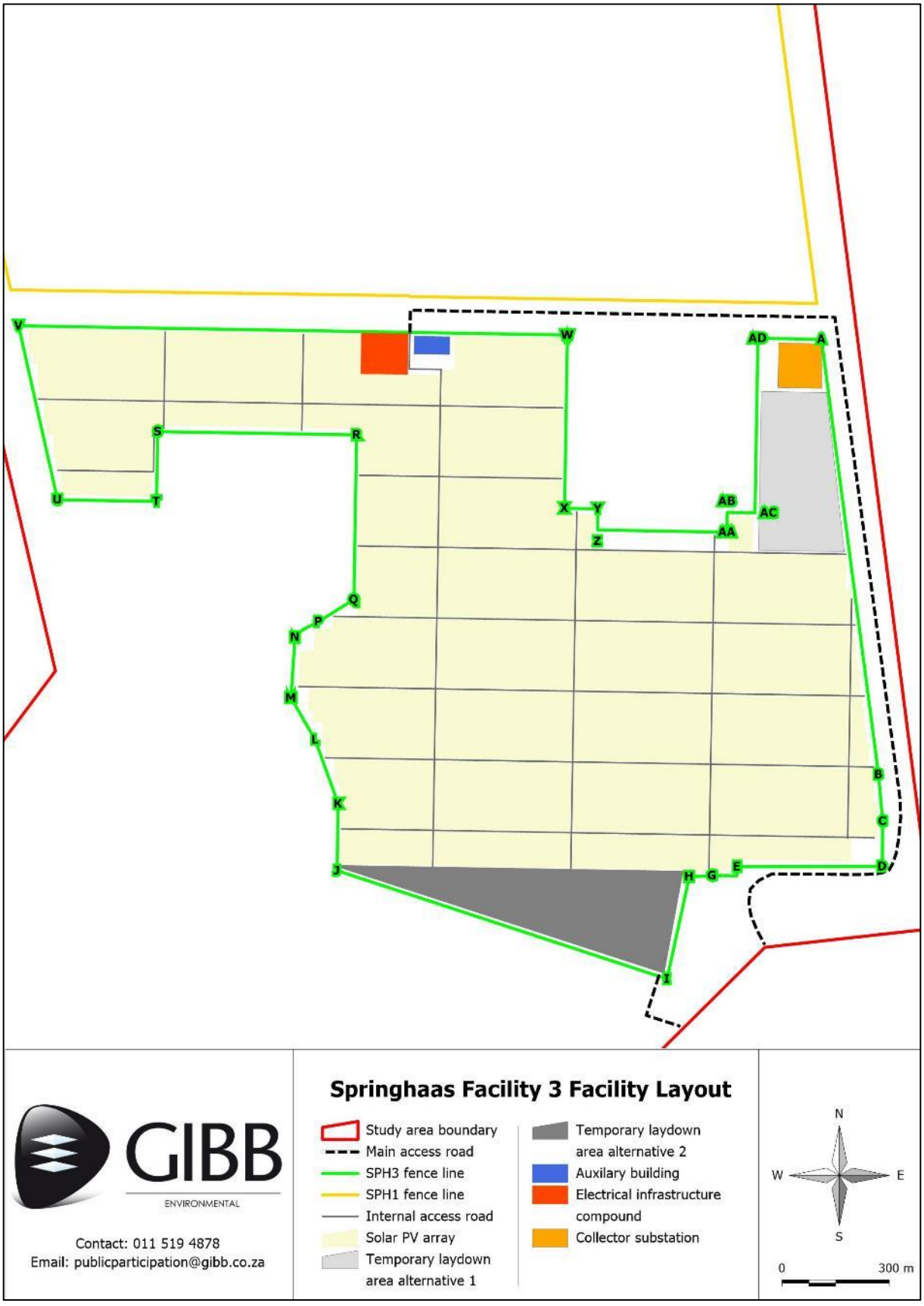


Figure 1-5: Springhaas Facility 3 Layout Plan

(a) Site Access

The proposed facility would be accessed via an existing unnamed farm road, located to the south-east of the proposed facility. The details of the access would be as per the recommendations in the Transport Impact Assessment. Note that there are two main access roads proposed namely, a shorter construction-phase access road (to the temporary lay down area) and a permanent operational phase road (to the entrance to the proposed facility). The construction-phase access road would be rehabilitated once it is no longer in use (noting that it may still be used during operation if other facilities are constructed nearby).

Existing farm roads will be utilised as far as reasonably possible and upgraded where necessary. New internal service roads will need to be established and these would either comprise farm (compacted dirt/gravel) roads or be paved (see layout).

(b) Services

The operations of the proposed facility would require some servicing, noting that the operational electrical requirements would be nominal and would be supplied by the facility on site. Confirmation of the availability of municipal services is provided in **Appendix G**. Where there is no capacity for the municipality to provide services it is the intention to make use of private contractors. A letter to this effect is provided in **Appendix G.**

(i) Water

Water would be required for sanitation use by operational staff, for washing the panels, as well as dust control on internal roads (where necessary). Water would ideally be sourced from the local municipality, in terms of a Service Level Agreement established between the Municipality and the Applicant. If this is not possible, then further options will be investigated. Where required, a storage tank (i.e. Jo-Jo tank) of up to approximately 10,000L may be used on site for temporary water storage.

The construction phase would also require water and sanitation, with these aspects being the primary responsibility of the Contractor. However, it would be preferable for water to be sourced from the local Municipality (where available), with alternative arrangements (for example, bringing water in with trucks) being made where necessary.

(ii) Sewerage

Sanitation requirements would be minimal, given that there would not be many operational staff. Sanitation for auxiliary buildings would be connected to the existing municipal sewage system. If the Municipality does not approve, or have capacity for, such a connection, sewage would be stored in the conservancy tank and collected either by a honey-sucker truck or by a service provider (Contractor) for treatment at a licensed disposal site. Alternatively, a standalone system would be used (i.e. portable toilets) which would be regularly serviced by an independent contractor. Note that it is not intended to make use of soakaways or on-site treatment solutions.

(iii) Solid Waste Management

Refuse/solid waste produced would also be nominal (approximately two wheelie bins per week) and would ideally be removed by the Municipality, however, if this is not possible, the

Operator would employ private contractors to remove the refuse and dispose of it appropriately. In the construction and operation phase, solid waste would also be produced and would be managed in accordance with the requirements in the Environmental Management Programme (EMPr).

(iv) Electrical

In terms of connection to the grid, the proposed facility falls within approximately 6 938 m of the existing 765 kV Eskom Beta Sub-station. Grid connection alternatives are available (from a technical perspective) and application for grid connection will be made through a separate process.

(v) Stormwater

A baseline hydrological study and stormwater management strategy (**Appendix 6 of the EMPr, Appendix I**) has been prepared for the facility. SPH3 is located outside the 1:100 year floodline of the pans on site. Stormwater management measures include collection of stormwater from hardened areas such as the electrical infrastructure compound and auxiliary buildings and transfer to stormwater control infrastructure which mimic the pre-development natural stormwater flows on site. This infrastructure may include:

- Grass swales next to hardened areas to mimic sheet flow instead of concentrating the follow of stormwater
- Grass swales next to gravel roads
- Infiltration strips
- Storage tanks and gutter systems for on-site temporary water storage for cleaning panels. Appropriate overflow systems must be considered.

Alternatives associated with this facility is discussed in **section 3**.

1.2.5 Springhaas Solar Facility 4 and Associated Infrastructure

Springhaas Solar Facility 4 (Pty) Ltd (i.e. the Applicant) proposes the development of Springhaas 4, a PV solar energy generation facility, of up to 150MWac in capacity, and associated infrastructure on farms Corneliasdal No. 45 and Dealesrust No. 922. A realignment of the existing access road is required to allow for the turning circle large vehicles accessing the site. This access road is located on farm Sunnyside 918.

The proposed facility would comprise the following:

- Solar Field/Solar Arrays (Note that the foundations, mounting structures and module types would be confirmed during detail design, however, would remain within the proposed development footprint and be up to approximately 3.5m in height);
- Associated internal underground electrical reticulation (i.e. low- and medium voltage lines);
- Internal access roads (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 5m);
- Main Access road (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 8m);

- On site electrical infrastructure compound (contained within the proposed up to 2Ha footprint) consisting of:
  - On site substation and associated infrastructure;
  - Additional collector infrastructure; and /or
  - Battery Energy Storage System (BESS).
- On site collector sub-station (of up to 400kV) and associated step-up infrastructure (it would collect multiple 132kV overhead lines and potentially step-up to 400kV (if required)), consolidated overhead lines would leave the collector sub-station for connection to any one of the proposed grid connection options (which would then connect to the Eskom grid), but note that grid connection and associated 132kV lines would be applied for under a separate application;
- Perimeter fencing; and
- Auxiliary buildings (including, but not limited to, Operation and Maintenance (O&M) buildings, admin buildings, workshops, gatehouse, security building, control centre, offices, visitor centre, warehouses, etc.).

A temporary laydown area would also be established during the construction period with the location and extent thereof provided in the indicative layout.

The co-ordinates for the corner points of as indicated in **Figure 1-7** are shown in **Table 1-7.**

Table 1-6: Springhaas Facility 4 Corner Point and Access Road Co-ordinates

Corner point	Latitude	Longitude
A	28°46'47.74"S	25°39'20.19"E
B	28°47'6.87"S	25°39'17.01"E
C	28°47'26.08"S	25°39'14.18"E
D	28°47'25.81"S	25°39'10.71"E
E	28°47'34.80"S	25°39'8.50"E
F	28°47'37.28"S	25°39'7.47"E
G	28°47'40.07"S	25°39'6.43"E
H	28°47'42.03"S	25°39'5.04"E
I	28°47'44.18"S	25°39'3.55"E
J	28°47'45.16"S	25°39'2.88"E
K	28°47'46.14"S	25°39'2.12"E
L	28°47'46.98"S	25°39'1.52"E
M	28°47'47.92"S	25°39'0.97"E
N	28°47'48.72"S	25°39'0.46"E
O	28°47'49.71"S	25°39'0.74"E
P	28°47'50.23"S	25°39'1.11"E
Q	28°47'50.57"S	25°39'1.89"E
R	28°47'50.91"S	25°39'3.47"E
S	28°47'56.72"S	25°39'32.26"E
T	28°47'58.33"S	25°39'36.83"E
U	28°48'35.04"S	25°39'20.08"E
V	28°48'10.34"S	25°38'2.37"E

W	28°47'50.75"S	25°38'20.93"E
X	28°47'50.62"S	25°38'21.13"E

Main access road

Location	Latitude	Longitude
Start	28°48'35.30"S	25°39'9.26"E
Middle	28°48'33.71"S	25°39'10.02"E
End	28°48'31.98"S	25°39'10.85"E

Eastern access road realignment

Location	Latitude	Longitude
Start	28°48'35.00"S	25°41'37.13"E
Middle	28°48'31.79"S	25°41'29.91"E
End	28°48'32.49"S	25°41'21.56"E

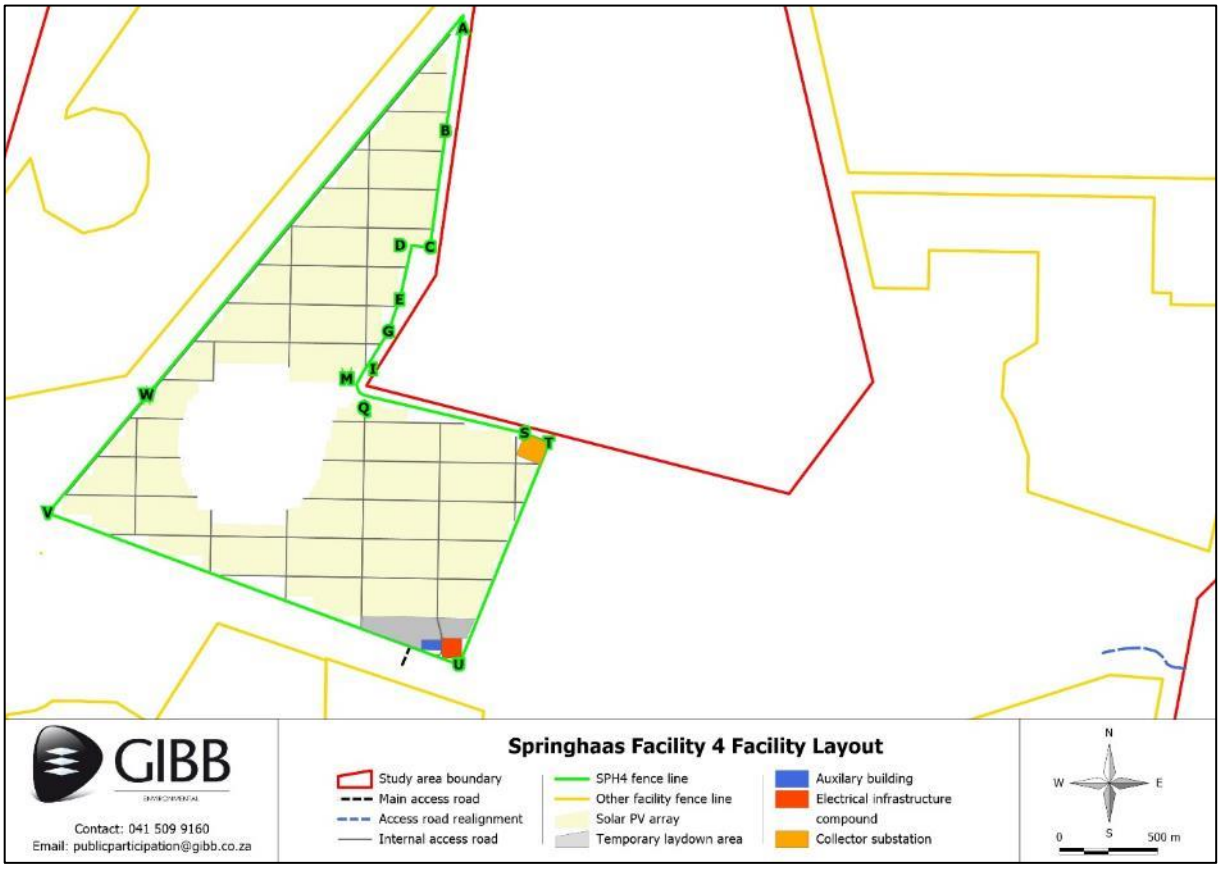


Figure 1-6: Springhaas Facility 4 Layout Plan

(a) Site Access

The proposed facility would be accessed via an existing unnamed farm road, located to the south of the proposed facility (and which transects the greater area from west to east). Access from the broader road network would be taken either from the N-S road connected to the R64 to the West of the proposed facility or to the N-S road connected to the R64 to the East of the facility. The road to the East would be re-aligned to abled a gentle curve for vehicles to access safely from the South. The details of the access would be as per the recommendations in the Transport Impact Assessment.

Existing farm roads will be utilised as far as reasonably possible and upgraded where necessary. New internal service roads will need to be established and these would either comprise farm (compacted dirt/gravel) roads or be paved (**refer to figure 1-7**).

(b) Services

The operations of the proposed facility would require some servicing, noting that the operational electrical requirements would be nominal and would be supplied by the facility on site. Confirmation of the availability of municipal services is provided in **Appendix G**. Where there is no capacity for the municipality to provide services it is the intention to make use of private contractors. A letter to this effect is provided in **Appendix G.**

(i) Water

Water would be required for sanitation use by operational staff, for washing the panels, as well as dust control on internal roads (where necessary). Water would ideally be sourced from the local municipality, in terms of a Service Level Agreement established between the Municipality and the Applicant. If this is not possible, then further options will be investigated. Where required, a storage tank (i.e. Jo-Jo tank) of up to approximately 10,000L may be used on site for temporary water storage.

The construction phase would also require water and sanitation, with these aspects being the primary responsibility of the Contractor. However, it would be preferable for water to be sourced from the local Municipality (where available), with alternative arrangements (for example, bringing water in with trucks) being made where necessary.

(ii) Sewerage

Sanitation requirements would be minimal, given that there would not be many operational staff. Sanitation for auxiliary buildings would be connected to the existing municipal sewage system. If the Municipality does not approve, or have capacity for, such a connection, sewage would be stored in the conservancy tank and collected either by a honey-sucker truck or by a service provider (Contractor) for treatment at a licensed disposal site. Alternatively, a standalone system would be used (i.e. portable toilets) which would be regularly serviced by an independent contractor. Note that it is not intended to make use of soakaways or on-site treatment solutions.

(iii) Solid Waste Management

Refuse/solid waste produced would also be nominal (approximately two wheelie bins per week) and would ideally be removed by the Municipality, however, if this is not possible, the Operator would employ private contractors to remove the refuse and dispose of it appropriately. In the construction and operation phase, solid waste would also be produced and would be managed in accordance with the requirements in the Environmental Management Programme (EMPr).

(iv) Electrical

In terms of connection to the grid, the proposed facility falls within approximately 7 674 m of the existing 765 kV Eskom Beta Sub-station. Grid connection alternatives are available (from a technical perspective) and application for grid connection will be made through a separate process.

(v) Stormwater

A baseline hydrological study and stormwater management strategy (**Appendix 6 of the EMPr, Appendix I**) has been prepared for the facility. SPH4 is located outside the 1:100 year floodline of the pans on site. Stormwater management measures include collection of stormwater from hardened areas such as the electrical infrastructure compound and auxiliary buildings and transfer to stormwater control infrastructure which mimic the pre-development natural stormwater flows on site. This infrastructure may include:

- Grass swales next to hardened areas to mimic sheet flow instead of concentrating the follow of stormwater
- Grass swales next to gravel roads
- Infiltration strips
- Storage tanks and gutter systems for on-site temporary water storage for cleaning panels. Appropriate overflow systems must be considered.

Alternatives associated with this facility is discussed in **section 3**.

1.2.6 Springhaas Solar Facility 5 and associated infrastructure

Springhaas Solar Facility 5 (Pty) Ltd (i.e. the Applicant) proposes the development of Springhaas 5, a photovoltaic (PV) solar energy generation facility, of up to 150MWac in capacity on farms Corneliasdal No. 45, Dealesrust No.921 and Dealesrust No. 922. A realignment of the existing access road is required to allow for the turning circle large vehicles accessing the site. This access road is located on farm Sunnyside 918.

The proposed facility would comprise the following:

- Solar Field/Solar Arrays (Note that the foundations, mounting structures and module types would be confirmed during detail design, however, would remain within the proposed development footprint and be up to approximately 3.5m in height);
- Associated internal underground electrical reticulation (i.e. low- and medium voltage lines);
- Internal access roads (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 5m);
- Main Access road (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 8m);
- On site electrical infrastructure compound (contained within the proposed up to 2Ha footprint) consisting of:
  - On site substation and associated infrastructure;
  - Additional collector infrastructure; and /or
  - Battery Energy Storage System (BESS).
- Perimeter fencing; and
- Auxiliary buildings (including, but not limited to, Operation and Maintenance (O&M) buildings, admin buildings, workshops, gatehouse, security building, control centre, offices, visitor centre, warehouses, etc.).

A temporary laydown area would also be established during the construction period with the location and extent thereof provided in the indicative layout.

The co-ordinates for the corner points of as indicated in **Figure 1-8** are shown in **Table 1-8.**

Table 1-7: Springhaas Facility 5 Corner Point Co-ordinates

Corner point	Latitude	Longitude
A	28°48'28.39"S	25°38'34.50"E
B	28°48'34.43"S	25°38'54.95"E
C	28°48'58.31"S	25°38'54.64"E
D	28°48'55.10"S	25°38'50.79"E
E	28°48'55.57"S	25°38'44.11"E
F	28°49'0.31"S	25°38'37.57"E
G	28°49'7.77"S	25°38'35.66"E
H	28°49'10.94"S	25°38'31.16"E
I	28°49'14.29"S	25°38'27.88"E
J	28°49'25.96"S	25°38'19.24"E
K	28°49'30.71"S	25°37'55.50"E
L	28°49'24.37"S	25°37'45.68"E
M	28°49'15.20"S	25°37'54.70"E
N	28°49'5.96"S	25°37'57.04"E
O	28°49'1.12"S	25°37'54.07"E
P	28°48'46.70"S	25°37'55.47"E
Q	28°48'44.81"S	25°37'54.84"E
R	28°48'43.77"S	25°37'54.68"E
S	28°48'43.59"S	25°37'55.40"E
T	28°48'43.45"S	25°37'56.64"E
U	28°48'43.27"S	25°37'57.92"E
V	28°48'43.14"S	25°37'59.17"E
W	28°48'42.92"S	25°38'0.26"E
X	28°48'42.27"S	25°38'1.95"E
Y	28°48'41.40"S	25°38'3.33"E
Z	28°48'41.38"S	25°38'7.61"E
AA	28°48'41.38"S	25°38'8.62"E
AB	28°48'41.45"S	25°38'10.45"E
AC	28°48'41.46"S	25°38'11.44"E
AD	28°48'41.50"S	25°38'13.76"E
AE	28°48'41.54"S	25°38'15.39"E
AF	28°48'45.28"S	25°38'22.35"E

Main access road

Location	Latitude	Longitude
Start	28°48'31.99"S	25°38'55.88"E
Middle	28°48'33.22"S	25°38'55.36"E
End	28°48'34.45"S	25°38'54.86"E

Eastern access road realignment

Location	Latitude	Longitude
Start	28°48'35.00"S	25°41'37.13"E
Middle	28°48'31.79"S	25°41'29.91"E
End	28°48'32.49"S	25°41'21.56"E

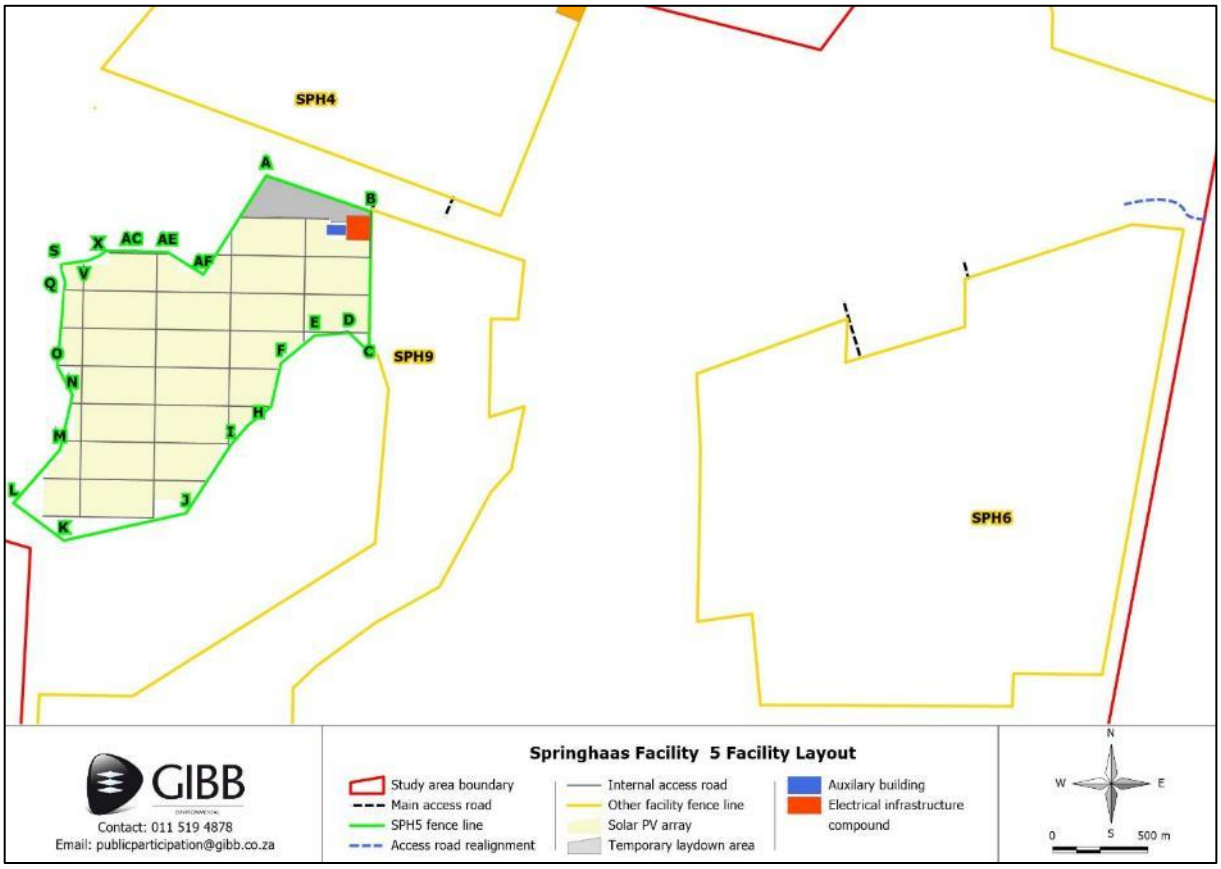


Figure 1-7: Springhaas Facility 5 Layout Plan

Note, the layout of SPH5 was amended during the impact assessment phase of the project. The facility footprint was decreased to avoid two ridgelines and their buffer regions (refer to figure 1-8). The specialists have all either updated their impact assessment to reflect the change in layout or provided an addendum to the specialist report to comment on the impact of the facility layout. This information has been appended to the specialist studies in ***Appendix F.***

(a) Site Access

The proposed facility would be accessed via an existing unnamed farm road, located to the south of the proposed facility (and which transects the greater area from west to east). Access from the broader road network would be taken either from the N-S road connected to the R64 to the West of the proposed facility or to the N-S road connected to the R64 to the East of the facility. The road to the East would be re-aligned to abled a gentle curve for vehicles to access

safely from the South. The details of the access would be as per the recommendations in the Transport Impact Assessment.

Existing farm roads will be utilised as far as reasonably possible and upgraded where necessary. New internal service roads will need to be established and these would either comprise farm (compacted dirt/gravel) roads or be paved (refer to figure 1-8).

(b) Services

The operations of the proposed facility would require some servicing, noting that the operational electrical requirements would be nominal and would be supplied by the facility on site. Confirmation of the availability of municipal services is provided in **Appendix G**. Where there is no capacity for the municipality to provide services it is the intention to make use of private contractors. A letter to this effect is provided in **Appendix G.**

(i) Water

Water would be required for sanitation use by operational staff, for washing the panels, as well as dust control on internal roads (where necessary). Water would ideally be sourced from the local municipality, in terms of a Service Level Agreement established between the Municipality and the Applicant. If this is not possible, then further options will be investigated. Where required, a storage tank (i.e. Jo-Jo tank) of up to approximately 10,000L may be used on site for temporary water storage.

The construction phase would also require water and sanitation, with these aspects being the primary responsibility of the Contractor. However, it would be preferable for water to be sourced from the local Municipality (where available), with alternative arrangements (for example, bringing water in with trucks) being made where necessary.

(ii) Sewerage

Sanitation requirements would be minimal, given that there would not be many operational staff. Sanitation for auxiliary buildings would be connected to the existing municipal sewage system. If the Municipality does not approve, or have capacity for, such a connection, sewage would be stored in the conservancy tank and collected either by a honey-sucker truck or by a service provider (Contractor) for treatment at a licensed disposal site. Alternatively, a standalone system would be used (i.e. portable toilets) which would be regularly serviced by an independent contractor. Note that it is not intended to make use of soakaways or on-site treatment solutions.

(iii) Solid Waste Management

Refuse/solid waste produced would also be nominal (approximately two wheelie bins per week) and would ideally be removed by the Municipality, however, if this is not possible, the Operator would employ private contractors to remove the refuse and dispose of it appropriately. In the construction and operation phase, solid waste would also be produced and would be managed in accordance with the requirements in the Environmental Management Programme (EMPr).

(iv) Electrical

In terms of connection to the grid, the proposed facility falls within approximately 10 883 m of the existing 765 kV Eskom Beta Sub-station. Grid connection alternatives are available (from a technical perspective) and application for grid connection will be made through a separate process.

(v) Stormwater

A baseline hydrological study and stormwater management strategy (**refer to Appendix I**) has been prepared for the facility. SPH5 is located outside the 1:100 year floodline of the pans on site. Stormwater management measures include collection of stormwater from hardened areas such as the electrical infrastructure compound and auxiliary buildings and transfer to stormwater control infrastructure which mimic the pre-development natural stormwater flows on site. This infrastructure may include:

- Grass swales next to hardened areas to mimic sheet flow instead of concentrating the follow of stormwater
- Grass swales next to gravel roads
- Infiltration strips
- Storage tanks and gutter systems for on-site temporary water storage for cleaning panels. Appropriate overflow systems must be considered.

Alternatives associated with this facility is discussed in **section 3**.

1.2.7 Springhaas Solar Facility 6 and Associated Infrastructure

Springhaas Solar Facility 6 (Pty) Ltd (i.e. the Applicant) proposes the development of Springhaas 6, a photovoltaic (PV) solar energy generation facility, of up to 250MWac in capacity on farm Sunnyside No. 918. A realignment of the existing access road is required to allow for the turning circle large vehicles accessing the site. This access road is also located on farm Sunnyside 918.

The proposed facility would comprise the following:

- Solar Field/Solar Arrays (Note that the foundations, mounting structures and module types would be confirmed during detail design, however, would remain within the proposed development footprint and be up to approximately 3.5m in height);
- Associated internal underground electrical reticulation (i.e. low- and medium voltage lines);
- Internal access roads (existing farm roads would be used as far as possible, and the road width would be up to approximately 5m);
- Main Access road (existing farm roads would be used as far as possible, and the road width would be up to approximately 8m);
- On site electrical infrastructure compound (contained within the proposed up to 4Ha footprint) consisting of:
  - On site substation and associated infrastructure;
  - Additional collector infrastructure; and /or
  - Battery Energy Storage System (BESS).
- Perimeter fencing; and

- Auxiliary buildings (including, but not limited to, Operation and Maintenance (O&M) buildings, admin buildings, workshops, gatehouse, security building, control centre, offices, visitor centre, warehouses, etc.).

A temporary laydown area would also be established during the construction period with the location and extent thereof provided in the indicative layout.

The co-ordinates for the corner points of as indicated in **Figure 1-9** are shown in **Table 1-9.**

Table 1-8: Springhaas Facility 6 Corner Point Co-ordinates

Springhaas Facility 6

Corner point	Latitude	Longitude
A	25°41'22.91"E	25°41'22.91"E
B	28°48'36.71"S	25°41'32.89"E
C	28°49'52.34"S	25°41'17.37"E
D	28°49'52.27"S	25°41'0.28"E
E	28°49'58.22"S	25°41'0.21"E
F	28°49'58.06"S	25°40'11.15"E
G	28°49'42.56"S	25°40'9.43"E
H	28°49'43.93"S	25°39'58.83"E
I	28°49'14.78"S	25°39'59.25"E
J	28°49'1.75"S	25°39'58.37"E
K	28°48'52.23"S	25°40'27.66"E
L	28°48'59.66"S	25°40'27.37"E
M	28°48'53.50"S	25°40'50.50"E
N	28°48'45.33"S	25°40'50.51"E

Main access road

Location	Latitude	Longitude
Start	28°48'49.21"S	25°40'26.86"E
Middle	28°48'54.09"S	25°40'28.60"E
End	28°48'45.23"S	25°40'30.30"E

Eastern access road realignment

Location	Latitude	Longitude
Start	28°48'35.00"S	25°41'37.13"E
Middle	28°48'31.79"S	25°41'29.91"E
End	28°48'32.49"S	25°41'21.56"E

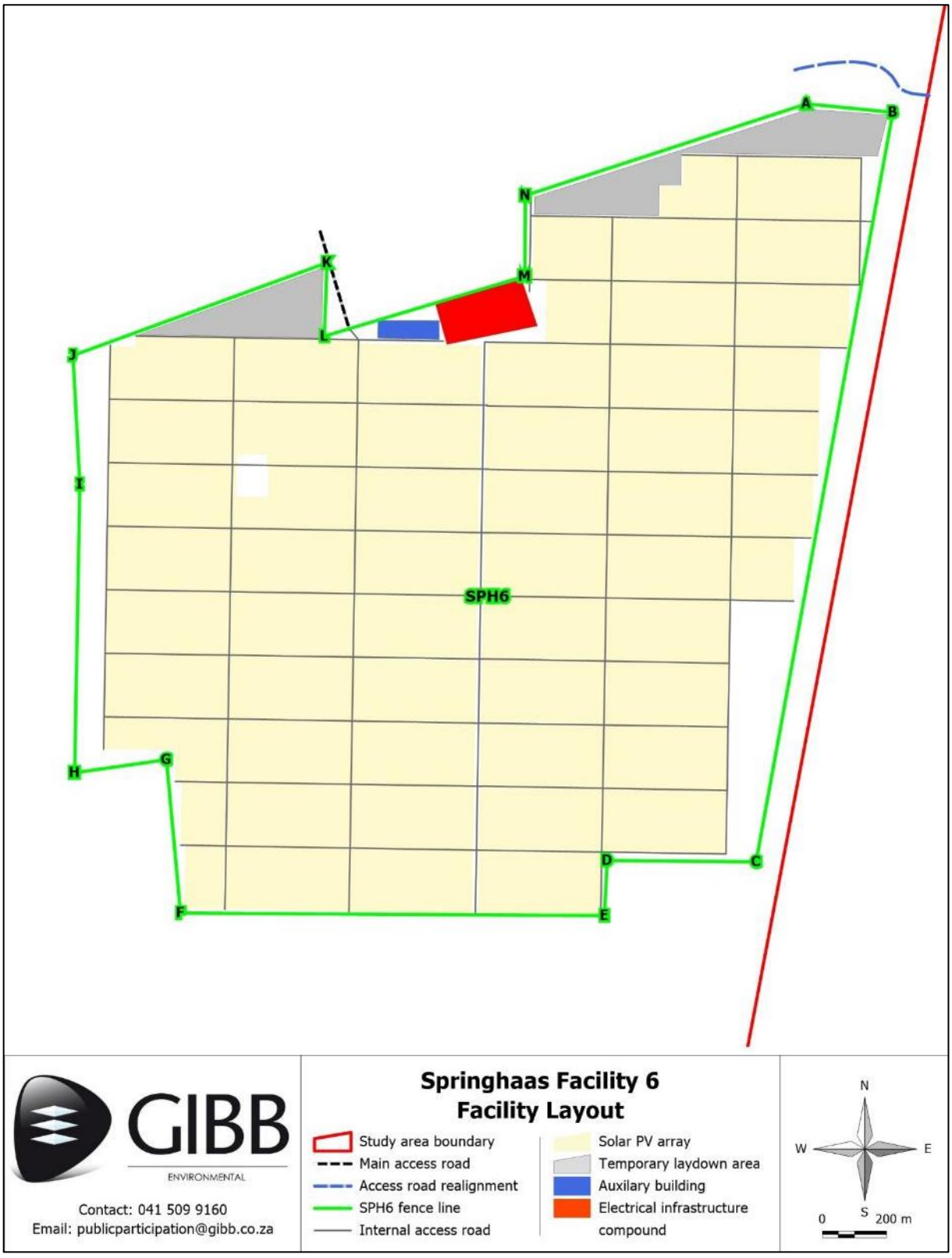


Figure 1-8: Springhaas Facility 6 Layout Plan

(a) Site Access

The proposed facility would be accessed via an existing unnamed farm road, located to the north of the proposed facility (and which transects the greater area from west to east). Access from the broader road network would be taken either from the N-S road connected to the R64 to the West of the proposed facility or to the N-S road connected to the R64 to the East of the facility. The road to the East would be re-aligned to abled a gentle curve for vehicles to access safely from the South. The details of the access would be as per the recommendations in the Transport Impact Assessment.

Existing farm roads will be utilised as far as reasonably possible and upgraded where necessary. New internal service roads will need to be established and these would either comprise farm (compacted dirt/gravel) roads or be paved (see layout).

(b) Services

The operations of the proposed facility would require some servicing, noting that the operational electrical requirements would be nominal and would be supplied by the facility on site. Confirmation of the availability of municipal services is provided in **Appendix G**. Where there is no capacity for the municipality to provide services it is the intention to make use of private contractors. A letter to this effect is provided in **Appendix G.**

(i) Water

Water would be required for sanitation use by operational staff, for washing the panels, as well as dust control on internal roads (where necessary). Water would ideally be sourced from the local municipality, in terms of a Service Level Agreement established between the Municipality and the Applicant. If this is not possible, then further options will be investigated. Where required, a storage tank (i.e. Jo-Jo tank) of up to approximately 10,000L may be used on site for temporary water storage.

The construction phase would also require water and sanitation, with these aspects being the primary responsibility of the Contractor. However, it would be preferable for water to be sourced from the local Municipality (where available), with alternative arrangements (for example, bringing water in with trucks) being made where necessary.

(ii) Sewerage

Sanitation requirements would be minimal, given that there would not be many operational staff. Sanitation for auxiliary buildings would be connected to the existing municipal sewage system. If the Municipality does not approve, or have capacity for, such a connection, sewage would be stored in the conservancy tank and collected either by a honey-sucker truck or by a service provider (Contractor) for treatment at a licensed disposal site. Alternatively, a standalone system would be used (i.e. portable toilets) which would be regularly serviced by an independent contractor. Note that it is not intended to make use of soakaways or on-site treatment solutions.

(iii) Solid Waste Management

Refuse/solid waste produced would also be nominal (approximately two wheelie bins per week) and would ideally be removed by the Municipality, however, if this is not possible, the Operator would employ private contractors to remove the refuse and dispose of it

appropriately. In the construction and operation phase, solid waste would also be produced and would be managed in accordance with the requirements in the Environmental Management Programme (EMPr).

(iv) Electrical

In terms of connection to the grid, the proposed facility falls within approximately 9 528 m of the existing 765 kV Eskom Beta Sub-station. Grid connection alternatives are available (from a technical perspective) and application for grid connection will be made through a separate process.

(v) Stormwater

A baseline hydrological study and stormwater management strategy (**Appendix 7 of the EMPr, Appendix J**) has been prepared for the facility. SPH6 is located outside the 1:100 year floodline of the pans on site. Stormwater management measures include collection of stormwater from hardened areas such as the electrical infrastructure compound and auxiliary buildings and transfer to stormwater control infrastructure which mimic the pre-development natural stormwater flows on site. This infrastructure may include:

- Grass swales next to hardened areas to mimic sheet flow instead of concentrating the follow of stormwater
- Grass swales next to gravel roads
- Infiltration strips
- Storage tanks and gutter systems for on-site temporary water storage for cleaning panels. Appropriate overflow systems must be considered.

Alternatives associated with this facility is discussed in **section 3**.

1.2.8 Springhaas Solar Facility 8 and Associated Infrastructure

Springhaas Solar Facility 8 (Pty) Ltd (i.e. the Applicant) proposes the development of Springhaas 8, a PV solar energy generation facility, of up to 150MWac in capacity on farm Corneliasdal No. 45. A realignment of the existing access road is required to allow for the turning circle large vehicles accessing the site. This access road is located on farm Sunnyside 918.

The proposed facility would comprise the following:

- Solar Field/Solar Arrays (Note that the foundations, mounting structures and module types would be confirmed during detail design, however, would remain within the proposed development footprint and be up to approximately 3.5m in height);
- Associated internal underground electrical reticulation (i.e. low- and medium voltage lines);
- Internal access roads (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 5m);
- Main Access road (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 8m);
- On site electrical infrastructure compound (contained within the proposed up to 2Ha footprint) consisting of:

- On site substation and associated infrastructure;
- Additional collector infrastructure; and /or
- Battery Energy Storage System (BESS).

- On site collector sub-station (of up to 400kV) and associated step-up infrastructure (it would collect multiple 132kV overhead lines and potentially step-up to 400kV (if required)), consolidated overhead lines would leave the collector sub-station for connection to any one of the proposed grid connection options (which would then connect to the Eskom grid), but note that grid connection and associated 132kV lines would be applied for under a separate application;
- Perimeter fencing; and
- Auxiliary buildings (including, but not limited to, Operation and Maintenance (O&M) buildings, admin buildings, workshops, gatehouse, security building, control centre, offices, visitor centre, warehouses, etc.).

A temporary laydown area would also be established during the construction period with the location and extent thereof provided in the indicative layout.

The co-ordinates for the corner points of as indicated in **Figure 1-11** are shown in **Table 1-11.**

Table 1-9: Springhaas Facility 8 Corner Point and Access Road Co-ordinates

Corner point	Latitude	Longitude
A	28°46'35.43"S	25°39'22.07"E
B	28°46'38.89"S	28°46'38.89"S
C	28°47'47.55"S	25°38'16.97"E
D	28°47'51.54"S	25°37'53.83"E
E	28°47'51.49"S	25°37'48.09"E
F	28°47'39.48"S	25°37'46.36"E
G	28°47'17.83"S	25°37'53.60"E
H	28°47'11.73"S	25°37'58.74"E
I	28°47'20.31"S	25°38'1.46"E
J	28°47'24.04"S	25°38'8.69"E
K	28°47'22.85"S	25°38'14.36"E
L	28°47'20.66"S	25°38'18.34"E
M	28°47'16.05"S	25°38'20.77"E
N	28°47'11.16"S	25°38'21.04"E
O	28°47'7.40"S	25°38'19.27"E
P	28°47'4.43"S	25°38'16.27"E
Q	28°47'3.39"S	25°38'10.52"E
R	28°47'5.12"S	25°38'5.34"E
S	28°47'3.52"S	25°38'5.57"E
T	28°46'21.45"S	25°38'38.77"E

Main access road

Location	Latitude	Longitude
Start	28°48'4.34"S	25°37'36.54"E
Middle	28°47'55.30"S	25°37'41.34"E
End	28°47'47.70"S	25°37'47.56"E

Eastern access road realignment

Location	Latitude	Longitude
Start	28°48'35.00"S	25°41'37.13"E
Middle	28°48'31.79"S	25°41'29.91"E
End	28°48'32.49"S	25°41'21.56"E

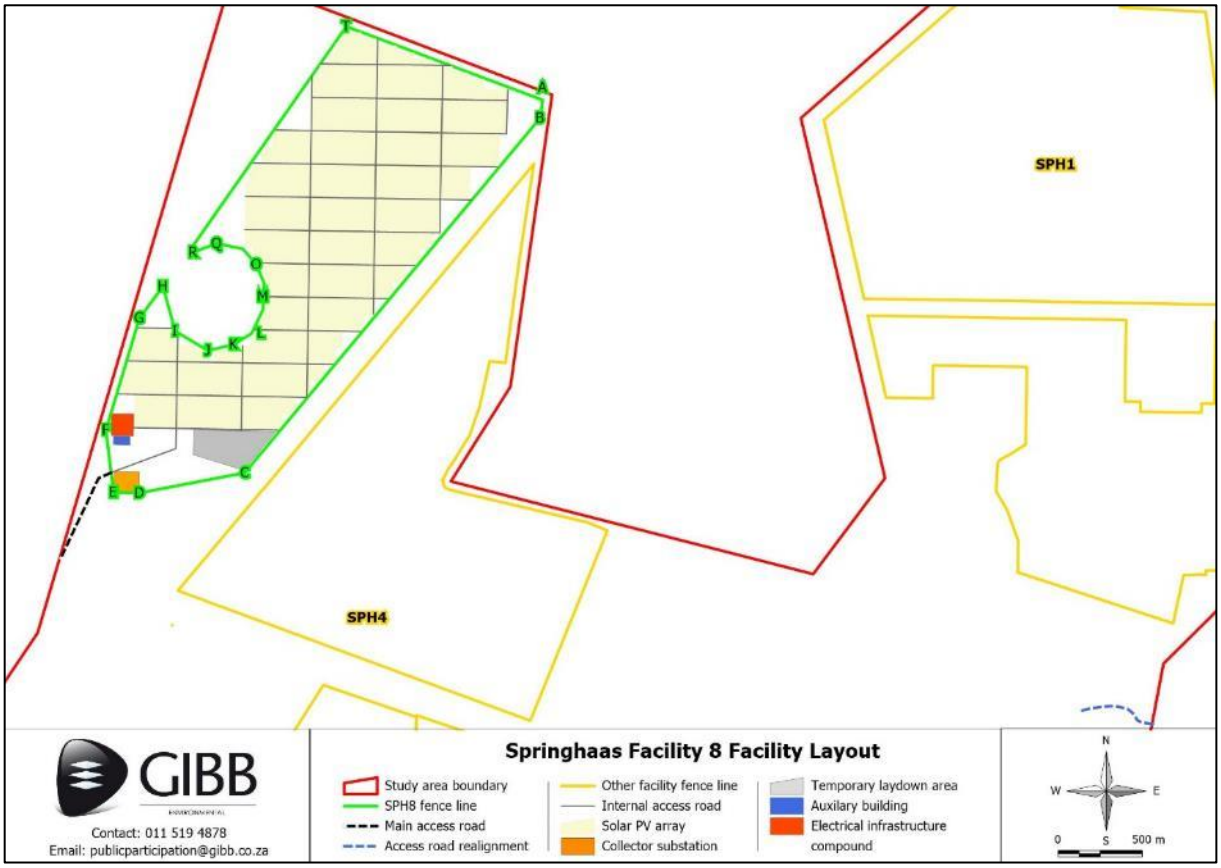


Figure 1-9: Springhaas Facility 8 Layout Plan

(a) Site Access

The proposed facility would be accessed via an existing unnamed farm road, located to the south of the proposed facility (and which transects the greater area from west to east). Access from the broader road network would be taken either from the N-S road connected to the R64 to the West of the proposed facility or to the N-S road connected to the R64 to the East of the facility. The road to the East would be re-aligned to abled a gentle curve for vehicles to access safely from the South. The details of the access would be as per the recommendations in the Transport Impact Assessment.

Existing farm roads will be utilised as far as reasonably possible and upgraded where necessary.

New internal service roads will need to be established and these would either comprise farm (compacted dirt/gravel) roads or be paved (refer to **Figure 1-11**).

(b) Services

The operations of the proposed facility would require some servicing, noting that the operational electrical requirements would be nominal and would be supplied by the facility on site. Confirmation of the availability of municipal services is provided in **Appendix G**. Where there is no capacity for the municipality to provide services it is the intention to make use of private contractors. A letter to this effect is provided in **Appendix G.**

(i) Water

Water would be required for sanitation use by operational staff, for washing the panels, as well as dust control on internal roads (where necessary). Water would ideally be sourced from the local municipality, in terms of a Service Level Agreement established between the Municipality and the Applicant. If this is not possible, then further options will be investigated. Where required, a storage tank (i.e. Jo-Jo tank) of up to approximately 10,000L may be used on site for temporary water storage.

The construction phase would also require water and sanitation, with these aspects being the primary responsibility of the Contractor. However, it would be preferable for water to be sourced from the local Municipality (where available), with alternative arrangements (for example, bringing water in with trucks) being made where necessary.

(ii) Sewerage

Sanitation requirements would be minimal, given that there would not be many operational staff. Sanitation for auxiliary buildings would be connected to the existing municipal sewage system. If the Municipality does not approve, or have capacity for, such a connection, sewage would be stored in the conservancy tank and collected either by a honey-sucker truck or by a service provider (Contractor) for treatment at a licensed disposal site. Alternatively, a standalone system would be used (i.e. portable toilets) which would be regularly serviced by an independent contractor. Note that it is not intended to make use of soakaways or on-site treatment solutions.

(iii) Solid Waste Management

Refuse/solid waste produced would also be nominal (approximately two wheelie bins per week) and would ideally be removed by the Municipality, however, if this is not possible, the Operator would employ private contractors to remove the refuse and dispose of it appropriately. In the construction and operational phase, solid waste would also be produced and would be managed in accordance with the requirements in the Environmental Management Programme (EMPr).

(iv) Electrical

In terms of connection to the grid, the proposed facility falls within approximately 7 085 m of the existing 765 kV Eskom Beta Sub-station. Grid connection alternatives are available (from a technical perspective) and application for grid connection will be made through a separate process.

(v) Stormwater

A baseline hydrological study and stormwater management strategy (**refer to Appendix 6 of the EMPr in Appendix I**) has been prepared for the facility. SPH8 is located outside the 1:100 year floodline of the pans on site. Stormwater management measures include collection of stormwater from hardened areas such as the electrical infrastructure compound and auxiliary buildings and transfer to stormwater control infrastructure which mimic the pre-development natural stormwater flows on site. This infrastructure may include:

- Grass swales next to hardened areas to mimic sheet flow instead of concentrating the follow of stormwater
- Grass swales next to gravel roads
- Infiltration strips
- Storage tanks and gutter systems for on-site temporary water storage for cleaning panels. Appropriate overflow systems must be considered.

Alternatives associated with this facility is discussed in **section 3**.

1.2.9 Springhaas Solar Facility 9 and associated infrastructure

Springhaas Solar Facility 9 (Pty) Ltd (i.e. the Applicant) proposes the development of Springhaas 9, a photovoltaic (PV) solar energy generation facility, of up to 150MWac in capacity, and associated infrastructure on farms Dealesrust No.922, Dealesrust No. 921 and Sunnyside No.918.

The proposed facility would comprise the following:

- Solar Field/Solar Arrays (Note that the foundations, mounting structures and module types would be confirmed during detail design, however, would remain within the proposed development footprint and be up to approximately 3.5m in height);
- Associated internal underground electrical reticulation (i.e. low- and medium voltage lines);
- Internal access roads (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 5m);
- Main Access road (noting that existing farm roads would be used as far as possible, and the road width would be up to approximately 8m);
- On site electrical infrastructure compound (contained within the proposed up to 2Ha footprint) consisting of:
    - On site substation and associated infrastructure,
    - Additional collector infrastructure, and /or
    - Battery Energy Storage System (BESS).
- Perimeter fencing; and
- Auxiliary buildings (including, but not limited to, Operation and Maintenance (O&M) buildings, admin buildings, workshops, gatehouse, security building, control centre, offices, visitor centre, warehouses, etc.).

A temporary laydown area would also be established during the construction period with the location and extent thereof provided in the indicative layout.

The co-ordinates for the corner points of as indicated in **Figure 1-12** are shown in **Table 1-12.**

Table 1-10: Springhaas Facility 9 Corner Point Co-ordinates

Corner point	Latitude	Longitude
A	28°48'42.69"S	25°39'24.77"E
B	28°48'52.64"S	25°39'23.59"E
C	28°48'52.58"S	25°39'18.33"E
D	28°49'9.31"S	25°39'18.12"E
E	28°49'7.47"S	25°39'24.92"E
F	28°49'18.24"S	25°39'22.45"E
G	28°49'22.12"S	25°39'18.47"E
H	28°49'38.25"S	25°39'8.59"E
I	28°49'44.33"S	25°38'56.32"E
J	28°49'51.76"S	25°38'44.88"E
K	28°49'55.64"S	25°38'40.22"E
L	28°50'1.74"S	25°38'40.14"E
M	28°50'3.55"S	25°38'39.90"E
N	28°50'8.57"S	25°38'40.21"E
O	28°50'16.78"S	25°38'32.77"E
P	28°50'14.08"S	25°37'49.94"E
Q	28°49'56.95"S	25°37'50.90"E
R	28°49'57.15"S	25°38'9.01"E
S	28°49'30.92"S	25°38'56.02"E
T	28°49'4.65"S	25°38'58.48"E
U	28°48'59.06"S	25°38'56.44"E
V	28°48'57.61"S	25°38'54.72"E
W	28°48'34.13"S	25°38'55.02"E

Main access road

Location	Latitude	Longitude
Start	28°48'32.02"S	25°38'55.95"E
Middle	28°48'33.10"S	25°38'55.52"E
End	28°48'34.18"S	25°38'55.08"E

Eastern access road realignment

Location	Latitude	Longitude
Start	28°48'35.00"S	25°41'37.13"E
Middle	28°48'31.79"S	25°41'29.91"E
End	28°48'32.49"S	25°41'21.56"E

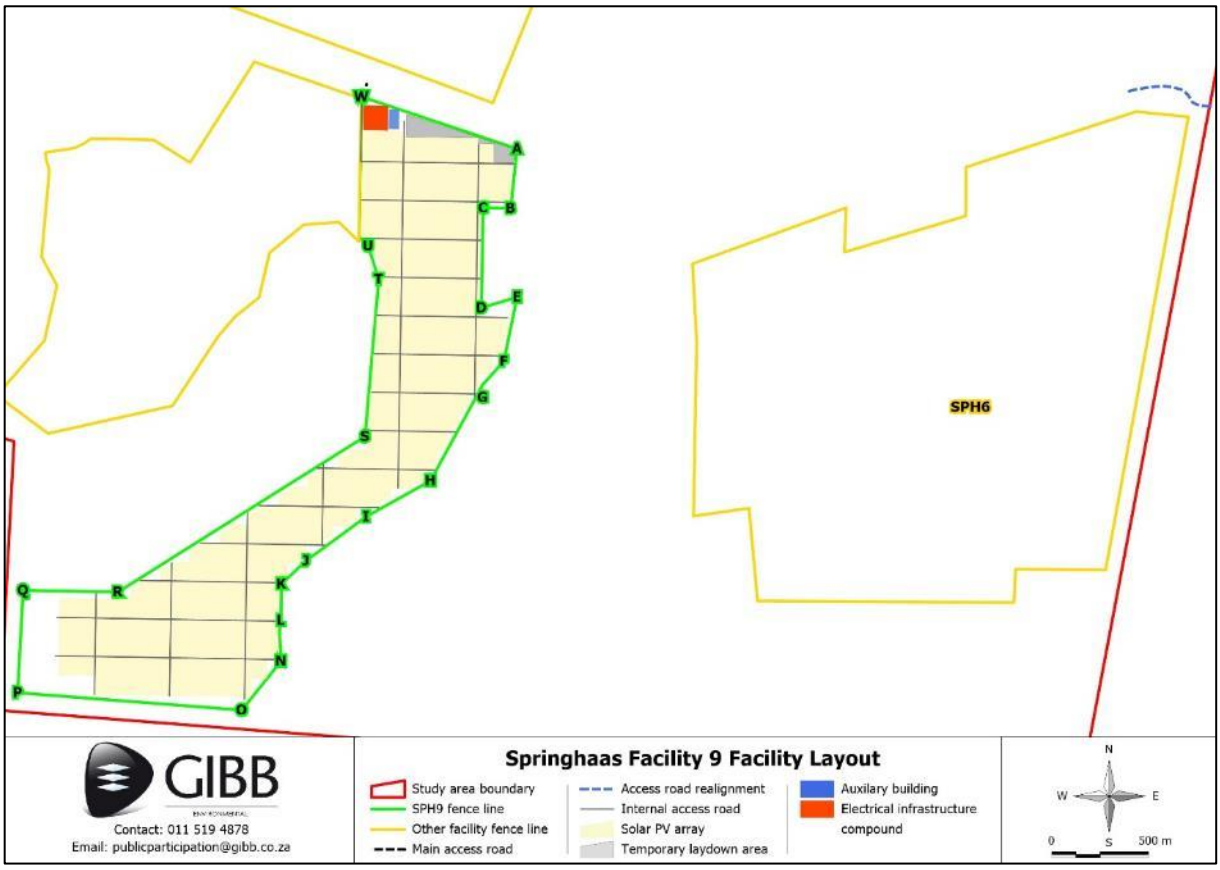


Figure 1-10: Springhaas Facility 9 Layout Plan

(a) Site Access

The proposed facility would be accessed via an existing unnamed farm road, located to the north of the proposed facility (and which transects the greater area from west to east). Access from the broader road network would be taken either from the N-S road connected to the R64 to the West of the proposed facility or to the N-S road connected to the R64 to the East of the facility. The road to the East would be re-aligned to abled a gentle curve for vehicles to access safely from the South. The details of the access would be as per the recommendations in the Transport Impact Assessment.

Existing farm roads will be utilised as far as reasonably possible and upgraded where necessary. New internal service roads will need to be established and these would either comprise farm (compacted dirt/gravel) roads or be paved (refer to **figure 1-12**).

(b) Services

The operations of the proposed facility would require some servicing, noting that the operational electrical requirements would be nominal and would be supplied by the facility on site. Confirmation of the availability of municipal services is provided in **Appendix G**. Where there is no capacity for the municipality to provide services it is the intention to make use of private contractors. A letter to this effect is provided in **Appendix G.**

(i) Water

Water would be required for sanitation use by operational staff, for washing the panels, as well as dust control on internal roads (where necessary). Water would ideally be sourced from the local municipality, in terms of a Service Level Agreement established between the Municipality and the Applicant. If this is not possible, then further options will be investigated. Where required, a storage tank (i.e. Jo-Jo tank) of up to approximately 10,000L may be used on site for temporary water storage.

The construction phase would also require water and sanitation, with these aspects being the primary responsibility of the Contractor. However, it would be preferable for water to be sourced from the local Municipality (where available), with alternative arrangements (for example, bringing water in with trucks) being made where necessary.

(ii) Sewerage

Sanitation requirements would be minimal, given that there would not be many operational staff. Sanitation for auxiliary buildings would be connected to the existing municipal sewage system. If the Municipality does not approve, or have capacity for, such a connection, sewage would be stored in the conservancy tank and collected either by a honey-sucker truck or by a service provider (Contractor) for treatment at a licensed disposal site. Alternatively, a standalone system would be used (i.e. portable toilets) which would be regularly serviced by an independent contractor. Note that it is not intended to make use of soakaways or on-site treatment solutions.

(iii) Solid Waste Managements

Refuse/solid waste produced would also be nominal (approximately two wheelie bins per week) and would ideally be removed by the Municipality, however, if this is not possible, the Operator would employ private contractors to remove the refuse and dispose of it appropriately. In the construction and operational phase, solid waste would also be produced and would be managed in accordance with the requirements in the Environmental Management Programme (EMPr).

(iv) Electrical

In terms of connection to the grid, the proposed facility falls within approximately 10 502 m of the existing 765 kV Eskom Beta Sub-station. Grid connection alternatives are available (from a technical perspective) and application for grid connection will be made through a separate process.

(v) Stormwater

A baseline hydrological study and stormwater management strategy ((**refer to Appendix 6 of the EMPr in Appendix I**)) has been prepared for the facility. SPH9 is located outside the 1:100 year floodline of the pans on site. Stormwater management measures include collection of stormwater from hardened areas such as the electrical infrastructure compound and auxiliary buildings and transfer to stormwater control infrastructure which mimic the pre-development natural stormwater flows on site. This infrastructure may include:

- Grass swales next to hardened areas to mimic sheet flow instead of concentrating the follow of stormwater
- Grass swales next to gravel roads
- Infiltration strips

- Storage tanks and gutter systems for on-site temporary water storage for cleaning panels. Appropriate overflow systems must be considered.

Alternatives associated with this facility is discussed in **section 3**.

1.2.10 Potential Grid Connections

Note that separate applications will be made for the grid connection options under consideration, however it is important to note that connection would be made to the existing 765 kV Eskom Beta sub-station, either by direct connection, or by connecting into either of the two (Beta/Delphi or Beta/Hydra) 400kV lines that feed the sub-station (alternatives will be assessed in the aforementioned separate process).

1.3 Project Location and Site Description

The Springhaas Solar Development will consist of seven (7) new Solar PV Facilities, with associated infrastructure, on a site measuring approximately 4 500 ha in extent, near Dealesville in the Free State. The project site is located approximately 60 km north-west of Bloemfontein, in the Tokologo Local Municipality, within the Lejweleputswa District Municipality. Refer to the Locality Map (**Figure 1-3)**.

The project site falls within the Kimberley Renewable Energy Development Zone (REDZ) number 5 and within the Central Corridor of the Strategic Transmission corridors (see **Figure 1-13** below).

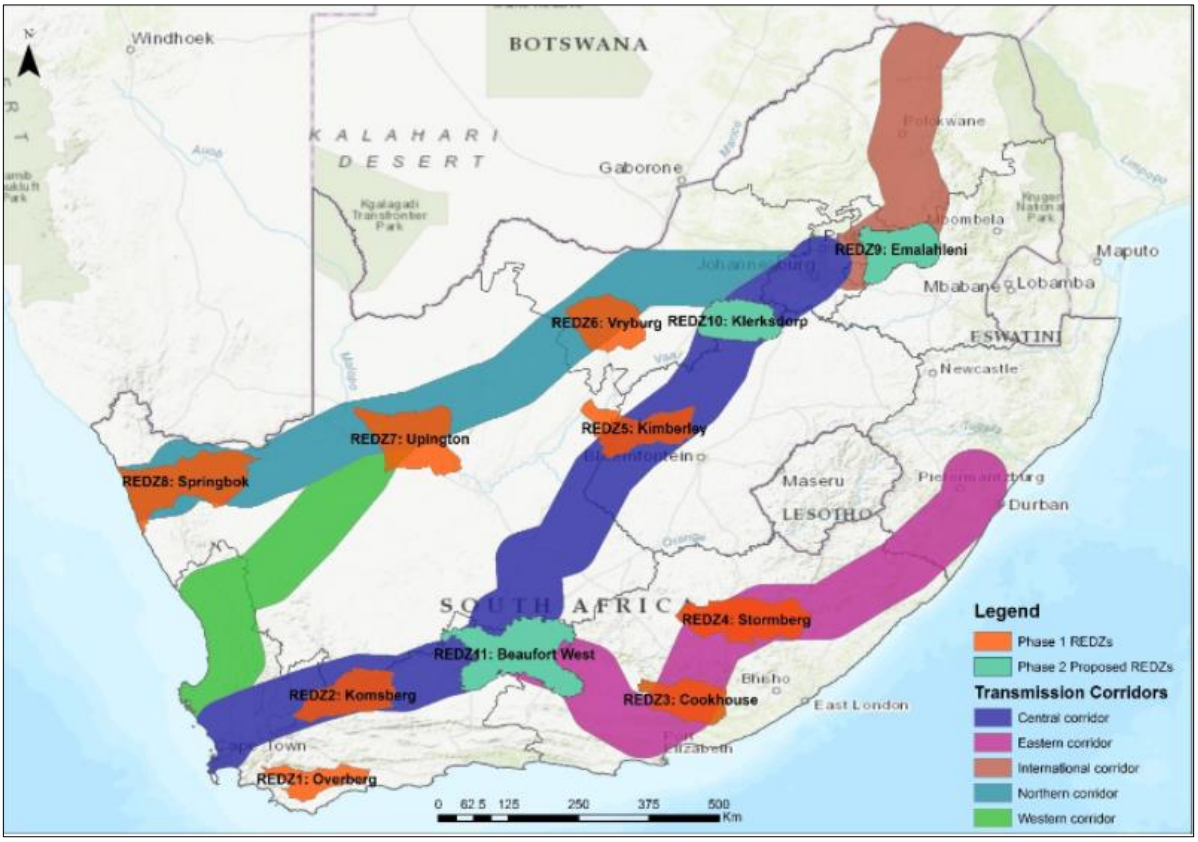


Figure 1-11: REDZs and Strategic Transmission Corridors (CSIR, 2021)

Refer to **Table 1-11** for the property description and SG Codes for the affected properties.

Table 1-11: SG Code and Property Description

Facility Name	Property Size	Property Description	SG Codes
SPH1	Total facility – up to 439Ha PV area – up to 370Ha	Lorraine no. 1182 Alsace no. 1181 Oertel's Rest no. 1184 (access road)	F00400000000118200000 F00400000000118100000 F00400000000118400000
SPH3	Total facility – up to 225Ha PV area – 183Ha	Alsace no. 1181 Oertel's Rest no. 1184	F00400000000118100000 F00400000000118400000
SPH4	Total facility – up to 261Ha PV area – 232Ha	Corneliasdal no. 45 Dealesrust no. 922	F00400000000004500000 F00400000000092200000
SPH5	Total facility – up to 177Ha PV area – 153Ha	Corneliasdal no. 45 Dealesrust no. 921 Dealesrust no. 922	F00400000000004500000 F00400000000092100000 F00400000000092200000
SPH6	Total facility – up to 462Ha PV area – 427Ha	Sunnyside no. 918	F00400000000091800000
SPH8	Total facility – up to 253Ha PV area – 224Ha	Corneliasdal no. 45	F00400000000004500000
SPH9	Total facility – up to 207Ha PV area – 184Ha	Dealesrust no. 921 Dealesrust no. 922 Sunnyside no. 918	F00400000000092100000 F00400000000092200000 F00400000000091800000

Figure 1-14 below shows the boundaries for all seven (7) PV facilities and the properties that it overlaps. It should be noted that consent has been given by all four of the affected landowners for the properties identified in **Table 1-11**.

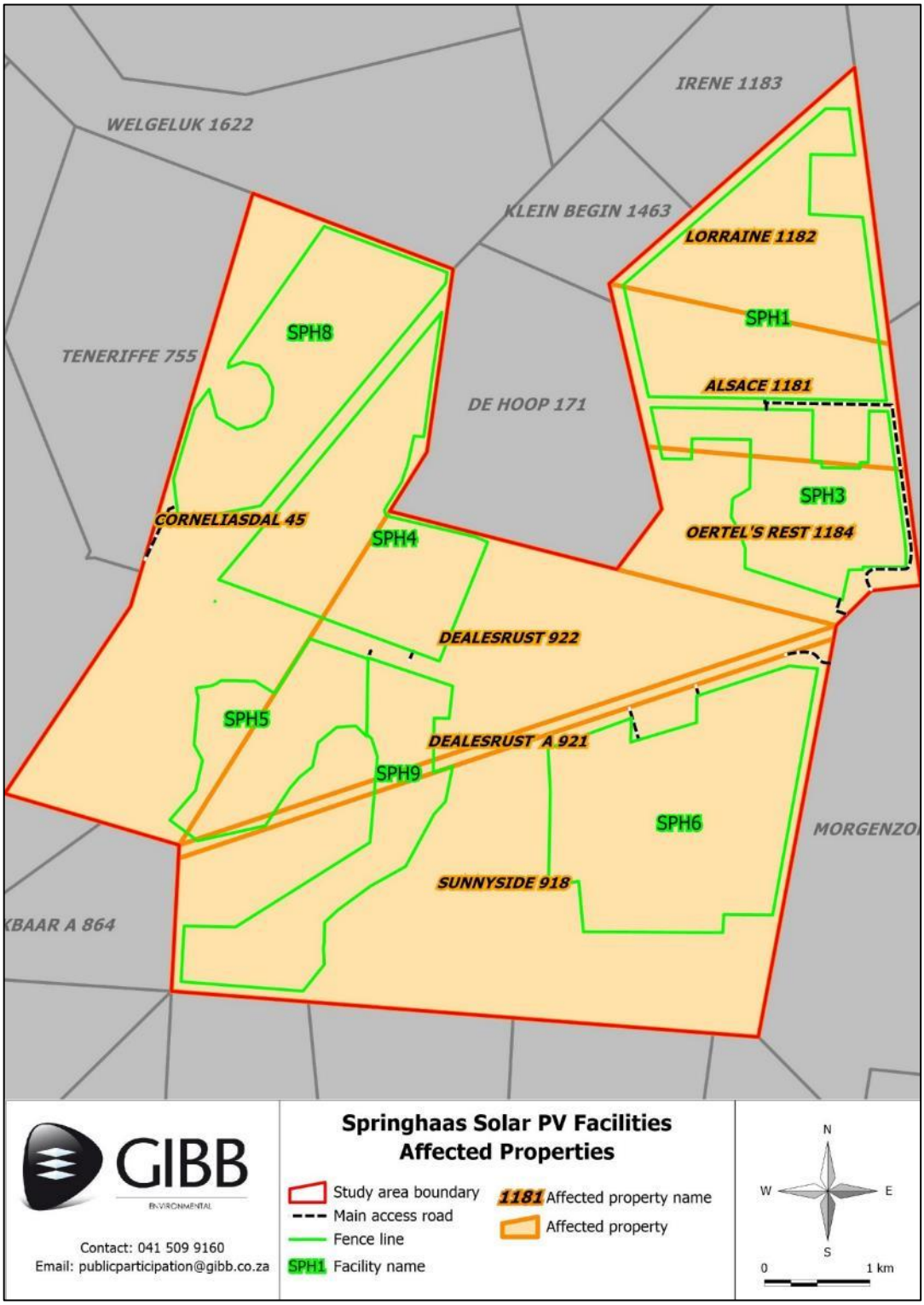


Figure 1-12: Affected properties

1.4 Need and Desirability

The Springhaas Solar PV facilities are renewable energy projects which, if developed will assist in the diversification of the energy mix in South Africa. This section presents an overview of international and South African policy relevant to renewable projects and highlights the fact that the proposed projects are well aligned to the intent of such policy.

1.4.1 Alignment with International Policy and Legislation

(a) United Nation's Development Programme's (UNDP's) Sustainable Development Goals (SDGs)

The 17 Sustainable Development Goals presented in the UN's 2030 Agenda for Sustainable Development look to realise the vision of a world which includes, amongst other things, "human habitats that are safe, resilient and sustainable and where there is universal access to affordable, reliable and sustainable energy". These goals, which came into effect on 01 January 2016 were intended to guide activities over the next 15 years. Goal 7 specifically addresses energy supply and looks to "ensure access to affordable, reliable, sustainable and modern energy for all". Goal 7 also highlights the need to increase substantially the share of renewable energy in the global energy mix and "by 2030 expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries". Photo-voltaic projects such as those proposed as part of this application clearly contribute to the realisation of such a vision.

1.4.2 Alignment with National Policy and Legislation

(a) National White Paper on Renewable Energy (2003)

The National White Paper on Renewable Energy (2003) is a policy lead document which provided a foundation and framework for promoting the renewable energy sector in South Africa, inclusive of solar energy. It was drafted in 2003 and provided a 10-year target of 10,000GWh renewable energy contribution by 2013. It emphasises the need for creating sustainable development through renewable energy and creating an enabling environment (i.e., sufficient renewable energy sources that feed into the new industry). The policy document also highlights strategic renewable energy targets and objectives to be accomplished within ten years. Five key areas addressed by the policy are:

- Promotion of financial and fiscal systems to encourage renewables
- Development of legislation (e.g. pricing regulations) to support renewables
- Stimulation of research and development of RETs
- Raising public awareness regarding RETs thought improved communication strategies, and training, and
- Establishing technology support centres such as the National Energy Research Institute.

Thanks to early policy paper such as this white paper, South Africa's renewables sector has progressed significantly since 2003 and the key focus areas listed above have led to the implementation of success programmes such as the Renewable Energy Independent Power

Producers Programme (REIPPP). The proposed Springhaas PV projects would contribute to the ongoing realisation of the vision of the white paper.

(b) South Africa's National Development Plan (NDP) 2030

The National Development Plan (NDP) 2030 provides a long-term plan which aims to eradicate poverty and decrease inequality by 2030.
The importance of the energy sector in economic growth is noted in the NDP and the NDP aims to move South Africa towards having an energy sector that:

- Provides reliable energy at competitive rates to support economic growth
- Is more readily available at affordable rates (90% of the population to have access to electricity within 20 years)
- Is produced in an environmentally sustainable manner

The proposed PV projects will contribute to achieving the above, particularly a reduction in generation costs and represents a significant improvement in terms of sustainability when compared to coal. The plan notes that by 2030 the contribution of coal as an energy source will be reduced and renewable sources will play a more central role in meeting South Africa's energy needs. In terms of energy from renewable sources, the NDP sets a long-term goal of ensuring that half of all electricity generation capacity is provided by renewables by 2030. South Africa's generation capacity is dominated by coal (approximately 70% of installed capacity), and crude oil (approximately 21%) (Akom, K, *et al*, 2021), and hence there remains a significant need to drive the development of renewables to achieve the 50% mark. The current proposals would assist in realising this goal.

(c) South Africa's National Climate Change Response Policy (2011)

This policy was published as a White Paper in October 2011 after an extensive public consultation process. It highlights that South Africa, as a developing country, is especially vulnerable to the impacts of climate change, and proceeds to map out a vision that responds to this challenge, centred around two main objectives; 1) managing the impacts, and 2) contributing to the global drive to reduce greenhouse gas emissions. The policy deals extensively with adaptation responses (focusing particularly on key sectors such as agriculture and forestry, biodiversity and human settlements) but makes strong commitments to mitigation, recognising it as a national priority. It highlights the need for interventions that deviate from the country's "business as usual GHG emission trajectory". The policy commits the country to a fair contribution to stabilising global GHG concentrations. It also identifies several Near-term Priority Flagship Programmes that will be implemented, one of which is the Renewable Energy Flagship Programme which was to include the Department of Trade and Industry's (DTI's) South African renewable Initiative. The plan also acknowledges the importance of partnering with private industry to realise its objectives, and the importance of private sector funding. These policy commitments made in 2011 have all contributed to the eventual realisation of the successful renewables bidding process that has seen renewable energy capacity successfully implemented in the country. The current Springhaas PV proposals area aligned to the vision of this policy in that they would contribute to a reduction in the country's GHG emissions and are to be procured through a private industry partnership.

(d) South Africa's National Climate Change Bill (2018)

The National Climate Change Bill was first published in 2018 and updated to the current iteration in October 2021. In February 2022 it was introduced to parliament. The intention of the bill is to provide a legal framework for South Africa to respond to climate change. The main objectives of this proposed act are:

- To allow for a coordinated response, by all levels of government, to the challenge of climate change. This includes strengthening government's institutional capacity and enhancing cooperative governance between departments and levels of government.
- To provide a framework for the management of future climate change impacts through adaptation measures that build resilience into society, the economy, and the environment.
- To make a fair contribution to stabilise global greenhouse gas concentrations in the atmosphere. In this regard the act requires the minister to set emission targets for different sectors, which must include quantitative GHG emission reduction targets. It is reasonable to assume that the energy sector will be a key focus sector for which targets will be set. Renewable energy projects such as the proposed Springhaas PV projects will therefore be important contributors to achieving future GHG emission targets, and an important means for reducing South Africa's dependence on coal. The proposed projects can therefore be considered well aligned to the objectives of the bill.

(e) National Energy Act (Act no. 34 of 2008)

The National Energy Act aims to provide a variety of available energy sources in a sustainable and economical manner, in order to alleviate poverty and assist in further economic growth (National Energy Act, 2008).

The proposed Springhaas projects are aligned with key objectives of the Act including:

- Diversification of supply. The Act references renewables and specifically solar energy as important contributors to this diversified mix. South Africa is heavily reliant on coal power and the additional solar capacity that would be contributed by the proposed projects would contribute to this diversification.
- Ensuring energy resources are available in sustainable quantities and at affordable prices. The price of renewable energy in South Africa has reduced significantly over time; the weighted average of all technologies of the REIPP bidding rounds was R2.02/kWh in round 1, while the cheapest solar bid in the latest round 5 was R0.375/kWh. It is anticipated that renewables will continue to drop in price and that the proposed Springhaas PV projects would contribute towards this reduction in energy costs for the country.
- Increasing specifically the generation and consumption of renewable energy. The proposed PV projects would contribute directly to such.

(f) Integrated Energy Plan (IEP) 2016

The National Energy Act (Act 34 of 2008) requires that an Integrated Energy Plan (IEP) be developed and, on an annual basis, reviewed and published in the Government Gazette. The

intention of the IEP is to provide South Africa with a roadmap for energy development over a 20-year horizon. The IEP is not focused only on electricity generation but addresses the full, broad scope of the energy economy including liquid fuels (petrol, diesel, paraffin), gas and electricity. The IEP lists 8 key objectives:

1. Ensure security of supply. For the electricity sector the plan requires that cost-effective tariffs are applied to ensure that sufficient capability exists for infrastructure investment and maintenance.
2. Minimise the cost of energy. For the electricity sector the plan states that "new electricity generators should be brought online through a competitive bidding process, where the ability to generate electricity at low cost is a key criterion." The proposed Springhaas projects will be secured through a competitive bidding process.
3. Promote the creation of jobs and localisation; The IEP notes that "solar technologies also present the greatest potential for job creation and localisation" and that "programmes to promote further development in the technology, as well as solar roll-out programmes, should be pursued."
4. Minimise negative environmental impacts from the energy sector; the plan proposes that a lower emission limit trajectory be factored into future energy sector targets. A move to renewables such as solar PV would support this.
5. Promote the conservation of water; the plan notes that new technologies such as dry-cooling in coal fired power stations should be prioritised.
6. Diversify supply sources of energy; with specific regard to solar PV and CSP, the plan states that these represent excellent opportunities to diversify the electricity mix, as to provide distributed generation.
7. Promote energy efficiency in the economy; the plan notes that increased efficiency will require improved demand-side interventions some of which could include improvements in end-use technology and fuel-switching. Different mechanisms for implementation would apply to different sectors.
8. Increase access to modern energy. Energy such as PV, which presents good opportunities for localisation, will contribute towards meeting the objective.

From the points above it is clear that solar PV projects, such as the proposed Springhaas projects, are aligned with the objectives of the plan and actively contribute to meeting several of the above objectives.

(g) Integrated Resource Plan (IRP) 2010–2030

The IRP was developed in 2010 and promulgated in 2011 as a long-term strategy for investment in electricity. The investment strategy focuses on generation capacity and associated supporting infrastructure required for the country over a 20-year timeframe. The electricity investment strategy incorporates the possible effects emerging from pricing and demand-side management (DSM). Other implications considered are related to the capacity provided by all parties involved in the generation of electricity (i.e. Eskom and other independent energy producers).

The IRP 2010 indicated the desired technologies for electricity generation that are essential to fulfil expected growth in demand up to 2030. It constituted the government objectives such as inexpensive electricity, minimised greenhouse gas (GHG) emissions, minimised water consumption, diversified electricity generation sources, localisation, and regional development.

The IRP notes the need to diversify the energy mix in South Africa and as such sets a target of 17.8GW of energy from renewable sources by 2030. To meet this target renewable energy electricity generation capacity needs to be expanded. Each of the proposed solar PV facilities will contribute to moving the country towards this target.

(h) Strategic Integrated Projects (SIP)

A total of 18 Strategic Infrastructure Projects have been developed under the guidance of the Presidential Infrastructure Coordinating Committee (PICC) with the intent of driving social and economic infrastructure development across all nine provinces in South Africa. There are currently three energy SIPs, one of which is SIP8, which looks to drive specifically green and clean energy development as highlighted in the Integrated Resource plan (2010). The proposed Springhaas PV projects would contribute to the execution of SIP8.

(i) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)

Since the publication of the IRP 2010–2030, there have been significant capacity developments in terms of renewable energy in South Africa. A total 6,422 MW through the Renewable Energy Independent Power Producers Programme (REIPPP) has been acquired, with 3,876 MW already operational and made accessible to the grid. The latest round of bidding (round 5) was concluded in October 2021 and bid window 6 is now open.

REIPPP is aimed at providing supplementary power onto the country's current electricity grid through private sector investment, principally in solar and wind. In addition, the renewable energy projects in the Eastern Cape have created 18 132 jobs since its launch. It should be noted that the proposed Springhaas PV facilities development is part of the Renewable Energy Independent Power Producer Procurement Programme (REIPPP).

1.4.3 Alignment with Provincial and Local Policy

The proposed Springhaas PV projects align well with policy and plans at a provincial, district and local level, as detailed below.

(a) Free State Growth and Development Strategy – Vision 2030

The Free State Growth and Development Strategy (FSGDS) was drafted in 2014. It serves as a framework for growth and development that is inclusive. It deals with policy planning, the allocation of resources, implementation of programmes, monitoring and the evaluation thereof. It identifies the requirements, challenges, and potential opportunities within the province. More specifically, this document identifies the vast opportunities for solar energy

development and notes that the "landscape of the province allows for massive opportunities for the harvesting of solar energy".

The plan identifies a number of drivers with Driver 12 being "Integrate environmental limitation and change into growth and development planning." This driver includes long term programmes including the mitigation of the causes and effect of climate change. One of the strategies under this programme is the adoption and integration of alternative energy approaches (solar, wind, hydro, and biofuels) to reduce the carbon footprint of the province's energy requirement. The proposed Springhaas PV project clearly support this approach.

(b) Free State Provincial Spatial Development Framework (2007)

The Free State Provincial Spatial Development Framework (FSPSDF) is an extensive developmental plan for the Free State Province that focuses on spatial and strategic planning policy on a provincial level. It promotes development through compliance to the NDP and other national and provincial directives. It supports the Free State Provincial Growth and Development Strategy, which aims to achieve a provincial economy that is successful, sustainable, and expanding whilst minimising poverty and enhancing social development. The FSPSDF highlights the current issues surrounding access to electricity, noting that at the time approximately 25% of households did not have access to electricity and therefore the need to prioritise the provision of electricity.

(c) Free State Green Economy Strategy (2014)

The Free State Green Economy Strategy (2014) was developed by the Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA) with six objectives:

- Improve environmental quality and economic growth
- Develop green industries and energy efficiency
- Expand the productive capacity and service delivery
- Adopt sustainable consumption and production processes
- Improve policy-making, permitting, monitoring and enforcement on Green Economy Initiatives/Programmes, and
- Create decent green jobs and build the capacity of relevant personnel, municipalities, and other relevant stakeholders

The strategy identifies five potential areas for greening the economy that are applicable to the Free State Province, one of which is energy, particularly renewable energy, and energy efficiency. While the strategy presents solar water heating programmes as a key vehicle for delivering renewable energy to particularly rural communities, the strategy highlights the importance of the broader renewable energy sector particularly for its potential for job creation. The development of large PV facilities such as those currently proposed is aligned with the strategy's objective of sustainable production delivery.

(d) Free State Province Climate Change Adaptation Strategy (January, 2021)

The proposed solar developments align well with the Free State's Climate Change Adaptation Strategy which was revised in 2020/2021. The strategy highlights energy production as a key economic industry for the province, one that is currently led by hydro power generation at Gariep Dam. The strategy highlights that the "province has immense solar harvesting potential" while also noting that impacts such as change in land use must be considered. Enhancement of investment in renewable energy projects, including solar, is listed as one of the key adaptation options for the Province, and it is recommended that the scale at which current solar and hydro generation initiatives are being implemented "can be improved to cover the entire province" (see section 5.1.7 (i)). The proposed PV projects would contribute significantly to improving solar generation within the region.

(e) Lejweleputswa Growth and Development Strategy (2008)

The Lejweleputswa Growth and Development Strategy (LGDS) is a strategy to guide decision making on development for the district, with the objectives being to:

- Stimulate economic development
- Develop and enhance the infrastructure for economic growth and social development
- Poverty alleviation through human and social development
- Ensure a safe and secure environment for all the people of the province
- Promote effective and efficient governance and administration

While the plan does not specifically address the potential in the province for renewables it does highlight the need for general economic development and job creation, which projects like the proposed PV developments would contribute to. The plan does highlight the presence of large maize production areas and the potential growth of the associated bio-fuels industry.

(f) Lejweleputswa District Municipality Integrated Development Plan (2017 -2022)

The IDP is based on the Lejweleputswa Growth and Development Strategy, and presents the district municipality's vision to be "a leader in sustainable development and service delivery", with the following strategic objectives:

- Promotion of projects that enhance economic growth and job creation
- Providing sound financial management
- Providing excellent, vibrant public participation and high quality local municipal support programmes maintaining good working relations in the spirit of cooperative governance
- Enhancing high staff morale, productivity, and motivation

The plan identifies "reducing greenhouse emissions" as a strategic objective and the presents of the Dealesville Solar facility is highlighted as well as the intention to facilitate the development of the southwestern part of the district as a solar energy hub. The proposed Springhaas PV projects are immediately south of Dealesville and hence well aligned with this hub proposal.

(g) Tokologo Local Municipality Integrated Development Plan

The vision of the Tokologo Local Municipality Integrated Development Plan (IDP) is to be:
"A progressive municipality, through cooperative governance creates conditions for economic growth social development and meet the basic needs of the community and improve the quality of life for all residents".

The IDP notes that the municipality will support renewable energy projects with guidance from the Spatial Development Framework. Local economic development, and particularly job creation, is one of the key performance areas defined in the IDP. SPH1 and SPH6 would create approximately 300 jobs during the peak of construction, the other facilities, SPH3, SPH4, SPH5, SPH8 and SPH9 would each create 150 jobs at the peak of construction. Hence the proposed PV projects would assist in realising this KPA. Employment would be undertaken according to applicable procurement guidelines and local labour would be utilised as a far as possible.

1.4.4 Desirability of Site Location and Layout

(a) Renewable Energy Development Zones (REDZs).

The Strategic Environmental Assessment (SEA) for Wind and Solar Photovoltaic Energy in South Africa (2015) originally recognised eight (8) Renewable Energy Development Zones (REDZs), with an additional three (3) added in 2021. These zones are of strategic importance for large scale wind and solar photovoltaic energy development, inclusive of the availability of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy. The REDZ were identified as areas where socio-economic impacts of wind and solar PV facilities can be maximised, and negative environmental impacts are limited. The REDZ aim to assist with responsible implementation of the Integrated Resource Plan (IRP 2019) that was gazetted by the Minister of Mineral Resources and Energy.

The REDZ are zones identified by the Department of Environmental Affairs (now DFFE) for the development of large-scale wind and solar photovoltaic energy projects. All seven of the Springhaas Solar PV facilities are all wholly located in REDZ 5 and within the central transmission corridor (refer to **figure 1-13**) and are hence well located on a regional scale. REDZ 5 encompasses an area of approximately 150km by 50km, stretching from Barkly West in the west to beyond Dealesville in the east.

(b) Strategic Transmission Corridors

The Strategic Environmental Assessment (SEA) for Electricity Grid Infrastructure (EGI) in South Africa recognised five (5) Strategic Transmission Corridors that are of strategic importance for supporting large scale electricity transmission and distribution infrastructure in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution. All of the proposed Springhaas Solar PV facilities are located within the "central" Strategic Transmission Corridor, as defined in terms of section 24(3) of the NEMA. The central corridor runs roughly from Johannesburg to Cape Town, and roughly bisects the country. **Figure 1-13** depicts the location

of 8 existing REDZs plus 3 proposed additional zones, as well as the Strategic Transmission Corridors, where investment in transmission infrastructure is planned. The location of the proposed Springhaas PV projects within the central Strategic Transmissions Corridor further confirms that the proposed projects are well located on a regional scale.

(c) Local physical features and layout

The following factors contribute further to the desirability of the site's location:

- **Solar resource:** The solar resource in the area is high. SolarGIS data shows the broader area between Bloemfontein and Kimberly, which includes the site of proposed projects, has GHI (Global Horizontal Irradiation) values of between 2000- 2100kWh/m^2 making it very suitable for PV.
- **Size and land use:** The site is large and the seven farm sections that constitute the site are such that the site can comfortably accommodate the multiple individual PV projects in appropriate layout configurations (ideally square or rectangular) that make the individual projects viable. The site is covered largely by natural grassland and sparse areas of shrubland which is currently used as grazing for livestock. The site is zoned for agricultural use, but the proposed development footprint has avoided areas of highest potential, and hence these can continue to be used as such. This, together with the fact that most the proposed sites' agricultural potential is generally low to very low, renders the site suitable.
- **Road network:** The site is accessible via the R64 (approximately 16-20 km to the east) and is flanked on either side by unsurfaced district roads, but which are of sufficient standard to allow easy access.
- **Topography:** The site topography is generally flat with the highest elevations in the north (approx. 1255 masl) dipping to approximately 1220 masl in the south. This means little cut and fill is required in order to develop the required levels for the PV platforms. There are limited number of local rocky outcrops but these have been accommodated in the internal layout.
- **Existing power transmission infrastructure:** The site lies near several promising grid connection options. There are 400kv and 765kv lines that traverse the site or run adjacent to the site and two Eskom 765kv substations (Beta and Perseus) are in close proximity of the site.
- **Landowners:** The landowners of the farms on which the proposed projects will be established have supported the proposal. Agricultural activities that fall within the footprint of the PV infrastructure will need to cease but, as confirmed by the socio-economic assessment undertaken for this application, the affected landowners have indicated their willingness to relocate their livestock and other activities and hence no material loss of agricultural activity should occur.
- **Socio-economic contributions:** The socio-economic assessment (Urban Econ, 2022) noted the potential positive contribution of the proposed projects. Overall, the project will require an investment of about R13,5 billion and each facility will create jobs during the construction phase. Each of the 150MWac facility (SPH3, SPH4, SPH5, SPH8 and SPH9) will create around 150 temporary jobs. The larger facilities, SPH1 and SPH6 which have a generation capacity of up to 250MWac will create 300 jobs during the

construction phase. Many of these jobs will be filled by labourers from the local communities, which will be highly beneficial considering the high unemployment rate observed in the local municipality. During operations however, each facility will employ eight people. While this is still a positive contribution it does means less of a positive impact on local communities during the operational phase. There will also be positive local economic benefit in terms of the rates and taxes that would flow from the plant to the local municipality.

- **Environmental sensitivities:** At a regional level, the site is not located in any areas that carry environmental designations e.g. critical biodiversity areas (CBA). At a site level the development of the internal layout has been an iterative one that has been informed by specialist studies that have considered all key environmental aspects of the site. The layout has considered and avoided site features such as freshwater features (pans, wetlands, or seeps), heritage features (e.g. graves and homesteads), sensitive faunal habitat (rocky outcrops) and key visual receptors. Refer to **Chapter 6** for details of the site sensitivity.

1.5 Details of Role Players

1.5.1 Details of the Applicant

The details of the Applicant can be found in **Table 1-13** below.

Table 1-12: Applicant information for each PV facility

Facility	Applicant	Company registration no.
SPH1	Springhaas Solar Facility 1 (Pty) Ltd	2021/905963/07
SPH3	Springhaas Solar Facility 3 (Pty) Ltd	2021/907158/07
SPH4	Springhaas Solar Facility 4 (Pty) Ltd	2021/906127/07
SPH5	Springhaas Solar Facility 5 (Pty) Ltd	2021/906208/07
SPH6	Springhaas Solar Facility 6 (Pty) Ltd	2021/948484/07
SPH8	Springhaas Solar Facility 8 (Pty) Ltd	2021/948393/07
SPH9	Springhaas Solar Facility 9 (Pty) Ltd	2021/948258/07

Table 1-13: Applicant Contact Details

Contact Person:	Marielle Penwarden		
Physical Address:	Unit B1 Mayfair Square, Century Way, Century City, Western Cape, 7441		
Postal Address:	Unit B1 Mayfair Square, Century Way, Century City, Western Cape, 7441		
Postal code:	7441	Fax:	--
Telephone:	021 276 3620	Cell:	079 862 0033
E-mail:	marielle.penwarden@abo-wind.com / capetown@abo-wind.com		

1.5.2 Details of Independent EAP

GIBB is an integrated group of scientists, project managers, engineers and architects providing cost-effective solutions and specialist services in a wide range of disciplines. The multi-disciplinary consulting, management and design approach allows for the execution of projects in a holistic way, as this is believed to be the best approach to fully meet the needs of our Clients.

The GIBB Environmental Services Division has a formidable track record and comprises highly qualified and experienced technical staff *viz*, Environmental Scientists and Specialists, which collectively form the National Environmental Team. The team members have broad experience in terms of working on a range of environmental projects within the public and private sector across South Africa. Refer to **Table 1-14** for the contact details of the lead EAP and **Table 1-15** for the details of the GIBB team members involved in this project.

Table 1-14: Details of the Independent Environmental Assessment Practitioner (EAP)

Project EAP:	**GIBB Environmental (Pty) Ltd**		
Contact Person:	Ms. Kate Flood		
Role in Project:	Project Manager Lead EAP Process management Specialist team management Client liaison		
Physical Address:	Port Elizabeth, 1st Floor, St. George's Corner, 116 Park Drive, Central, Port Elizabeth, 6001		
Postal Address:	PO Box 63703, Greenacres, 6057		
Postal code:	6057	**Fax:**	-
Telephone:	041 509 9160	**Cell:**	084 631 1456
Email:	kflood@gibb.co.za		
Expertise:	**Ms Kate Flood** is an environmental scientist (Pr Sci Nat) with over nine years of experience, Kate Flood specialises in various environmental disciplines including waste planning, environmental monitoring, environmental impact assessment and environmental management plans. Kate is the Service Offering Lead for Waste Planning projects at GIBB Environmental and manages the Waste Planning Team. Her key experience includes: - Environmental impact assessments and environmental management plans – preparation of environmental impact reports and environmental management plans, in accordance with published guidelines, for construction projects - Public Participation Process in compliance with NEMA 2014 EIA regulations. Public perception survey for waste management plans - Waste Management including waste stream surveys and waste characterisation, integrated waste management plans, waste infrastructure masterplans and waste feasibility studies - Environmental auditing including environmental control officer audits, ISO 14000 audits, audits of waste facilities and landfill sites - Environmental Monitoring, surface water sampling		

	- Project management

Please refer to **Table 1-15** for the roles and responsibilities of other GIBB team members on this project. CV's of the Project Team are included in **Table 1-15.**

Table 1-15: Project Team and Experience

Project Role	Name	Expertise
Technical Peer Review	Mr Walter Fyvie	A professional environmental consultant with 21 years of experience, Walter Fyvie is part of the national management team that leads GIBB Environmental. He has experience in many different areas of environmental management, including Waste Management, Environmental Impact Assessments (EIAs) for large developments including renewable energy projects, and Environmental Auditing and Monitoring. He has international experience as an environmental consultant, having worked in the UK. With a technical background in zoology, biochemistry, biotechnology, and environmental management, he appreciates the scientific, engineering, and biological requirements of environmental projects. He currently is the acting General Manager for GIBB Environmental. His key experience includes: • Environmental Impact Assessments (EIAs), including Basic Assessments, scoping studies, full Environmental Impact Assessments, public participation, and coordination of large specialist teams. He has been involved with more than 30 assessment projects including large residential estate projects, wind farm projects in the Western Cape, and high-rise mixed-use developments in London (UK) • Environmental Auditing, including compliance audits of more than 30 waste disposal facilities, health care risk waste (HCRW) treatment facilities, ISO14000 audits, and construction audits as an Environmental Control Officer (ECO) for various infrastructure projects. • Environmental Management Programmes/Plans (EMPr), including the drafting of EMPrs for numerous construction projects including roads, railways, residential estates, commercial and retail developments, and renewable energy projects including wind farms • Project Management. Walter has functioned in a project leader capacity at Gibb since 2004, in a role where he has been responsible for all project aspects including technical requirements, financial control, programme control, and client liaison.
Assistant to EAP & Public Participation Administrator	Ms Ziyanda Makapela	A graduate environmental scientist with three years of experience, Ziyanda Makapela specialises in environmental monitoring and waste management. Her key experience includes: • Environmental auditing including environmental control officer audits, audits of waste facilities and landfill sites • Public perception surveys

Project Role	Name	Expertise
		• Waste management including integrated waste management plans • Technical report writing • GRAP assessments for landfills (rehabilitation and closure provisions in terms of GRAP 17 and 19) • Waste feasibility study and baseline assessments • Drafting technical and financial proposals for Integrated Waste Management Plans • Project Administration • Liaison with Government authorities and clients • Undertaking stakeholder, public and authority engagement meetings • Overall project management • Invoicing

1.5.3 Details of Competent Authority

The DFFE will be the Competent Authority (CA) for the Application for Environmental Authorisation by way of a BAR process. **Table 1-16** sets out the contact details of the relevant Case Officer.

Table 1-16: Details of Competent Authority

Competent Authority:	Department of Forestry, Fisheries and the Environment (DFFE)		
Case Officer:	TBC		
Postal Address:	Private Bag X447, Pretoria		
Postal code:	0001	**Fax:**	
Telephone:		**Cell:**	
Email:			

1.5.4 Details of Specialists

In order to comprehensively investigate the impact of the proposed project on the receiving environment, a number of Specialist Studies were undertaken by independent specialists during the impact assessment phase of the project. The specialist team responsible for the various studies are presented in the **Table 1-17** below.

Table 1-17: Specialist Studies

Study	Specialist	Report Location
Agricultural Compliance Statement	Mariné Pienaar -Terra Africa Consult cc	Appendix F1
Aquatic Biodiversity and Species Assessment	Toni Belcher - BlueScience (Pty) Ltd	Appendix F2
Avifaunal Impact Assessment	Jon Smallie - Wildskies Ecological Services (Pty) Ltd	Appendix F3
Bat Specialist Assessment	Craig Campbell - Arcus Consultancy Services South Africa (Pty) Ltd	Appendix F4
Botanical Assessment	Dave MacDonald - Bergwind Botanical Surveys and Tours cc	Appendix F5

Study	Specialist	Report Location
Groundwater	Julian Conrad & Christel van Staden - GEOSS South Africa (Pty) Ltd	Appendix F6
Heritage Impact Assessment (Archaeological and Heritage)	Dr Jayson Orton - ASHA Consulting (Pty) Ltd	Appendix F7
Landscape and Visual	Jon Marshall - Afzelia Environmental Consultants (Pty) Ltd	Appendix F8
Palaeontological Impact Assessment	Prof. Marion Bamford – The Palaeontologist Consultant	Appendix F9
Risk Assessment	Debra Mitchell - Ishecon cc	Appendix F10
Socio-Economic	Ruan Oberholzer & Tasmyn Cooper - Urban-Econ Development Economists	Appendix F11
Traffic and Transport	Iris Wink - JG Afrika (Pty) Ltd	Appendix F12
Terrestrial Biodiversity and Animal Species	Robyn Phillips – Cossypha Ecological	Appendix F13
Geotechnical	Carel de Beer, Geotechnical Consulting Services	Appendix F6 of the EMPr (Appendix J of DBAR)
Stormwater and Floodline Analysis	Peter Wium –Peter Wium Consulting Engineers	Appendix F7 of the EMPr (Appendix J of DBAR)

All the findings of the Specialist Studies undertaken BA process are summarised in **Chapter 5, 6,** and **7** of this DBAR. In addition to this, the full Specialist Studies can be viewed in **Appendix F** of this report.

1.6 Assumptions and Limitations

The following assumptions and limitations apply to the preparation of this DBAR, including those from specialist reports:

- The information provided to the EAP by the Applicant and the specialists was accurate and true, and was relevant and applicable during the period when the DBAR was prepared;
- Water Use License (WUL) applications have been submitted for each facility, noting that the aquatic ecologist has indicated that all facilities would qualify for registration as a General Authorisation, given the low risk to aquatic ecosystems. This process is separate to the BAR process;
- All alternatives that were considered for the proposed development can be achieved; and
- The identification and registration of I&APs was an ongoing activity during the course of the BAR process. The I&AP database will be a preliminary database which will continue to be updated and form part of the stakeholder database for the project.

1.6.1 Specialist Reports Assumptions and Limitations

The specialist team qualified their studies with a set of assumptions and limitations. These assumptions and limitations form part of the specialist studies in **Appendix F** and have been listed below.

(a) Agricultural Compliance Statement

The following assumptions and limitations apply to the agricultural study prepared by TerraAfrica (**Appendix F1**)

- *it is assumed that the development footprint will remain within the development area of each of the proposed Springhaas solar PV facilities that were assessed in this report;*
- *it is assumed that the project area will be fenced off and that the fenced off areas will be unavailable for farming activities for the duration of the project;*
- *it is further assumed that the activities for the construction and operation of the infrastructure are limited to that typical for the construction and operation of solar PV facilities, inclusive of the infrastructure listed in each project's description; and*
- *The Springhaas Solar PV facilities will each have an estimated lifespan of 20 years (operational phase). Upon completion of the operational phase the infrastructure on site will be decommissioned and the site will be rehabilitated. The impacts associated with the construction phase activities have been assessed. There is no guarantee that once the facilities are decommissioned that agricultural activities will recommence. The impact of reinstatement of agricultural activities post decommissioning has therefore not been assessed.*

The following limitations are part of the assessment:

- *the anticipation and rating of impacts are based on the report author's knowledge and experience on the nature of construction and operation of solar PV facilities and associated infrastructure. Therefore, it is done as accurately as possible but must not be considered as absolute measures.*

(b) Aquatic Biodiversity and Species Assessment (**Appendix F2**)

The following limitations were noted in the aquatic biodiversity assessment prepared by BlueSciene:

Limitations and uncertainties often exist within the various techniques adopted to assess the condition of ecosystems. The methodologies and techniques used in this assessment have been developed nationally and are typically rapid as is required for this freshwater impact assessment.

Very limited aquatic features occur within the site and surrounding area. No baseline long-term monitoring was undertaken as part of this assessment. There is also very little existing information available for the aquatic features within the study area. Data was utilised for adjacent aquatic ecosystems where available. The nature of the proposed activities however also allows them to be placed some distance from any mapped aquatic features such that the likely impacts would be very low. It is usually the associated infrastructure that has the potential to have a greater impact on the aquatic features. The impacts of roads and powerlines on the aquatic features are however well understood and can be effectively

mitigated to ensure the impacts remain low. The preferred mitigation measure is to limit the disturbance to aquatic features as far as possible by avoiding and minimising the number of crossings and providing adequate buffer areas. The proposed development footprint and layout has considered this and has been placed outside of sensitive aquatic features. This will also ensure that the cumulative impacts will remain low.

The level of aquatic assessment undertaken was considered to be adequate for this study. No further fieldwork will be required. The ground-truthing of aquatic features was undertaken during early summer, after the commencement of the summer rainfall period and when the use of vegetation as an indicator was possible. As it was not possible to cover the entire site in a high level of detail, extrapolation of the areas ground-truthed to those not covered was done using the latest available aerial imagery for the site.

(c) Heritage Impact Assessment (Archaeological and cultural heritage)

The following assumptions and limitations were included in the Heritage Impact Assessment (**Appendix F7**) prepared by ASHA Consulting:

- *The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located*
- *It is not always possible to determine the depth of archaeological material visible at the surface.*
- *The site is very large and coverage is low, although it is assumed that all the main heritage features will have been located and recorded. There is, however, always the chance that other finds will be made later such as the graves reported by the environmental consultant after the heritage survey.*

(d) Avifaunal Assessment

The following assumptions and limitations were noted in the avifaunal impact assessment (**Appendix F3**) prepared by WildSkies Ecological Services

The presence of the ornithologist on site is certain to have an effect on the birds itself. For example during walked transects, certain bird species will flush more easily than others (and therefore be detected), certain species may sit undetected, certain species may flee, and yet others may be inquisitive and approach the observers.

(e) Bat Impact Assessment

A specialist bat impact assessment was undertaken by Arcus (**Appendix F4**). The following assumptions and limitations apply to the study:
It is emphasised that information, as presented in this report, only has bearing on the development sites, as indicated on the accompanying maps (Figures 1, 3, 4, 5, 6, 8 and 9). This information cannot be applied to a broader area, should the size of the area increase, however

similar in appearance or any other aspect, without proper investigation by an appropriate bat specialist.
Only one site visit was conducted in summer, which may provide limited information on bat activity or occurrences noted during site inspections. Bat occurrence and activity may vary in accordance with seasonality. However, as summer is considered to be the season of highest activity due to the breeding period and more suitable environmental conditions, the single site visit conducted during summer is considered representative for high levels of activity and roost usage for most resident bat species. However, even though summer is perceived to be the period where activity is highest, most bats are active throughout the year.

(f) Botanical Assessment (Plant Species Assessment)

A Botanical Assessment was undertaken by Bergwind (**Appendix F5**). The following was noted in the study:

*Some geophytes and annuals were past growing and flowering but since the vegetation is predominantly grassland, non-graminoid species form a very small percentage of the flora and biomass. The confidence placed in this botanical assessment is **high**.*

(g) Terrestrial Biodiversity and Animal Species

The following assumptions and limitations were applied to the Terrestrial Biodiversity and Animal Species assessment (**Appendix F13**) prepared by Cossypha Ecological.

- *To obtain a comprehensive understanding of the dynamics of the biota on site, including species of conservation concern, studies should include sampling through the different seasons of the year, over several years, and extensive sampling of the area. Such long-term research is not feasible for non-academic studies of this nature, and the surveys were conducted during two field visits during the early summer season.*
- *Vegetation habitat boundaries usually consist of subtle transitional zones or ecotones, which cannot be captured as distinct lines. Boundaries of habitat types are therefore approximately defined.*
- *Habitat types and Impact Receptors were defined and mapped in the context of use by fauna and not in terms of botanical species associations. Similarly, the habitat associated with pans and wetlands described in this report are defined in terms of broad habitat use by fauna and do not denote the boundaries of wetlands and watercourses.*
- *Potential impacts of the proposed project were evaluated based on the layout provided at the time of writing, and where necessary, recommendations for the most appropriate mitigation measures have been provided.*
- *Findings, recommendations, and conclusions provided in this report are based on the author's best scientific and professional knowledge as well as information available at the time of compilation.*

(h) Geotechnical Investigation

A geotechnical investigation (**Appendix 6 of the EMPr, Appendix I**) was undertaken by GCS. The following limitations were noted in the report:

The information provided in this specialist report is based on information provided by the client and/ or the client's representatives, published scientific literature, maps, and information published in the public domain and that collected by Geotechnical Consult Services during the site investigation in the area.

(i) Groundwater Impact Assessment

The following assumptions and limitations were applied to the Groundwater Impact Assessment (**Appendix F6**) prepared by GEOSS.

- *We have assumed that the available published geological and hydrogeological data on which our study has been based, is accurate. The interpretation of the analysis results that have been presented here are based on standard rating tables.*
- *Our recommended mitigation and remedial measures do not necessarily account for the most economically feasible options available. We have, however, endeavoured to highlight options, which to our knowledge, are best practise in the industry.*
- *It has been assumed that wide-spread construction of hard-surfaced areas across this development will be minimal; and therefore, that little formal stormwater management will be required for this facility. This should; however, be guided by an appropriate professional. GEOSS could advise with additional information in this regard.*
- *No mention of a waste water treatment plant was made in the brief, and therefore, we have not included risks associated with this type of amenity. Should a waste water treatment facility be require, an impact assessment will be required.*
- *The decommissioning phase of this project has not been assessed as the water requirements and decommissioning plan are not currently available. Once this information is available it is advised that the risks associated with groundwater quality and availability should be assessed.*

(j) Socio-Economic Impact Assessment

The following assumptions and limitations were applied to the socio-economic impact assessment (**Appendix** F12) prepared by Urban-Econ:

- *Project-related information supplied by the environmental practitioner and the client for the analysis is assumed to be reasonably accurate*

- *The secondary data sources used to compile the socio-economic baseline (demographics, dynamics of the economy), although not exhaustive, can be viewed as being indicative of broad trends within the study area*
- *The identification of possible impacts was based on the project team's experience with similar studies in the past and the existing desktop-level knowledge of the socio-economic environment*
- *Secondary data that will be used are sourced from Stats SA and Quantec, which may include data from the 2011 Census that may not have been updated since*
- *The focus on the primary data collection was on those parties that were perceived to be most sensitive to the proposed project. As such, it is believed that the study was able to identify the most significant impacts and assess the most pertinent issues.*

(k) Transport Assessment

The following assumptions and limitations were applied to the Transport Assessment (**Appendix F12**) prepared by JG Afrika:

- *This study is based on the project information provided by the Client.*
- *According to the Eskom Specifications for Power Transformers (Eskom Power Series, Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers), the following dimensional limitations need to be kept when transporting the transformer total maximum height 5 000mm, total maximum width 4 300mm and total maximum length 10 500mm.*
- *Maximum vertical height clearances along the haulage route are 5.2m for abnormal loads.*
- *The imported elements will be transported from the most feasible port of entry, which is deemed to be Port of Ngqura in the Eastern Cape.*
- *If any elements are manufactured within South Africa, these will be transported from their respective manufacturing centres, which would be either in the greater Johannesburg, Cape Town or Pinetown/Durban.*
- *All haulage trips on the external road network will occur on either surfaced national and provincial roads or existing gravel roads.*
- *Material for the construction of internal access roads will be sourced locally as far as possible.*

(l) Landscape and Visual Impact Assessment

The following assumptions and limitations were applied to the Landscape and Visual Impact Assessment (**Appendix F8**) prepared by Afzelia Environmental Consultants & Environmental Planning and Design:

- *A site visit was undertaken over a two day period (1st and 2nd October 2021).*
- *The timing of photography was planned to ensure that the sun was as far as possible behind the photographer to ensure that as much detail as possible was recorded in the photographs.*

- *GIS data sets used in the assessment are either available on line to the public or have been sourced from relevant government departments.*
- *Photographs were taken with a Canon EOS M50 camera fitted with a 22mm lens.*
- *Visibility of the proposed facilities has been assessed using the Global Mapper Viewshed tool.*
- *The visibility assessment is based on terrain data that has been derived from satellite imagery. This data was originally prepared by NASA and is freely available on the CIAT-CCAFS website (http://www.cgiar-csi.org). This data has been ground truthed using a GPS as well as online mapping.*
- *Calculation of visibility is based purely on the Digital Elevation Model and does not take into account the screening potential of vegetation or other development.*

1.7 Structure of this Report

This DBAR has been drafted in accordance with the requirements of the NEMA EIA Regulations. The DBAR has been compiled in a diligent and independent manner.

Table 1-18 indicates the relevant regulated requirements and the corresponding sections within this report which have been prepared to comply with these requirements.

Table 1-18: Legislated Requirements for BAR Content as Detailed in the EIA Regulations

Legislated Requirements	Relevant Report Section
1) A BAR must contain all the information that is necessary for the competent authority to consider and come to a decision on the application, and must include - (a) details of – i. the EAP who prepared the report; and	Section 1.5.2 Table 1-14
ii. the expertise of the EAP, including a curriculum vitae;	Appendix A
(b) the location of the activity, including: i. the 21 digit Surveyor General code of each cadastral land parcel; ii. where available, the physical address and farm name; iii. where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 1.2 Table 1-11
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is- i. a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or ii. on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 1.2 Figure 1-2 Figure 1-3
(d) a description of the scope of the proposed activity, including- i. all listed and specified activities triggered and being applied for; and ii. a description of the activities to be undertaken including associated structures and infrastructure;	Section 1.2 Section 2.1.2
(e) a description of the policy and legislative context within which the development is proposed including-	Section 1.4 Section 2

Legislated Requirements	Relevant Report Section
i. an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and ii. how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments	
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 1.4
(g) a motivation for the preferred site, activity and technology alternative	Section 1.4
(h) a full description of the process followed to reach the proposed preferred alternative within the site, including: i. details of all the alternatives considered; ii. details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; iii. a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; iv. the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; v. the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- • can be reversed • may cause irreplaceable loss of resources; and • can be avoided, managed or mitigated; vi. the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; vii. positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; viii. the possible mitigation measures that could be applied and level of residual risk; ix. the outcome of the site selection matrix; x. if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and xi. a concluding statement indicating the preferred alternatives, including preferred location of the activity.	i. Section 3 ii. Section 4 & Appendix H iii. Appendix X (N/A for DBAR) iv. Section 5 & 6 v. Section 7 vi. Section 7 vii. Section 7 viii. Section 7 and Appendix I ix. Section 7 x. N/A xi. Section 8
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- i. a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section 7

Legislated Requirements	Relevant Report Section
ii. an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	
(j) an assessment of each identified potentially significant impact and risk, including- i. cumulative impacts; ii. the nature, significance and consequences of the impact and risk; iii. the extent and duration of the impact and risk; iv. the probability of the impact and risk occurring; v. the degree to which the impact and risk can be reversed; vi. the degree to which the impact and risk may cause irreplaceable loss of resources; and vii. the degree to which the impact and risk can be avoided, managed or mitigated;	Section 7
(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Executive Summary and Section 8
(l) an environmental impact statement which contains- i. a summary of the key findings of the environmental impact assessment; ii. a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and iii. a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 8
(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;	Appendix I
(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorization;	Section F
(o) description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 1.6
(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 8
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	N/A
(r) an undertaking under oath or affirmation by the EAP in relation to: i. the correctness of the information provided in the reports;	Appendix A

Legislated Requirements	Relevant Report Section
ii. the inclusion of comments and inputs from stakeholders and interested and affected parties; iii. the inclusion of inputs and recommendations from the specialist reports where relevant; and iv. any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	
(s) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	N/A
(t) any specific information that may be required by the competent authority; and	DFFE requested for the impacts of the BESS to be assessed. A risk assessment was undertaken and is available in Appendix F10.
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A

2 Legal Requirements

This chapter details the applicable legal provisions and the policy context for the BA process. It provides a review of relevant legislation, regulations and policy documents, which are applicable to (or have implications for) the proposed Springhaas Solar PV Facilities.

The authorisation process associated with the project has been carried out in compliance with South Africa's environmental legislation. The legal framework applicable to this project is diverse. A summary of the key environmental legislation and relevant policies and/or guidelines is provided in the following sections.

One of the main focus points of this section is on the provisions of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA). The NEMA is the primary South African legislation governing the requirements for environmental impact assessment. In the context of the proposed development, the provisions of NEMA and the associated Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) are of fundamental relevance.

The section also describes other legislation relevant to constitutional and administrative legal precepts in South African law, as well as environmental legislation of specific relevance to water resources, heritage, biodiversity and land use planning, among others. **Section 1.4** details energy specific legislation, policy and guidelines related to the proposed development.

2.1 National Legislation

2.1.1 Constitution of the Republic of South Africa (No. 108 of 1996)

The Constitution of the Republic of South Africa is the legal source for all law, including environmental law, in South Africa. The Constitution enshrines the basic, fundamental and inalienable rights of the citizens of the Republic. Section 24 of the Constitution provides the right to a safe and healthy environment that is protected by the state. There are no specific permitting requirements in the Constitution in this regard, however the assessment is undertaken in alignment with the environmental rights contemplated herein.

2.1.2 National Environmental Management Act, 1998 (Act No. 107 of 1998)

The NEMA is the primary South African legislation governing the requirements for Environmental Impact Assessment (EIA). In the context of the project, the provisions of NEMA and the associated EIA Regulations (regarding S&EIR) have reference.

NEMA is the most significant single piece of legislation dealing with environmental management in the Republic of South Africa (RSA).

Chapter 5 of NEMA, entitled "Integrated Environmental Management" establishes the environmental impact assessment regime in the RSA. Since 3 July 2006, the procedural and

substantive requirements for undertaking EIAs in South Africa have been regulated in terms of the provisions contained in section 24 of NEMA and the NEMA EIA Regulations 2014.

The EIA Regulations identify lists of activities which have the potential to result in detrimental environmental impacts and thus require Environmental Authorisation (EA), subject to either a "Basic Assessment" or "Scoping and Environmental Impact Reporting Process – S&EIR". Listed activities in terms of GN R984 (Listing Notice 2) are triggered by the proposed development and therefore the applicable environmental process to be undertaken is the S&EIR process.

The Regulations prescribe the procedural and substantive requirements for the undertaking of EIAs and the issue of EA's. Activities identified in terms of section 24(2)(a) and (d) of NEMA, which may not commence without environmental authorisation from the CA and in respect of which the investigation, assessment and communication of the potential impact of such activities must thus follow the procedure as described in the EIA Regulations.

In terms of the EIA Regulations, activities listed in GN R983 (Listing Notice 1), GN R984 (Listing Notice 2) and GN R985 (Listing Notice 3) require EA before they can proceed and be implemented, and the following listed activities (**Table 2-2**) are deemed applicable to the proposed development.

The environmental application process in terms of the listing notices is described below:

- GN R983 (Listing Notice 1) identifies activities that require EA, subject to a Basic Assessment (BA) process, prior to commencement of that activity;
- GN R984 (Listing Notice 2) identifies activities that require EA subject to a full S&EIR process, prior to commencement of that activity; and
- GN R985 (Listing Notice 3) identifies activities within specific geographical areas of sensitivity that require EA subject to a BA process, prior to commencement of that activity.

As stipulated in Government Notice 114 of 2018 and GN 142 of 2021, if the large scale wind or solar facility is located fully within a Renewable Energy Development Zone (REDZ) and triggers activities in Environmental Impact Assessment Regulations Listing Notice 2 of 2014 (as amended), the BA. The Springhaas Solar PV facilities are all fully located within the Kimberley REDZ, REDZ 5.

Applications have been made to DFFE (on 13 April 2022).

The following colour coding system is used in the below table.

Table 2-1: Guide to colour coding

Facility	Facility	Activity status
All facilities	Springhaas 5	Activity is triggered
Springhaas 1	Springhaas 6	Activity is not triggered
Springhaas 3	Springhaas 8	-
Springhaas 4	Springhaas 9	

Where a comment is applicable to all 7 facilities the cell in the table has been left blank.

Table 2-2: Triggered listed activities in terms of NEMA EIA Regulations 2014 as amended

Activity No.	Activity Description	Project Relevance	Facility Applicability
Listing Notice 1: GNR 983 (as amended)			
11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometers or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	Each of the 7 facilities will include underground powerlines, the capacity of these lines will not exceed 33kV and is expected to be within the range of 22 – 33kV. *132kV overhead transmission lines will be constructed to connect the collector substations to the grid. These transmission lines will be subject to a separate application and are excluded from this application for EA.*	**All facilities** The facilities will include underground powerlines, the capacity of these lines will not exceed 33kV and is expected to be within the range of 22 – 33kV. 132kV overhead transmission lines will be constructed to connect the collector substations to the grid. These transmission lines will be subject to a separate application and are excluded from this application for EA. Each facility will include a substation/ collector infrastructure with the capacity of more than 33kV but less than 275kV. The facilities are all located outside urban areas. **This activity is therefore triggered.**
12	The development of (ii) Infrastructure or structures with a physical footprint of 100 m^2 or more; Where such development occurs – (a) within a watercourse; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	The layout for all facilities has been designed to avoid all the large pans across the site. There are drainage regions across the site which allow the movement of water across the landscape. These features are classified as watercourses. Infrastructure for some facilities is located within these regions.	**SPH1:** The layout of the facility has been designed to avoid all the large pans across the site. There are drainage regions across the site which allow the movement of water across the landscape. There is a drainage region within the solar arrays, a section of the internal access road and fence line. These aspects of the development will have a footprint in excess of 100m^2. This activity is triggered. **This activity is triggered.** **SPH3:** None of the infrastructure including the main access road for SPH3 is located within a watercourse or within 32m of a watercourse. **This activity is not triggered.** **SPH4:** The layout for the facility has been designed to avoid all the large pans across the site. There are two drainage regions in the footprint of SPH4. The solar PV arrays, internal access roads, electrical infrastructure compound, auxiliary buildings and

Activity No.	Activity Description	Project Relevance	Facility Applicability
			collector substation are all located within the drainage region. These aspects of the development will have a footprint in excess of 100m^2. **This activity is triggered.**
			SPH5: The layout for the facility has been designed to avoid all the large pans across the site. A section of the temporary laydown area as well as some stretches of the fence would also be located within a drainage area. The total footprint of these aspects of the development would exceed 100m^2**This activity is triggered.**
			SPH6: The layout for the facility has been designed to avoid all the large pans across the site. There are drainage regions within the solar arrays, a section of the internal access road and fence line. These aspects of the development line will have a footprint in excess of 100m^2. **This activity is triggered.**
			SPH8: The layout for the facility has been designed to avoid all the large pans across the site. There is a drainage region within the solar arrays, a section of the internal access road, main access road, part of the temporary laydown area and fence line. These aspects of the development will have a footprint in excess of 100m^2. **This activity is triggered.**
			SPH9: The layout for the facility has been designed to avoid all the large pans across the site. There is a drainage region within the solar arrays, a section of the internal access road, temporary laydown area, auxiliary buildings, electrical infrastructure compound and fence line. These aspects will have a footprint in excess of 100m^2. **This activity is triggered.**
14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	Each facility will include a BESS. The BESS. Two technology options for the BESS are under consideration and assessed as part of the BA process namely Redox Flow and Lithium-ion batteries. As part of the installation and maintenance of the Redox Flow batteries electrolyte may need to be stored on site. The capacity of storage tanks would be confirmed during detailed design but the capacity would be kept in the range of 80 – 500m^3	**All facilities**: The applicability of this activity to the BESS was discussed with DFFE at the pre-application meeting on 16 November 2021 and confirmed via email on 11 November 2021 (refer to **Appendix A**). The opinion from DFFE <u>BESS Alternative 1 (preferred): Lithium-ion battery technology</u> The BESS itself is not considered a facility for storage or handling of dangerous goods. The Lithium-ion batteries are solid state batteries and the chemicals (hazardous material) associated with the batteries are contained within the battery. **This activity is not triggered for the preferred technology option (lithium-ion batteries) for all Springhaas facilities.**

Activity No.	Activity Description	Project Relevance	Facility Applicability
			<u>BESS Alternative 2: Redox flow battery technology</u> The BESS itself is not considered a facility for storage or handling of dangerous goods. As part of the installation and maintenance of the Redox Flow batteries electrolyte may need to be stored on site. The capacity of storage tanks would be confirmed during detailed design but would be in the range of 80 – 500m^3. **This activity is triggered for the alternative technology option, redox flow batteries for all Springhaas facilities.** In addition to the BESS there will be a need to store dangerous good on site such a fuel, motor oil and transformer oil for the substation during the construction and operational phase. The capacity of dangerous goods storage facilities may be within the range of 80 – 500m^3. **This activity is triggered for the alternative technology option, redox flow batteries for all Springhaas facilities and for the general construction and operational phases of all facilities.**
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	The facility layouts are being designed to avoid watercourses as far possible. However, construction activities may require the infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	**SPH1:** The facility layout has been designed to avoid watercourses as far possible. However, construction activities would require the infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse. There is a drainage region which contains a section of solar arrays, internal access roads and fence. The construction of these aspects of the development would result in the accumulated infilling of more than 10m^3 in a watercourse. **This activity is triggered.** **SPH3:** None of the infrastructure for SPH3 is located within a watercourse. **This activity is not triggered.** **SPH4:** The facility layout has been designed to avoid watercourses as far possible. However, construction activities would require the infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse. There are two drainage regions in the footprint of SPH4. The solar PV arrays, fence, internal access roads, electrical infrastructure compound, auxiliary buildings and collector substations are all

Activity No.	Activity Description	Project Relevance	Facility Applicability
			located within the drainage regions. The accumulated volume of material to be infilled and/ or removed from these areas to allow for the construction of the facility would exceed 10m^3 **This activity is triggered.**
			SPH5: The facility layout has been designed to avoid watercourses as far possible. However, construction activities would require the infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse. A large section of the solar PV arrays and associated internal access roads are located within a drainage area. A section of the temporary laydown area as well as some stretches of the fence would also be located within a drainage area. Construction of these would result in the accumulated infilling of more than 10m^3 in a watercourse. **This activity is triggered.**
			SPH6: The facility layout has been designed to avoid watercourses as far possible. However, construction activities would require the infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse. There is a drainage region within the facility. The construction of foundations for the solar PV arrays, fence and internal access roads would result in the accumulated infilling of more than 10m^3 in a watercourse. **This activity is triggered.**
			SPH8: The facility layout has been designed to avoid watercourses as far possible. However, construction activities would require the infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse. There is a drainage region within the facility. The construction of foundations for the solar PV arrays, fence, internal access roads, main access road and part of the temporary laydown area would result in the accumulated infilling of more than 10m3 in a watercourse. **This activity is triggered.**

Activity No.	Activity Description	Project Relevance	Facility Applicability
			SPH9: The facility layout has been designed to avoid watercourses as far possible. However, construction activities would require the infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse. There is a drainage region within the facility. The construction of foundations for the solar PV arrays, fence, internal access roads, parts of the temporary laydown area, auxiliary buildings and electrical infrastructure compound would result in the accumulated infilling of more than $10m^3$ in a watercourse. **This activity is triggered.**
24	The development of a road— (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road— (a) Which is identified and included in activity 27 in Listing Notice 2 of 2014; (b) where the entire road falls within an urban area; or which is 1 kilometre or shorter.	Internal access roads will be required for access to the facility during the operational phase. Main access roads will be required during the construction phase to transport materials and components to site.	**All facilities:** The internal access roads will be up to 5m in width and the main access roads will be up to 8m width. As none of the roads exceed 8m in width **this activity is not triggered.**
27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation isrequired for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenancemanagement plan.	Vegetation clearance is required for infrastructure.	**All facilities:** Each facility will require the clearance of vegetation for the following: • Electrical infrastructure compound – 2 - 4Ha • Auxiliary building – 0.5 -1Ha • Foundations for solar PV arrays In addition SPH3, SPH4 and SPH8 will require an additional clearance of up to 2Ha of vegetation for the collector substations.

Activity No.	Activity Description	Project Relevance	Facility Applicability
			Although only a small section of vegetation would be cleared for the solar PV modules due to the large number of modules to be installed the cumulative vegetation clearance per facility will be in excess of 20Ha. Note: vegetation clearance will also be undertaken for access roads and installation of fencing. As these are linear activities this clearance is excluded from this activity. **This activity is therefore not triggered** as more than 20Ha of vegetation would be cleared.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	A solar PV facility is considered as both a commercial and industrial development.	**All facilities:** All of the facilities are located on land which is currently used for agriculture. Each facility will cover an area in excess of 1Ha. A solar PV facility is considered as both a commercial and industrial development. **This activity is triggered.**
48	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or where such expansion occurs— (a) within a watercourse; (c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse; excluding where such expansion occurs in (ee) existing roads, road reserves or railway line reserves	Where possible existing access roads will be used. These roads may need to be widened and/or lengthened.	**All facilities:** Access roads will be expanded, lengthened and widened. This activity however excludes the expansion of existing roads. **This activity is not triggered.**
56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometer— (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres;	The main access roads will be up to 8m wide. Where possible existing access roads will be upgraded and widened. Internal access roads will be up to 5m in width.	**All facilities:** Widening of roads will not exceed the threshold. Existing farm roads will be used where possible for internal access. The combined lengthening of these road per facility will most likely exceed 1km, however as the internal access roads do not have a road reserve and the roads are less than 8m in width **this activity is not triggered.**

Activity No.	Activity Description	Project Relevance	Facility Applicability
	excluding where widening or lengthening occur inside urban areas.		
Listing Notice 2: GNR 984 (as amended)			
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs — (a) within an urban area; or (b) on existing infrastructure.	Each facility will generate in excess of 20MW.	**All facilities:** Each of the 7 solar PV facilities have the capacity to generate in excess of 20MW. SPH1 and SPH6 will have a generation capacity up to 250MWac and SPH3, SPH4, SPH5, SPH8 and SPH9 all have a generation capacity up to 150MWac. **This activity is triggered.**
4	The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	Each facility will include a BESS. The BESS. Two technology options for the BESS are under consideration and assessed as part of the BA process namely Redox Flow and Lithium-ion batteries. As part of the installation and maintenance of the Redox Flow batteries electrolyte may need to be stored on site. The capacity of storage tanks would be confirmed during detailed design but the capacity may have a capacity in excess of 500m3.	The applicability of this activity to the BESS was discussed with DFFE at the pre-application meeting on 16 November 2021 and confirmed via email on 11 November 2021. BESS Alternative 1 (preferred): Lithium-ion battery technology The BESS itself is not considered a facility for storage or handling of dangerous goods. The Lithium-ion batteries are solid state batteries and the chemicals (hazardous material) associated with the batteries are contained within the battery. **This activity is not triggered for the preferred technology option (lithium-ion batteries).** BESS Alternative 2: Redox flow battery technology The BESS itself is not considered a facility for storage or handling of dangerous goods. As part of the installation and maintenance of the Redox Flow batteries electrolyte may need to be stored on site. The capacity of storage tanks would be confirmed during detailed design but would be in the range of 80 – 500m3**. This activity is triggered for the alternative technology option, redox flow batteries.**
9	The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —	Collector substations on SPH3, SPH4 and SPH8 will contain 132/400kV step up transformers.	**SPH1:** There is no collector substation for SPH1. The substation located within the electrical infrastructure compound and has a capacity of less than 275kV. **This activity is not triggered.** **SPH3:** There is a collector substation as part of the infrastructure for SPH3. The collector substation will have a capacity in excess of 275Kv. **This activity is triggered.** **SPH4:** There is a collector substation as part of the infrastructure for SPH4. The collector substation will have a capacity in excess of 275Kv. **This activity is triggered.**

Activity No.	Activity Description	Project Relevance	Facility Applicability
	a) temporarily required to allow for maintenance of existing infrastructure; b) 2 kilometres or shorter in length; c) within an existing transmission line servitude; and d) will be removed within 18 months of the commencement of development.		**SPH5:** There is no collector substation for SPH5. The substation located within the electrical infrastructure compound and has a capacity of less than 275kV. **This activity is not triggered.** **SPH6:** There is no collector substation for SPH6. The substation located within the electrical infrastructure compound and has a capacity of less than 275kV. **This activity is not triggered.** **SPH8:** There is a collector substation as part of the infrastructure for SPH8. The collector substation will have a capacity in excess of 275Kv. **This activity is triggered.** **SPH9:** There is no collector substation for SPH9. The substation located within the electrical infrastructure compound and has a capacity of less than 275kV. **This activity is not triggered.**
15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Vegetation clearance of more than 20 Ha will be required for the construction of the proposed development. The removal of 20 Ha or more of vegetation may affect indigenous species. Thus, the proposed activity will trigger this listed activity.	**All facilities:** Each facility will require the clearance of vegetation for the following: • Electrical infrastructure compound – up to approximately 2-4Ha • Auxiliary building – up to approximately 0.5- 1 Ha • Foundations for solar PV arrays • Temporary laydown area- ranging from up to approximately 4- 12Ha In addition SPH3, SPH4 and SPH8 will require an additional clearance of up to 2Ha of vegetation for the collector substations. Although only a small section of vegetation would be cleared per solar PV modules due to the large number of modules to be installed the cumulative vegetation clearance per facility will be in excess of 20 Ha. Vegetation clearance will also be required for internal access roads, the main access road and the fence line. This clearance is excluded from the calculations as clearance for linear activities is excluded from this activity. **This activity is therefore triggered.**
Listing Notice 3: GNR 985 (as amended)			

Activity No.	Activity Description	Project Relevance	Facility Applicability
4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. **b. <u>Free State</u>** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding disturbed areas; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (dd) Sites or areas identified in terms of an international convention; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (ff) Core areas in biosphere reserves; or (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas; or	The proposed development includes the development of roads which will be wider than 4m and the site is located outside an urban area. Therefore, this listed activity will be triggered.	**SPH1:** The main access road will be 8m in width. The southern end of the main access road is located within 5km of the Nielsview Nature Reserve which is a designated protected area in terms of NEMPAA. **This activity is triggered.** **SPH3:** The main access roads will be 8m in width and internal access roads will be up to 5m in width. The facility and portions of the main access road are located within 5km of the Nielsview Nature reserve which is a protected area identified in terms of NEMPAA. **This activity is triggered.** **SPH4:** The proposed development includes the development of roads which will be wider than 4m and the site is located outside an urban area. The eastern access road realignment is within 5km of the Nielsview Nature Reserve which is a designated protected area in terms of NEMPAA. **This activity is triggered.** **SPH5:** The main access roads will be 8m in width and internal access roads will be up to 5m in width. The facility is located within 5km of the Nielsview Nature reserve which is a protected area identified in terms of NEMPAA. **This activity is triggered.** **SPH6:** The main access roads will be 8m in width and internal access roads will be up to 5m in width. The facility is located within 5km of the Nielsview Nature reserve which is a protected area identified in terms of NEMPAA. **This activity is triggered.** **SPH8:** The main access roads will be 8m in width. A section of the main access road (eastern access road realignment) is located within 5km of the Nielsview Nature reserve which is protected areas identified in terms of NEMPAA. **This activity is triggered.** **SPH9:** The main access roads will be 8m in width and internal access roads will be up to 5m in width. The facility is located within 5km of the Nielsview Nature reserve which is a protected area identified in terms of NEMPAA. **This activity is triggered.**
10	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a	Each facility will include a BESS. The BESS. Two technology options for the	**All facilities:** <u>BESS Alternative 1 (preferred): Lithium-ion battery technology</u>

Activity No.	Activity Description	Project Relevance	Facility Applicability
	dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. **b. Free State** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (dd) Sites or areas identified in terms of an international convention; (ee)Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (ff) Core areas in biosphere reserves; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve; or (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland;	BESS are under consideration namely Redox Flow and Lithium-ion. As part of the installation and maintenance of the Redox Flow batteries electrolyte may need to be stored on site. The capacity of storage tanks would be confirmed during detailed design, however the capacity would exceed 80m^3.	The BESS itself is not considered a facility for storage or handling of dangerous good. The Lithium-ion batteries are solid state batteries and the chemicals (hazardous material) associated with the batteries are contained within the battery. **This activity is not triggered** for the preferred technology option as lithium-ion batteries are not considered as facilities for the storage or handling of dangerous goods. BESS Alternative 2: Redox flow battery technology As part of the installation and maintenance of the Redox Flow batteries electrolyte may need to be stored on site. The capacity of storage tanks would be confirmed during detailed design but would have a capacity in excess of 80m^3. **This activity is triggered not triggered.**
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. **b. Free State** i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;	Clearance of more than 300m^2 of vegetation may occur within 100m of a watercourse. None of the facilities are located within a critically endangered or endangered ecosystem. The site is located within Western Free State Clay Grassland which is listed as Least Concern. The zoning of the land is agricultural.	**SPH1:** The first 60m of the main access road is located within 100m of a watercourse. The main access road will be up to 8m in width and thus require vegetation clearance in excess of 300m^2. **This activity is triggered.** **SPH3:** The first 60m of the main access road is located within 100m of a watercourse. The main access road will be up to 8m in width and thus require vegetation clearance in excess of 300m^2. **This activity is triggered.** **SPH4:** Clearance of more than 300m^2 of vegetation will occur within 100m of a watercourse. A portion of the fence line, internal access road and solar arrays are located in an ESA.

Activity No.	Activity Description	Project Relevance	Facility Applicability
	iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or iv. Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.		There is a drainage region within the solar arrays. The solar areas and internal access roads have a footprint in excess of 100m^2. **This activity is triggered.**
			SPH5: Clearance of more than 300m^2 of vegetation will occur within a watercourse or within 100m of a watercourse. A large section of the solar PV arrays and associated internal access roads are located within a drainage area. A section of the temporary laydown area as well as some stretches of the fence would also be located within a drainage area. These aspects are also located within 100m of the drainage areas. **This activity is triggered.**
			SPH6: Clearance of more than 300m^2 of vegetation will occur within 100m of a watercourse. A portion of the fence line, internal access road and solar arrays are located in drainage regions. These aspects of the development will have a footprint in excess of 100m^2.. **This activity is triggered.**
			SPH8: Clearance of more than 300m^2 of vegetation will occur within 100m of a watercourse. A portion of the fence line, internal access road, solar arrays and temporary laydown area and a section of the main access road are located in a drainage area or within 100m of drainage area. These aspects of the development will have a footprint in excess of 100m^2. **This activity is triggered.**
			SPH9: Clearance of more than 300m^2 of vegetation will occur within 100m of a watercourse. There is a drainage region within the solar arrays, internal access road network, parts of the temporary laydown area, auxiliary buildings and electrical infrastructure compound. These aspects of the development would have a footprint in excess of 100m^2. **This activity is triggered.**
14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse;	The construction of infrastructure may occur within 32m of a watercourse for certain facilities.	**SPH1:** There is a drainage region within the solar arrays and internal access roads and a section of the fence traverses the drainage region. These aspects of the development would have a combined footprint excess of 10m^2. **This activity is triggered.**
			SPH3: None of the infrastructure for SPH3 is located within a watercourse or within 32m of a watercourse. **This activity is not triggered.**

Activity No.	Activity Description	Project Relevance	Facility Applicability
	(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.		**SPH4:** Construction will occur within a watercourse. There are two drainage regions in the footprint of SPH4. The solar PV arrays, internal access roads, electrical infrastructure compound, auxiliary buildings and collector substation are all located within the drainage regions. The collective footprint of the infrastructure within the drainage regions will exceed 10m^2. **This activity is triggered.**
			SPH5: A large section of the solar PV arrays, internal access roads and some section of the fence are located within a drainage area. The construction of these aspects of the development would have a combined footprint excess of 10m^2. **This activity is triggered.**
			SPH6: There are drainage regions within the solar arrays and internal access roads and section of the fence traverse the drainage region. These aspects of the development would have a combined footprint excess of 10m^2.. **This activity is triggered.**
			SPH8: Construction will occur within a watercourse. There is a drainage region within the solar arrays and internal access roads traverse the drainage region. A section of main access road is also located within a drainage region. The aforementioned aspects of the proposed development would have a combined footprint excess of 10m^2.. **This activity is triggered.**
			SPH9: Sections of the solar PV arrays and internal access roads are located within a drainage region. The collective footprint of the infrastructure within the drainage regions will exceed 10m^2. **This activity is triggered.**
18	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. **b. <u>Free State</u>** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;	Existing access roads may need to be widened in certain places to allow for construction, however internal access roads will only be a maximum of 5m in width so existing roads would not need to be widened by more than 4m. The main access roads will be up to 8m in width.	**SPH1:** Existing roads would not be widened by more than 4m. The combined lengthening of existing roads may exceed 1km. Sections of the internal access roads are located within a watercourse and/or within 100m of a watercourse. **This activity is triggered.**
			SPH3: Existing roads would not be widened by more than 4m. The combined lengthening of existing roads may exceed 1km. SPH3 is located within 5km of the Nielsview Nature Reserve. **This activity is triggered.**

Activity No.	Activity Description	Project Relevance	Facility Applicability
	(dd) Sites or areas identified in terms of an international convention; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (ff) Core areas in biosphere reserves; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; or (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland; or ii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose.		**SPH4:** Existing roads would not be widened by more than 4m. The combined lengthening of existing roads may exceed 1km. The facility is located within 5km of the Nielsview Nature Reserve. In addition a section of SPH4 is covered by a drainage area. **This activity is triggered.**
			SPH5: Existing roads would not be widened by more than 4m. The combined lengthening of existing roads may exceed 1km. The facility is located within 5km of the Nielsview Nature Reserve. In addition a large section of SPH5 is covered by a drainage area.**This activity is triggered.**
			SPH6: Existing roads would not be widened by more than 4m. The combined lengthening of existing roads may exceed 1km. The facility is located within 5km of the Nielsview Nature Reserve. In addition a large section of SPH5 is covered by a drainage area. **This activity is triggered.**
			SPH8: Existing roads would not be widened by more than 4m. The combined lengthening of existing roads may exceed 1km. Sections of SPH8 are covered by a drainage region. **This activity is triggered.**
			SPH9: Existing roads would not be widened by more than 4m. The combined lengthening of existing roads may exceed 1km. SPH9 is located within 5km of the Nielsview Nature Reserve. In addition a large section of SPH9 is covered by a drainage area. **This activity is triggered.**
23	The expansion of— (ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs— (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.	To minimise the footprint of the development existing access roads will be upgraded where possible (including widening) to allow for construction.	**SPH1:** Existing internal access roads in SPH1 would be expanded by more than 10m^2. Sections of SPH1 are located in drainage regions. SPH1 is not located within any of the sensitive environments identified in the listed activity. The Nielsview Nature reserve, a protected area is located more than 5km from the facility. **This activity is not triggered.**
			SPH3: Existing internal access roads would be expanded by more than 10m^2. The facility is located within 5km of the Nielsview Nature Reserve, a formal protected area. **This activity is not triggered.**
			SPH4: Existing internal access roads within drainage regions would be expanded by more than 10m^2. SPH4 is located within 5km of the Nielsview Nature Reserve, a protected area. **This activity is triggered.**

Activity No.	Activity Description	Project Relevance	Facility Applicability
	b. Free State i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (dd) Sites or areas identified in terms of an international convention; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (ff) Core areas in biosphere reserves; or (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; or ii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose.		**SPH5:** Existing internal access roads within drainage regions would be expanded by more than 10m^2. SPH5 is located within 5km of the Nielsview Nature Reserve a protected area identified in NEMPAA. **This activity is triggered.** **SPH6:** Existing access roads for SPH6 requiring upgrade are not located within a watercourse or within 32m of a watercourse. As such, no expansion of access roads would occur within a watercourse. **This activity is not triggered.** **SPH8:** Internal access roads would be expanded, however SPH8 is not located within any of the sensitive environments identified in the listed activity. The Nielsview Nature reserve, a protected area is located more than 5km from the facility. **This activity is not triggered.** **SPH9:** Existing internal access roads within drainage regions would be expanded by more than 10m^2. SPH9 is located within 5km of the Nielsview Nature Reserve, a protected area. **This activity is triggered.**

1.1.1. National Heritage Resources Act (Act 25 of 1999)

The National Heritage Resources Act (Act No. 25 of 1999) [NHRA] aims to introduce an integrated system for the management of South Africa's heritage resources. Further, the Act empowers civil society to nurture and conserve their heritage resources so that they can be passed on to future generations. The Act provides a framework for the management of heritage resources in South Africa and to protect heritage resources of national significance. In order to meet these objectives, the Act introduces an integrated system that can allow for the identification, assessment and management of heritage resources in South Africa.
According to Section 38 (1) of NHRA:

Subject to the provisions of Subsections (7), (8) and (9) of the same section, any person who intends to undertake a development categorised as:

- *The construction of a road, wall, power line, pipeline, canal or other similar form of linear development, or barrier exceeding 300m in length;*
- *The construction of a bridge or similar structure exceeding 50m in length;*
- *Any development or other activity which will change the character of a site:*
    - *Exceeding 5 000 m^2 in extent; or*
    - *Involving three or more existing erven or subdivisions thereof; or*
    - *Involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
    - *The costs of which will exceed a sum set in terms of Regulations by the South African Heritage Resources Agency (SAHRA) or a Provincial Heritage Resources Authority (PHRA);*
    - *The re-zoning of a site exceeding 10 000 m^2 in extent; or*
- *Any other category of development provided for in Regulations by the South African Heritage Resources Agency (SAHRA); must at the very earliest stages of initiating such a development, notify the responsible Heritage Resources Authority (HRA) and furnish it with details regarding the location, nature and extent of the proposed development.*

Each of the seven Springhaas Solar PV facilities will transform an area of land currently used for agriculture in excess of 5,000m^2 in area. In addition, the fence line for each facility will exceed 300m, in length.

A Heritage Impact Assessment (HIA) was undertaken for the Springhaas Solar PV facilities. The DFFE is the decision making authority (competent authority) for each of the applications for environmental authorisation. The HIA will be submitted to SAHRA for comment. The HIA complies with the assessment, public participation process and reporting requirements of the NHRA.

1.1.2. National Environmental Management: Biodiversity Act (Act No. 10 of 2004)

The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) [NEMBA] has as an objective to provide for the management and conservation of biological diversity within the Republic and of the components of such biological diversity. The focus of this legislation is

on the preservation of species and ecosystems irrespective of whether or not they are situated in protected areas.

Chapter 4 of the NEM:BA is particularly relevant and provides for:

- The protection of threatened or protected ecosystems, with particular emphasis on critically endangered, endangered, vulnerable and protected ecosystems. – List of Threatened Ecosystems (Notice 1002 of Government Gazette 34808 dated 9 December 2011);
- Listing of species that are threatened or in need of protection to ensure their survival in the wild, while regulating the activities, including trade, which may involve such listed threatened or protected species and activities which may have a potential impact on their long-term survival. - Threatened or Protected Species Regulations (Regulation 152 of 2007); and
- The protection of natural systems from invasive species.

Chapter 5 of the Act specifically deals with species and organisms posing potential threats to biodiversity. To summarise, the purpose of Chapter 5 is to:

- Prevent the unauthorised introduction and spread of alien species and invasive species to ecosystems and habitats where they do not naturally occur;
- To manage and control alien species and invasive species to prevent or minimise harm to the environment and to biodiversity in particular; and
- To eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats.

Furthermore Section 73 (2) states that a person who is the owner of land on which a listed invasive species occurs must:

- Notify any relevant CA, in writing, of the listed invasive species occurring on that land;
- Take steps to control and eradicate the listed invasive species and to prevent it from spreading; and
- Take all the required steps to prevent or minimise negative impacts on biodiversity.

For the purpose of identifying the impacts of the proposed Springhaas facilities on terrestrial biodiversity, a Terrestrial Biodiversity and Animal Species Assessment was undertaken (**Appendix F13**).

1.1.3. National Environmental Management: Protected Areas Act (No. 57 of 2003)

The National Environmental Management: Protected Areas Act (No. 57 of 2003) intends to provide:

- The protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes;

- The establishment of a national register of all national, provincial and local protected areas;
- The management of those areas in accordance with national norms and standards;
- Intergovernmental co-operation and public consultation in matters concerning protected areas; and
- For matters in connection therewith.

The proposed facilities are not located within a protected area. The southern edge of the study area does however border the Nielsview Nature Reserve which is a designated protected area in terms of the Protected Areas Act. The proximity of the protected area to the site has been considered in the relevant specialist studies.

1.1.4. National Water Act (Act No. 36 of 1998)

The National Water Act (Act No. 36 of 1998) [NWA] aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in responsible ways.

There are numerous pans and wetlands and drainage areas across the study area. The facility layouts were designed to avoid the larger pans. Infrastructure will encroach on drainage regions. These regions are typically only wet following heavy rainfall and facilitate the movement of water across the landscape. These features are considered as watercourses in terms of the definition included in the NWA.

Potential water use activities may include the following:

Section 21(c) Impeding or diverting the flow of water in a watercourse.

- The proposed development may potentially impede or divert the flow of water in the drainage areas on site.

Section 21(i) Altering the bed, banks, course or characteristics of a watercourse.

- The proposed development may alter the physical character of the drainage areas on site.

Accordingly, water use license applications (WULAs) have been submitted to the Department of Water and Sanitation (DWS) by the aquatic ecologist with a supporting motivation that all facilities would be within the limits of the applicable General Authorisation given the low risk that the proposed development could have on aquatic ecosystems.

1.1.5. National Environmental Management: Air Quality Act (Act No. 39 of 2004)

The National Environmental Management: Air Quality Act (Act 39 of 2004) [NEMAQA] provides for the setting of national norms and standards for regulating air quality monitoring,

management and control and describes specific air quality measures so as to protect the environment and human health or well-being by:

- Preventing air pollution and ecological degradation; and
- Promoting sustainable development through reasonable resource use.

It also includes the establishment of national ambient dust fall out levels that may be relevant to the construction.

A temporary increase in dust generation may occur during construction of solar PV facilities. The impact of dust (primarily from use of unserviced roads) is assessed in the transport impact assessment (refer to **Appendix F12**).

1.1.6. Health and Safety

Regulations in terms of the Occupational Health and Safety Act (Act No. 85 of 1998), address the health and safety of the employer and workers during both construction and operation of the proposed development. **Table 2-3**below provides a list of legislation that applies to the proposed Springhaas facilities.

Table 2-3: Health, safety and major hazardous installation regulations

Legislation	Description
Occupational Health and Safety Act 1993: Major Hazardous Installation Regulations (GNR No. 692)	The Minister of Labour has, after consultation with the Advisory Council for Occupational Health and Safety, under section 43 of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), made the regulations in the Schedule. Main objective is to provide for the health and safety of persons at work, including aspects which are hazardous to health and safety. In terms of major hazardous installation, the regulations shall apply to employers, self-employed persons and users, who have on their premises, either permanently or temporarily, a major hazard installation or a quantity of a substance which may pose a risk that could affect the health and safety of employees and the public. During both the construction and operational phase of this development all the requirements of Occupational Health and Safety Act 1993 will need to be adhered to.
Hazardous Chemical Substance Regulations 1995	These regulations stipulate requirements for storage and handling of hazardous chemical substances and provide guidelines for training of staff. Any hazardous chemical substances used during the construction and operational phases must be identified, stored used and disposed of in accordance with this legislation.

Legislation	Description
Environmental Regulations for Workplaces 1987	These regulations specify optimal working conditions for staff including thermal conditions, illumination requirements, requirements for ventilation; noise levels etc. and also specify requirements for housekeeping.
General Administrative Regulations 2003	These regulations stipulate the administration of the various Occupational Health and Safety regulations incusing designation of health and safety committees, reporting and recording of incidents and occupational diseases.
Construction Regulations 2003	These Regulations apply to any persons involved in construction work and are therefore applicable to the construction phase. The regulations provide guidelines for safe operation during construction.

1.1.7. Noise Management

There is a potential for the generation of noise during the construction phase of the facilities. Environment Conservation Act (Act 73 of 1989) [ECA] includes a regulation pertaining to noise management.

Table 2-4 below lists this regulation and other by-laws which apply to the current project in terms of noise management.

Table 2-4: Legislation applicable to noise management

Legislation	Description
Environment Conservation Act (Act 73 of 1989)	The Act outlines the powers that the Minister possesses to mandate regulations regarding noise. The provisions of the regulations may not apply if any person may by means of a written application, in which the reasons are given in full, apply to the local authority concerned for exemption from any provision of these Regulations.
Noise induced Hearing Loss Regulations 2003	These regulations specify safe working conditions in environments where noise levels exceed safe levels and gives guidelines for assessment of noise, training measures, provisions of information to staff etc.
National Standards (SANS10103:2003)	Specifies the maximum ambient noise level acceptable in various land use type zones.

1.1.8. Waste Management

During construction and operational phases of the Springhaas facilities general and hazardous waste will be generated. Where possible the generation of waste should be avoided or minimised and waste which is generated must be stored, transported and recycled, treated or disposed of according to the legislated requirements.

Table 2-5: Legislation applicable to waste management

Legislation	Description
National Environmental Management Act 1998	Outlines principles that serve as the general framework within which environmental management and implementation plans must be formulated: "4 (iv) that waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled

Legislation	Description
	where possible and otherwise disposed of in a responsible manner;"
National Environmental Management Waste Act (Act 59 of 2008) [NEMWA]	Section 20 of the NEMWA states that no person may commence, undertake or conduct a waste management activity except in accordance with a WML. A list of waste management activities that require a WML was published in GNR 921 (29 November 2013). GNR 921 states that a person who wishes to commence with a waste management activity must undertake the required process in accordance with GNR 326 stipulated under NEMA. GIBB undertook a detailed analysis of the listed activities contained in GNR 921 and none of the activities are applicable to the Proposed Development. The EMPr contains best waste management practices including the implementation of the waste management hierarchy.

1.1.9. Other Legal Requirements

The section below highlights any other applicable or relevant policies, legislation, guidelines and standards associated with the project.

Table 2-6: Policies, legislation, guidelines and standards applicable to the BA

Applicable Legislation/ guideline/ standard	Details/Applicable Sections
National Legislation	
Promotion of Access to Information Act, 2000 (Act 2 of 2000)	The purpose of the Promotion of Access to Information Act (PAIA) is to give effect to the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights, and to provide for matters connected therewith. For the purpose of the Proposed Development, information has been shared in line with legislative public participation guidelines.
National Road Traffic Act, 1996 (Act 93 of 1996)	The National Road Traffic Act requires permits are obtained for abnormal loads to be transported by road. The transformers would need to be transported on an abnormal load vehicle. The necessary permits must be obtained prior to transport.
Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)	The purpose of CARA is to protect agricultural land from degradation. For the purpose of the Springhaas facilities, alien invasive species may establish as a result of construction activities, soil erosion may occur and compaction of soil may result from activities on site. It is imperative that these potential impacts are managed through specific conditions of the EMPr.
Site sensitivity verification requirements where a specialist assessment is required but no	Site sensitivity verifications were undertaken by the specialist team to verify the findings of the screening report. The site

specific assessment protocol has been prescribed (GN 320 of 2020)	sensitivity assessments are included with the specialist reports in **Appendix F**.
Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Agricultural Resources by Onshore Wind and/or Solar Photovoltaic Energy Generation Facilities where the Electricity Output is 20 Megawatts or More (GN 320 of 2020)	The Agricultural Compliance Statement (**Appendix F1**) was prepared according to the requirements of the protocol.
Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN 320 of 2020)	The Terrestrial Biodiversity and Animal Species Assessment (**Appendix F13**) was prepared according to the requirements of the protocol.
Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (GN 320 of 2020)	The Aquatic Biodiversity and Species Assessment (**Appendix F2**) was prepared according to the requirements of the protocol.
Guidelines	
Guideline on Need and Desirability, Department of Environmental Affairs (2017)	This guideline contains information on best practice and how to meet the peremptory requirements prescribed by the legislation and sets out both the strategic and statutory context for the consideration of the need and desirability of a development involving any one of the NEMA listed activities. Need and desirability is based on the principle of sustainability, set out in the Constitution and in NEMA, and provided for in various policies and plans, including the National Development Plan 2030 (NDP). Addressing the need and desirability of a development is a way of ensuring sustainable development – in other words that a development is ecologically sustainable and socially and economically justifiable – and ensuring the simultaneous achievement of the triple bottom-line. The need and desirability has taken into consideration all the legislative and other contextual requirements relating to the Proposed Development.
Species Environmental Assessment Guideline SANBI (2021)	The Guidelines for Implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessment in South Africa were produced for DFFE by SANBI and BirdLife South Africa. The guidelines provide methodologies for specialists undertaking assessments in terms of the EIA regulations. These guidelines were used to inform the Terrestrial Biodiversity and Animal Species Assessment.

BirdlLife South Africa Best Practice Guidelines for Birds and Solar Energy (2017)	The guideline specifies report and monitoring requirements for avifaunal assessments. The guideline clearly defines an avifauna monitoring schedule which is dependant on the size of the solar PV facility. The avifaunal specialist study was undertaken in accordance with these guidelines.
A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas" document, as published by DWAF (2005)	The procedure was used in the Aquatic Ecology and Species assessment to guide the delineation of aquatic features on site.
National Environmental Management Act (Act 107 of 1998) Public Participation Guideline (GN.R807 of 2012)	In 2010, the Minister gazetted a new set of regulations on the requirements for conducting EIAs in terms of Chapter 5 of NEMA. In order to assist potential Applicants, interested and affected parties and environmental assessment practitioners to understand their role, the DEA has produced a series of guidelines. These guidelines must be read in line with NEMA and the EIA Regulations of 2010 as they do not substitute primary legislation. The guideline updates and revises the draft integrated environmental management guideline which was developed in 2005. The public participation guideline provides for inter alia: the minimum legal requirements for public participation processes (PPP); the steps of a PPP; guidelines for planning a PPP; and a description of the roles and responsibilities of the various role players. For the purpose of the Proposed Development, public participation has taken into consideration all the legislative requirements for allowing the public to comment and provide their concerns throughout the process.
Policy and Planning Context	
National Spatial Biodiversity Assessment (NBSA)	The NSBA establishes protection and conservation priority status for terrestrial, inland water, estuarine and marine ecosystems at a 1:250,000 scale nationally and suggested implementation options for priority areas. It provides the national context for development of biodiversity plans at the sub-national and local scale.
Tokologo Local Municipality 4th Generation Integrated Development Plan 2017/18	The vision statement of the Tokologo Municipality IDP is *"a progressive municipality, which through cooperative governance create conditions for economic growth, social development and meet the basic needs of the community and improve the quality of life of all residents".* In terms of renewable energy developments the IDP notes one of the strengths of the municipality is the two grid connections at Beta and Perseus substations. The IDP notes the need to support renewable energy developments as guided by the Spatial Development Framework.

Lejweleputswa District Municipality Integrated Development Plan 2021 – 2022 Final IDP	The IDP aims to improve the lives of residents and alleviate poverty. The IDP notes that the Lejweleputswa District Municipality has one of the highest rates of unemployment in the Free State. The IDP recognises the need to promote solar energy at Dealesville and Boshof.

3 Alternatives

The EIA procedures and regulations stipulate that the environmental investigation needs to consider feasible alternatives as part of proposed development. During the planning and pre-application phase of the project, the identified alternatives were assessed, in terms of environmental acceptability as well as socio-economic feasibility. Therefore, a number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated.

The term "alternatives" as per GN R982 is defined as follows:

"…in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to:

a) The property on which or location where it is proposed to undertake the activity;
b) The type of activity to be undertaken;
c) The design or layout of the activity;
d) The technology to be used in the activity;
e) The operational aspects of the activity; or
f) The option of not implementing the activity."

For the purpose of this Draft BAR, all proposed alternatives are further explained below. The alternatives identified below, were investigated further and the preferred alternatives were identified during the initial phase of the project.

3.1 Location Alternatives

No site alternatives for the seven (7) solar facilities were considered due to multiple reasons. Most importantly, as discussed in the Needs and Desirability Section, the development site falls within a REDZ (i.e. Kimberley, Zone 5) and a strategic transmissions corridor (i.e. central transmissions corridor). The REDZ and strategic transmissions corridor have been identified as geographically strategic areas for solar energy developments and so the regulatory environment encourages the development of renewable energy infrastructure within these areas.

Additionally, the site is strategically close to existing high voltage lines and well located to the existing substations, which makes the site suitably located for connection into the existing grid infrastructure (refer to **Figure 3-1**). There are also several other solar facility developments proposed in the area. The site is located adjacent to mainly farm areas and open grasslands and not next to residential areas or other such areas, which could have been sensitive receptors that may be impacted by traffic and noise from the development of the solar facilities.

Hence, there are relatively limited opportunities to consider alternative sites and the proposed site is considered suitable from a legislative and infrastructure perspective.

Figure 3-1: Location of existing sub-stations

3.2 Land Use Alternatives (Type of Activity)

The purpose of the Springhaas Solar PV facilities is to generate electricity. An alternative land-use to achieve this objective within an area which strategically and legislatively at a National level encourages such type of development is the development of a wind energy facility or a hydro energy facility. These alternatives are discussed below.

3.2.1 Wind Energy Facility

When identifying suitable zones for the development of wind energy facilities a minimum power density of 250 W/m^2 is identified as a key criterion for suitability of development sites

(DEFF, 2019). The Springhaas site has a power density of approximately 200 W/m^2 (refer to **Figure 3-2**). The power density falls below the minimum threshold for the consideration of a wind energy facility and so would be unlikely to produce a viable yield when compared to solar energy. The development of a wind energy facility is therefore not considered as a viable alternative to a solar PV facility.

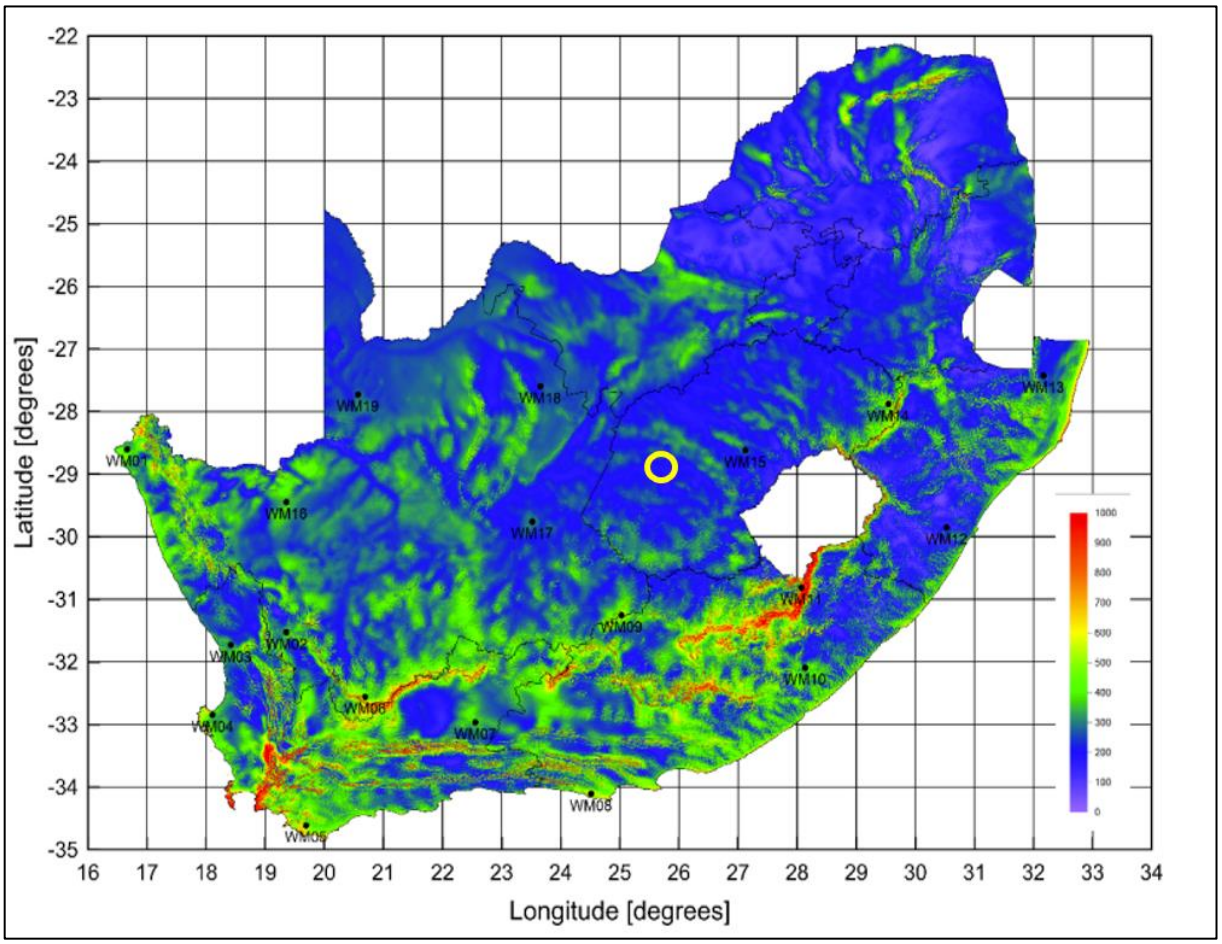


Figure 3-2: High resolution win map, approximate location of site indicated by yellow circle (source, web reference 1)

3.2.2 Hydro Energy Facility

There are no large waterbodies on the proposed site which could be used to establish a hydro energy facility of any scale. The development of a hydro energy facility at the Springhaas study area is therefore not a feasible option and no further investigation was undertaken.

3.2.3 Concentrated Solar Power

Concentrated solar power (CSP) was not deemed as a viable alternative to solar PV due to the fact that the IRP (2019) excludes the procurement of power from CSP facilities until 2030. In contrast the new capacity required from solar PV facilities is approximately 6,000 MW. Due to a lack of allocation of CSP in the IDP and higher visual impact and water demand solar PV technology is considered to be the preferred technology option.

3.2.4 Solar Energy Facility

As previously mentioned, the Springhaas facilities are located within a solar PV REDZ. This REDZ (Kimberley REDZ 5) has been pre-selected by DFFE and determined to be zones which are suitable for the development of solar PV facilities. During the identification of REDZ environmental sensitivities were taken into consideration.

Areas with a PV yield of more than 1,850 kWh/kWp are considered as suitable for the development of a solar PV facility. The Springhaas solar PV facility has a yield of 2,100 – 2,300 kWh/kWp (DEFF, 2019). The site is therefore suitable for the development of a solar facility as there is more than sufficient resource available in the area. This is further confirmed by the inclusion of this areas in the list of REDZ.

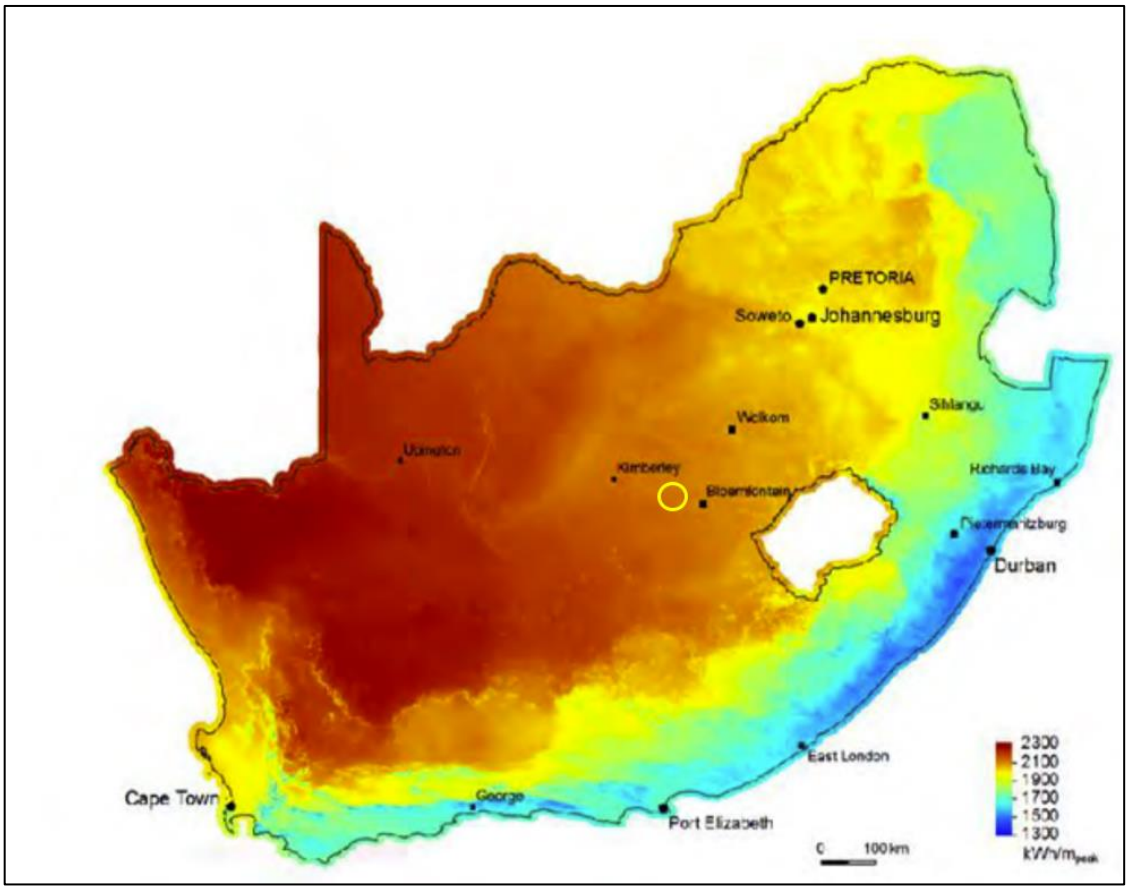


Figure 3-3: Solar yield, approximate location of site indicated by yellow circle (DEFF, 2019)

3.3 Layout Alternatives

3.3.1 Electrical Infrastructure Compound

The electrical infrastructure compound will contain the BESS, substation and/or additional collector infrastructure. Two layout alternatives were assessed for the electrical infrastructure compound for SPH1. The alternatives were sent to the specialist team for consideration during their studies. There are no location alternatives for the electrical infrastructure compound in the other six facilities, largely due to the fact that the infrastructure was sited to avoid environmentally sensitive areas.

(a) Springhaas Facility 1

Two electrical infrastructure compound locations were assessed for SPH1. The location of the two electrical infrastructure compound alternatives are depicted in **Figure 3-4 and Figure 3-5.**

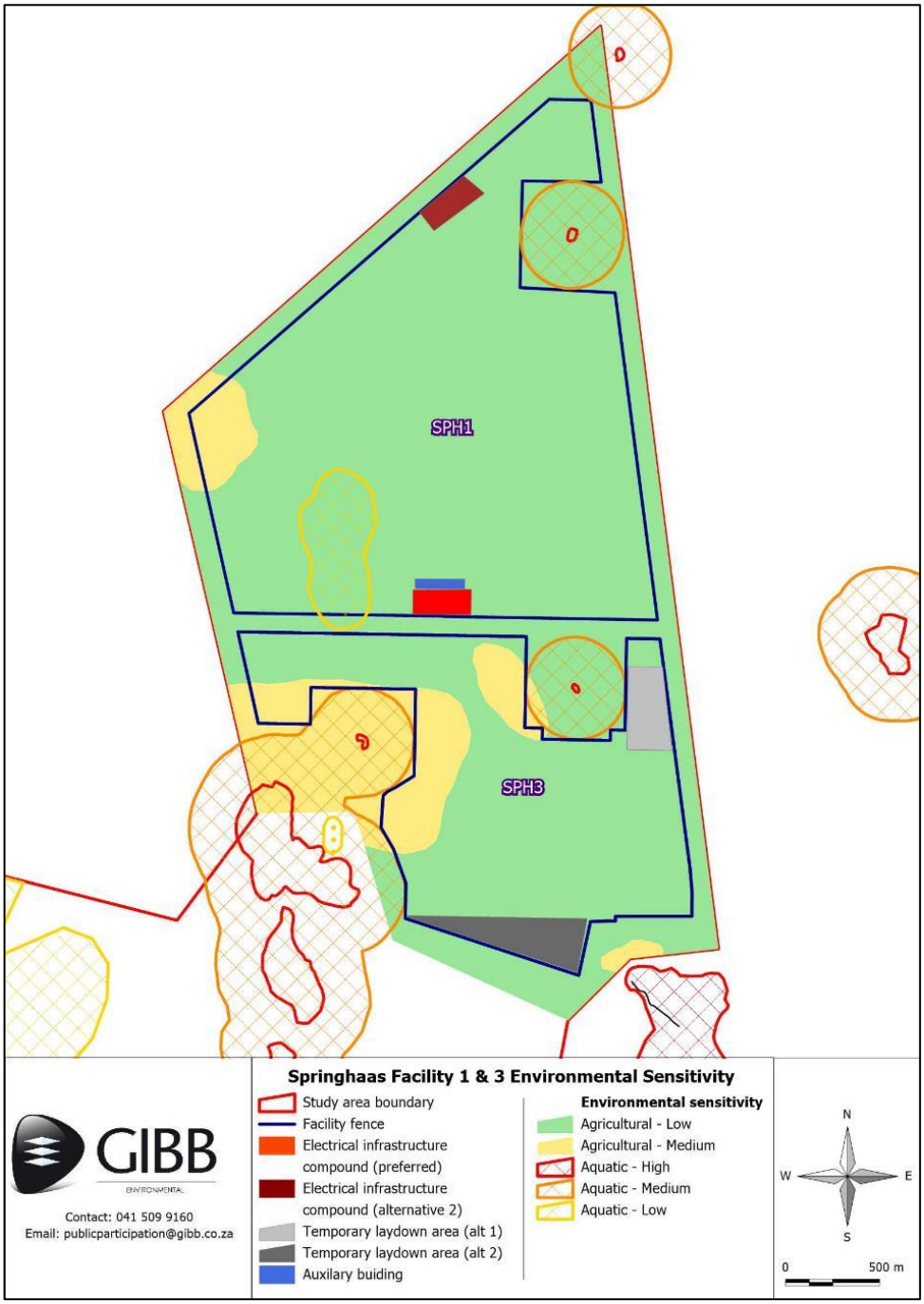


Figure 3-4: SPH1 electrical infrastructure compound location alternatives and SPH3 temporary laydown area location alternatives in relation to agricultural and aquatic sensitivities

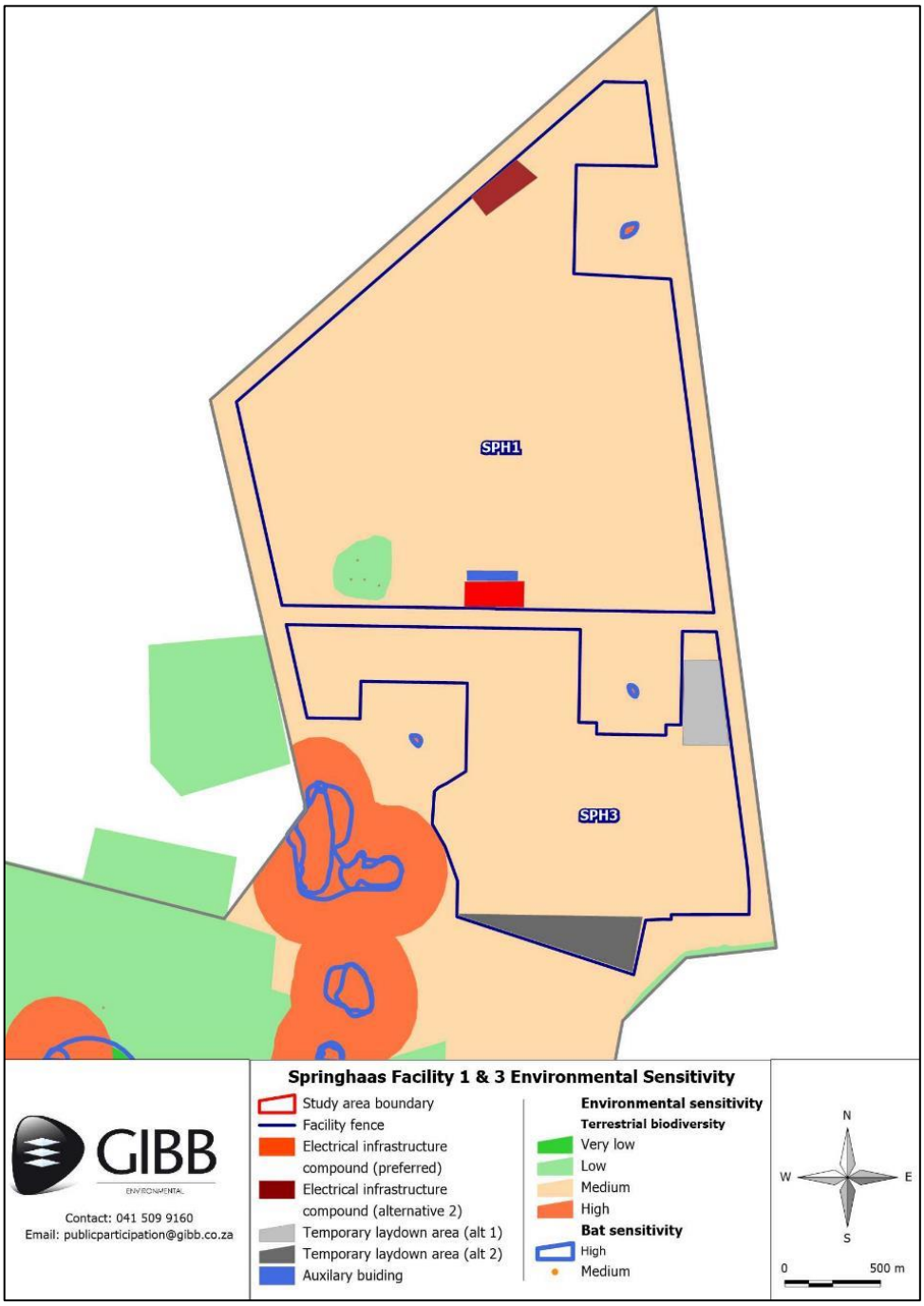


Figure 3-5: SPH1 electrical infrastructure compound location alternatives and SPH3 temporary laydown area location alternatives in relation to terrestrial biodiversity and bat sensitivities

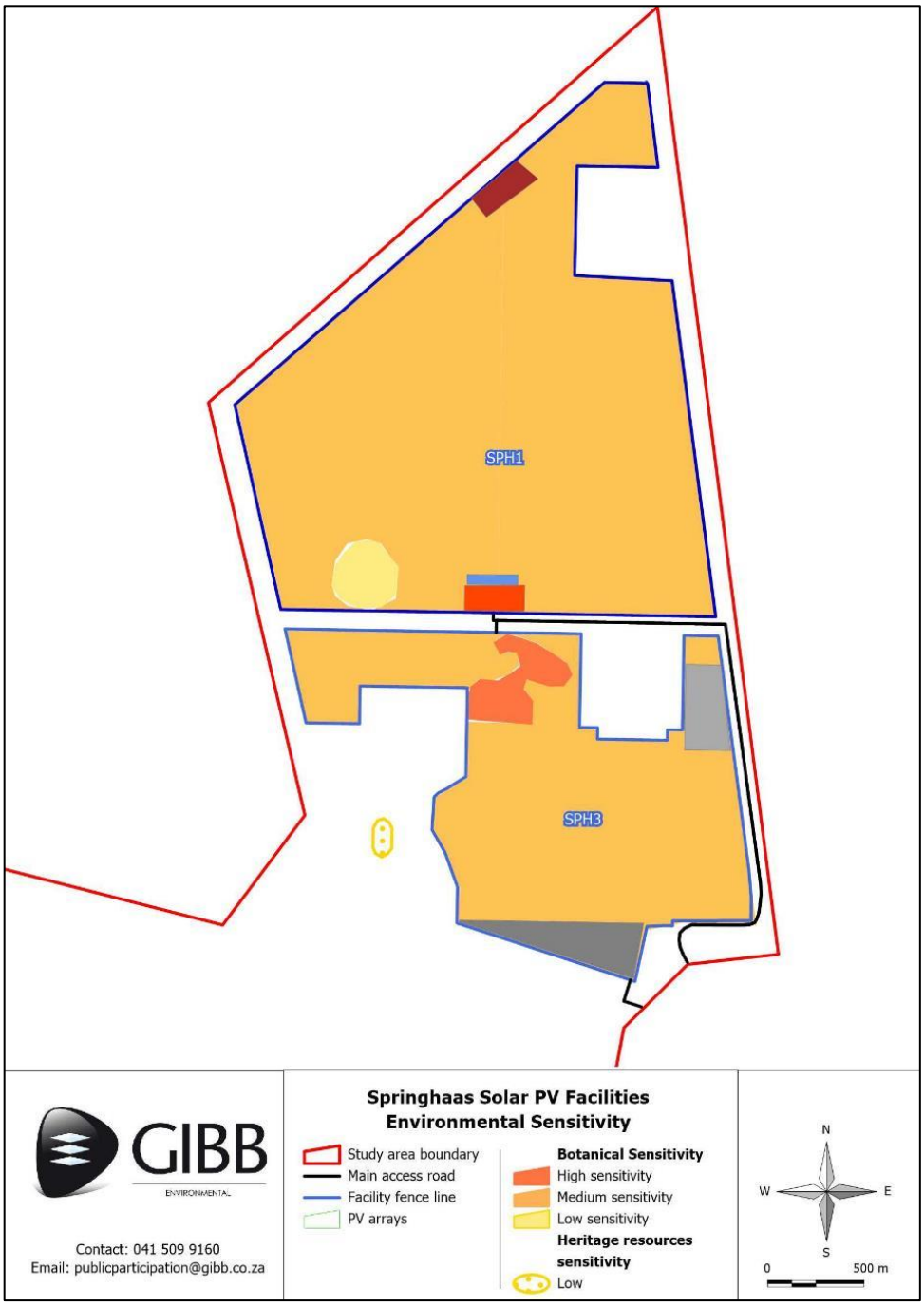


Figure 3-6: SPH1 electrical infrastructure compound location alternatives and SPH3 temporary laydown area location alternatives in relation to botanical and heritage

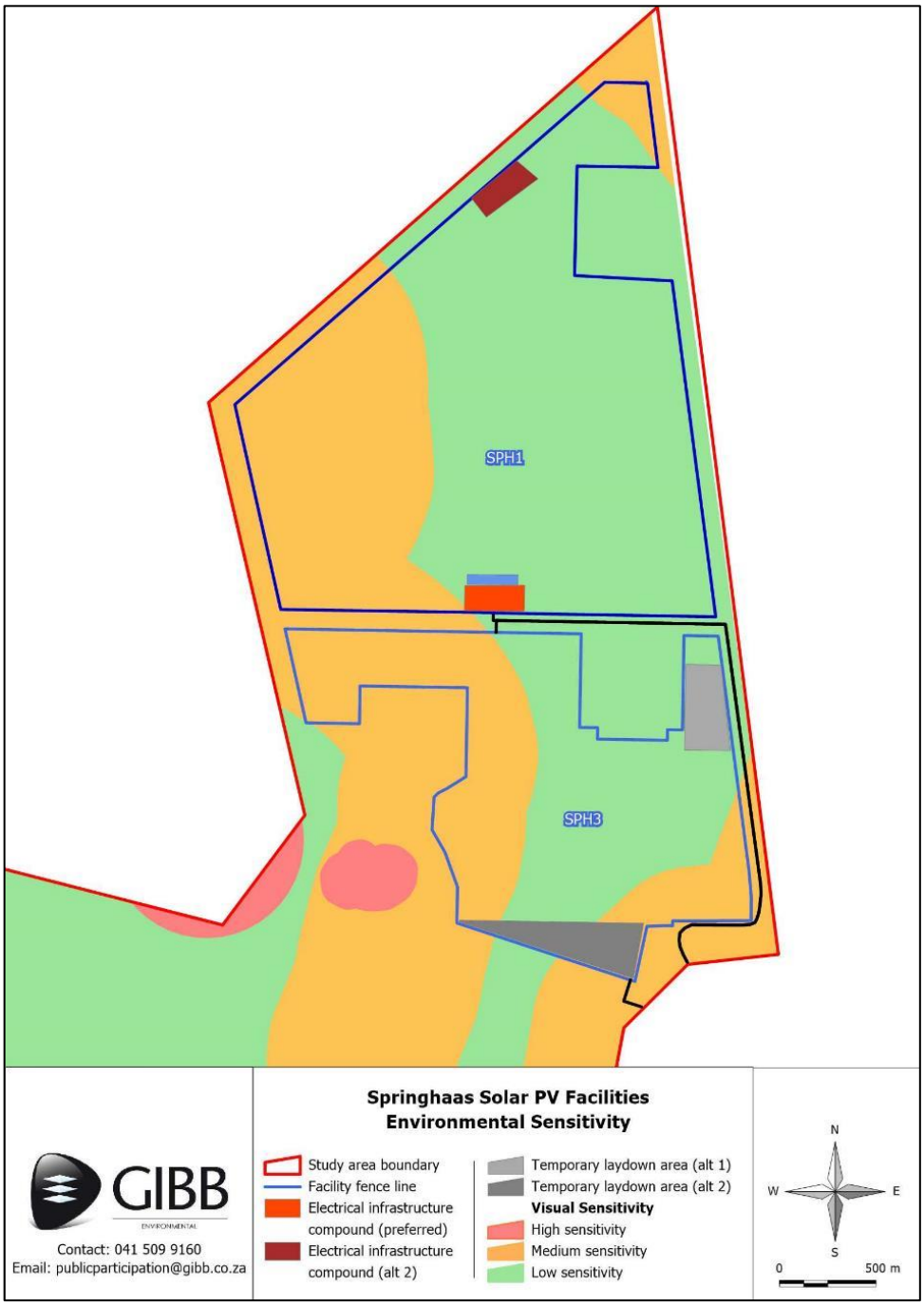


Figure 3-7: SPH1 electrical infrastructure compound location alternatives and SPH3 temporary laydown area location alternatives in relation to visual sensitivity

During the site sensitivity assessment the independent specialist team mapped out sensitive areas in the study area. The sensitive areas for SPH1 are shown above in **Figure 3-4 and Figure 3-5**.

Specialists were asked to assess the two location alternatives for the electrical infrastructure compound and identify their preferred option. A summary of the findings of the specialist studies is presented below.

Table 3-1: Specialist preference for SPH1 electrical infrastructure compound location

Specialist Study	Preferred Alternative			Comment
	Alt 1 south	Alt 2 north	No preference	
Agricultural			X	Both alternatives are located in areas of low agricultural sensitivity.
Aquatic			X	Both alternatives are located outside aquatic habitats.
Archaeology and heritage			X	Neither footprint contains any heritage resources.
Avifauna	X			There is a slight preference to placing the electrical infrastructure compound adjacent to the auxiliary buildings.
Bat			X	Both location alternatives are located in similar habitats and do not overlap any sensitive features for bats.
Botanical			X	The botanical impact is generalized across the site. The location of the electrical infrastructure compound will not affect the impact assessment.
Faunal and terrestrial biodiversity	X			It is preferable to consolidate the footprint with the auxiliary buildings.
Geotechnical			X	Both alternatives are located on land which is suitable for development
Groundwater			X	The location of the electrical infrastructure compound will not affect any potential impacts on groundwater
Palaeontological			X	The entire site is rated as low sensitivity and it is unlikely that sensitive palaeontological resources would occur at either location alternative. Therefore there is no preference between the two location alternatives.
Risk assessment		X		The location furthest away from watercourses is preferred. Both are located more than 500m from the nearest farmhouse.
Socio-economic			X	The location of the electrical infrastructure compound will not impact on socio-economic impacts. Socio-economic impacts relate to the facility as a whole instead of individual components.
Stormwater				The report does not comment on alternatives, however both are located outside of any aquatic environment and the 1:100 year floodline.
Traffic and transportation			X	The location of the BESS will not impact on access points so there is no difference between the two alternatives.
Visual		X		There is a relatively small difference in visual impacts between the two electrical infrastructure compound location alternatives. Alt 2 is preferred but Alt 1 can also be authorised.

The majority of specialist studies concluded there is no difference in impact between the two proposed location alternatives for the electrical infrastructure compound.
The Visual Impact Assessment and Risk Assessment both expressed a slight preference for Location Alternative 2. From a visual perspective the location will be slightly less visible from the adjacent public gravel road. Alternative 2 was preferred in terms of the Risk Assessment as it was slightly further away from the closest watercourse. The Aquatic Ecology assessment did not indicate preference between the two location alternatives as they are both located beyond any aquatic features and their buffer areas. Both the Visual Impact Assessment and Risk Assessment did however note that either alternative would be acceptable and could therefore be approved.

The Faunal and Terrestrial Biodiversity Assessment and Avifaunal Impact Assessment identified the Alternative 1 as the preferred alternative as it allowed the footprint of the electrical infrastructure compound to be combined with the footprint of the auxiliary buildings. The study did however note that either alternative would be acceptable and could therefore be approved.

The Applicant's technically preferred location of the electrical infrastructure compound is Alternative 1, the southern location. As no fatal flaws were identified with either of the locations it is proposed that Alternative 1 be considered as the preferred for authorisation.

3.3.2 Temporary Laydown Area Location Alternatives

Two temporary laydown location alternatives have been assessed for Springhaas Facility 3 (as depicted in **Figure 3-4 and Figure 3-5**).

Table 3-2: Specialist preference for SPH3 temporary laydown area alternatives

Specialist Study	Preferred Alternative			Comment
	Alt 1 North	Alt 2 South	No preference	
Agricultural			**X**	Both alternatives are located in areas of low agricultural sensitivity.
Aquatic			**X**	Both alternatives are located outside aquatic habitats.
Avifauna	**X**		**X**	Alternative 1 is slightly preferred due to its smaller footprint.
Archaeology and heritage			**X**	Neither footprint contains any heritage resources.
Bat			**X**	Both location alternatives are located in similar habitats and do not overlap any sensitive features for bats.
Botanical			**X**	The botanical impact is generalized across the site. The location of the electrical infrastructure compound will not affect the impact assessment.
Faunal and terrestrial biodiversity	**X**			The northern-most temporary laydown area for is preferred to the southern position. This would consolidate the

Specialist Study	Preferred Alternative			Comment
	Alt 1 North	Alt 2 South	No preference	
				disturbance to near the proposed access road and in an area that will already be fragmented by the panel arrays.
Geotechnical			**X**	Both alternatives are located on land which is suitable for development
Groundwater			**X**	The location of the temporary laydown area will not affect any potential impacts on groundwater
Palaeontological			**X**	The entire site is rated as low sensitivity and it is unlikely that sensitive palaeontological resources would occur at either location alternative. Therefore there is no preference between the two location alternatives.
Risk assessment	**N/A**	**N/A**	**N/A**	The risk assessment focused on the BESS and did not consider the location alternative for the temporary laydown area.
Socio-economic			**X**	The location of the electrical infrastructure compound will not impact on socio-economic impacts. Socio-economic impacts relate to the facility as a whole instead of individual components.
Stormwater				The report does not comment on alternatives, however both are located outside of any aquatic environment and the 1:100 year floodline.
Traffic and transportation			**X**	The location of the BESS will not impact on access points so there is no difference between the two alternatives.
Visual	**X**			Alt 1 is preferred as it would be less visible from adjacent roads. Either of the alternatives is acceptable from a visual perspective.

The visual, avifauna and terrestrial biodiversity and animal species studies all noted that the northern (alternative 1) is slightly preferred to the southern location.

3.4 Technology Alternatives

With regard to the proposed Battery Energy Storage System (BESS) for each of the seven (7) facilities, the technology thereof is dynamic and so the specific type/technology to be developed would be selected based on market demands and technology availability at the time of construction.

Two types of battery technology are being considered for the proposed BESS (i.e. Solid State Battery and Flow Battery). More specifically, either lithium ion batteries or redox flow batteries. Lithium-ion batteries are the developer-preferred technology alternative.

In terms of installation of the batteries, the lithium-ion and redox flow batteries are delivered to site preassembled and because they are solid state batteries, there is not a lot of liquid/ electrolyte in the cells. The electrolyte solution for the redox flow batteries would also need to be replaced periodically (estimated at once every 10 to 20 years) during the operational phase. During this process old electrolyte is pumped out and removed from site and new electrolyte is added.

Table 3-3: Specialist preference for BESS technology alternatives

Specialist Study	Preferred Alternative			Comment
	Lithium-ion	Redox flow	No preference	
Agricultural			**X**	Both technology options will have the same impact on soil and agricultural potential.
Aquatic			**X**	No preference noted in the report. The report does note the risk of lithium-ion batteries to drainage regions on SPH4 and SPH9 as the BESS is located in a drainage region for these facilities.
Avifauna			**X**	Impacts on avifauna relate to habitat destruction. The footprint of both BESS technology options would the same.
Archaeology and heritage			**X**	Both battery technologies are equally acceptable.
Bat			**X**	The BESS is located outside sensitive areas. The type of battery is not considered relevant in terms of impacts on bats.
Botanical			**X**	The botanical impact is generalized across the site. The type of battery technology will not affect the impact assessment.
Faunal and terrestrial biodiversity			**X**	The battery technology will not affect the size of the footprint cleared for the BESS.
Geotechnical			**X**	Technology alternatives make no difference to findings and recommendations.

Specialist Study	Preferred Alternative			Comment
	Lithium-ion	Redox flow	No preference	
Groundwater			X	Technology alternatives make no difference to findings and recommendations.
Palaeontological			X	No difference between the two battery types.
Risk assessment			X	The risk assessment
Socio-economic			X	The type of battery technology will not impact on socio-economic impacts. Socio-economic impacts relate to the facility as a whole instead of individual components.
Stormwater			X	The BESS are all located outside the 1:100 year floodline. No preference on battery technology type is stated in the report.
Traffic and transportation			X	The type of battery technology will not impact on traffic and transportation.
Visual			X	There is no difference between the batteries technology alternatives from a visual perspective.

All of the specialist studies found no difference in the impacts of the battery technology alternatives. No fatal flaws were identified for either battery technology alternative, either would be acceptable for development. As such, it is recommended that the preferred alternative (lithium-ion) batteries are considered as the preferred alternative for authorisation.

3.4.1 Solar PV Panel Technology Alternatives

There are various different PV technology alternatives available. The primary difference in these (other than the potential yield) would pertain to the extent of the facility (the maximum extent of the facility has been assessed in this process) and the height (i.e. visual impacts).A panel height of 3.5m has been used for the impact assessment. This is the maximum height of the panels. The type of panels to be used will be confirmed during detailed design.

3.5 Land Use Alternative

A land use alternative to the development of a solar PV facility could be continue with the current agricultural activities on site, grazing of livestock or potential expand cultivation. The majority of the site consists of areas of low agricultural potential interspersed with small

pockets of low-moderate or moderate potential. As the pockets of low-moderate/ moderate potential land as typically small in nature and isolated from larger stretches of moderate/ high potential land these pockets are not deemed to be viable for production even if the proposed development does not go ahead. There are larger areas of high agricultural potential in the broader study area but these areas have been excluded from the layout. This land use alternative is therefore not deemed to be an appropriate alternative and is not assessed further. The continued use of the site for livestock grazing (status quo) is considered under the no-go alternative.

3.6 No-Go Alternatives

The "No Go" Alternative refers to the alternative of not embarking on the proposed project. This alternative would imply that the current *status quo* of the biophysical and social environment, without the proposed development of the seven (7) solar PV facilities, would remain.

The identified preliminary key biophysical and socio-economic issues (**Section 6**) related to the proposed solar development during the construction and operational phases may not occur should the proposed development not be approved. These include job creation, stimulation of the economy and skills creation. It is important to note that the No-Go Alternative has been assessed in conjunction with all other feasible alternatives associated with the project requirements, as part of the planning phase of the project.

There is an increase in the demand for electricity due to the country's current shortfalls. Access and provision to electricity in a consistent, environmentally sustainable and cost-effective manner is a critical issue that the Free State Province and the remaining provinces in South Africa faces. Should the development not be approved, the Free State Province and the rest of South Africa (i.e. including the economy) will continue to experience challenges accessing electricity. The Springhaas Solar PV Facilities would not be able to contribute to addressing these issues. More so, the country will not be able to meet supply demands as the population and economy grows.

Therefore, should the No-Go Alternative be implemented, these existing challenges would be exacerbated. In addition, a No-Go Alternative for the solar facilities does not guarantee that the site will not be developed for another purpose in the future, as the sites do hold existing development rights.

3.7 Conclusion

No alternatives for the location or land-use were assessed in detail. Alternatives were assessed for layout (SPH1 and SPH3) and battery technology (lithium-ion and redox flow) for all facilities. No fatal flaws were identified for any of the alternatives. The preferred alternatives are shown below are considered acceptable by all independent specialist who conducted impact assessment as part of the BA process.

Table 3-4: Preferred alternatives

Alternative	Comment
Location alternative	All facilities - No location alternatives were considered.
Land use alternative	All facilities - A solar PV facility is the preferred land use. No other land use alternatives were assessed in detail.
Layout alternatives	SPH1 – alternative 1 for the electrical infrastructure compound is preferred.
	SPH3 – alternative 1 for the temporary laydown area is preferred.
Technology alternative	All facilities - Lithium-ion batteries are the preferred alternative

Part of the scope of work for specialist studies was the assessment of alternatives. Each report compiled in terms of NEMA provides comment on the various proposed alternatives. These are detailed in Chapter 7 Impact Assessment.

4 Basic Assessment Process

4.1 Approach to the Basic Assessment Process

The Basic Assessment (BA) Process is an environmental planning tool which identifies the environmental impacts of a proposed project and, by identifying mitigation measures, assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way.

An application for EA by way of a BA Process is being conducted for this project, based on the triggering of Listed Activities within the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended (NEMA), and the Environmental Impact Assessment (EIA) Regulations, 2014 - Government Notice R983, R984 and R985 (as amended). As stipulated in Government Notice 114 of 2018, if the large scale wind or solar facility is located fully within a Renewable Energy Development Zone (REDZ) and triggers activities in Environmental Impact Assessment Regulations Listing Notice 2 of 2014 (as amended), the basic assessment procedure must be followed. The Springhaas Solar PV facilities are all wholly located within the Kimberley renewable energy development zone (REDZ), REDZ 5.

The assumptions and limitations associated with the BA process and specialist studies are listed in Section 1.6.

4.2 Guiding Principles for a BA Process

The aim of the BA Process is to allow for I&APs to comment and provide meaningful input in the BA process. All relevant and applicable information generated through the BA process has been included in the draft BAR. Technical information from the various specialist studies has been summarised in the BAR. The aim is to communicate to stakeholders in a way that is understood by them and that enables them to meaningfully comment on the project.

I&AP will be notified of the opportunity to comment through various channels which are detailed in Section 4.4. There is opportunity for input by specialists and members of the public during the 30-day review period of the DBAR. Their contributions and concerns should be considered in the technical Specialist Studies and when decisions are made.

The eight guiding principles that govern the BA Process are as follows:

1. **Participation**: Appropriate and timely access to the process for all interested parties;
2. **Transparency:** All assessment decisions and their basis should be open and accessible;
3. **Certainty:** The process and timing of the public participation process has been communicated to I&APs and they have been informed of the timeframes for submission of comment and provided with contact details for the EAP;
4. **Accountability:** The decision-makers are responsible to all parties for their action and decisions under the assessment process;
5. **Credibility:** Assessment is undertaken with professionalism and objectivity;

6. **Cost-effectiveness:** The assessment process and its outcomes will ensure environmental protection at the least cost to the society;
7. **Flexibility:** The assessment process should be able to adapt to deal efficiently with any proposal and decision-making situation that may arise; and
8. **Practicality:** The information and outputs provided by the assessment process are relevant and readily usable in decision making and planning.

A BA Process is considered as a project management tool for collecting and analysing information on the environmental effects that may arise from the implementation of a project in order to present sufficient relevant information to the decision maker for a decision to be made on the application. As such, it is used to:

- Identify potential environmental impacts;
- Examine the significance of environmental implications;
- Assess whether impacts can be mitigated;
- Recommend preventive and corrective mitigating measures;
- Inform decision makers and registered I&APs about the environmental implications; and
- Offer a recommendation regarding whether development should go ahead.

The Public Participation Process (PPP) forms an integral part of the BA Process and is discussed in greater detail below.

4.3 BA Technical Process

This section provides a summary of the technical process that will be or has been followed to date for this BA Process. A detailed process flow diagram of the BA Process, outlining the various steps undertaken, is contained in Error! Reference source not found.**1-1.**

4.3.1 Application for Environmental Authorisation

As advised by DFFE during the Pre-Application Meeting, seven (7) separate applications for Environmental Authorisations are required (i.e. one application per PV facility). The applications were submitted online to DFFE on **13 April 2022** (refer to **Appendix B**). **Table 4-1** below indicates the DFFE reference numbers for each of the applications.

Table 4-1: DFFE Reference numbers for applications

Facility Name	DFFE Reference No.
Springhaas Facility 1 (SPH1)	14/12/16/3/3/1/2523
Springhaas Facility 3 (SPH3)	14/12/16/3/3/1/2524
Springhaas Facility 4 (SPH4)	14/12/16/3/3/1/2525
Springhaas Facility 5 (SPH5)	14/12/16/3/3/1/2526
Springhaas Facility 6 (SPH6)	14/12/16/3/3/1/2527
Springhaas Facility 8 (SPH8)	14/12/16/3/3/1/2528
Springhaas Facility 9 (SPH9)	14/12/16/3/3/1/2529

In a series of seven emails dated **14 April 2022**, the DFFE acknowledged receipt of the Applications for EA (**refer to Appendix B**).

4.3.2 Information Gathering

At the inception of the BA Process, the EAP identified the specialist information, municipal planning documents (e.g. IDP and SDF), spatial datasets, legislation and reports that would be required for the impact assessment phase. The reference sections provides a list of documentation reviewed. In addition, the specialists were tasked with undertaking field visits, undertaking sensitivity mapping and compiling baseline environmental reports and the necessary impact assessment reports/ compliance statements. The sensitivity mapping was used to inform the siting and layout of each facility as far as possible.

The EAP undertook a two day site visit on 06 – 07 October and visited the site footprint of each of the seven proposed facilities.

4.3.3 Specialist Studies

The following Specialist Studies have been undertaken for the BA Process:

- Agricultural Compliance Statement (Appendix F1);
- Aquatic Biodiversity and Species Assessment (Appendix F2);
- Avifauna Impact Assessment (Appendix F3);
- Bat Impact Assessment (Appendix F4);
- Botanical Impact Assessment (Plant Species Assessment) (Appendix F5);
- Groundwater Impact Assessment(Appendix F6);
- Heritage Impact Assessment (Archaeological and Heritage) (Appendix F7);
- Landscape and Visual Impact Assessment (Appendix F8);
- Palaeontological Impact Assessment (Appendix F9);
- Risk Assessment (Appendix F10);
- Socio-economic Impact Assessment (Appendix F11);
- Traffic and Transport Impact Assessment (Appendix F12);
- Terrestrial Biodiversity and Animal Species Assessment (Appendix F13);

In addition to the above a Geotechnical Investigation and Baseline Hydrological Study and Stormwater Management Strategy have been undertake for each facility. These studies have been commissioned to inform the facility design. These reports have been appended to the site specific EMPrs (**Appendix I**).

4.4 Public Participation Process

A comprehensive Public Participation Process (PPP) has been implemented to date, throughout the BA Process. Public participation is the involvement of all parties who potentially have an interest in a development or project, or may be affected by it. The principal objective of public participation is to inform and enrich decision-making.

These principles include the provision of sufficient and transparent information to I&APs on an on-going basis, to allow them to comment and ensure the participation of historically disadvantaged individuals, including women, the disabled and the youth.

The PPP aims to:

- Ensure all relevant key stakeholders and I&APs have been identified to date and invited to
- engage in the BA Process;
- Raise awareness, educate and increase understanding of stakeholders about the proposed project, the affected environment and the environmental process being undertaken;
- Create open channels of communication between key stakeholders and I&APs and the project team;
- Provide opportunities for key stakeholders and I&APs to identify issues or concerns and propose suggestions for enhancing potential benefits;
- Provide opportunities for key stakeholders and I&APs to provide suggestions in terms of mitigating the severity of potential impacts that may result from the project; and
- Accurately document all opinions, concerns and queries raised regarding the project.

4.4.1 DFFE Approval of PPP Plan

As per the requirements of GN 650, published in Government Gazette 43412, dated 05 June 2020 the PPP Plan was submitted to DFFE prior to lodging the application forms for the project. The PPP Plan was approved by DFFE on 23 November 2021 (refer to correspondence in **Appendix B**). A copy of the PPP Plan is available in **Appendix H**. The PPP methodology has been developed in compliance with the NEMA Environmental Impact Assessment Regulations, 2014 (GN 982 of 2014).

4.4.2 Identification of Key Stakeholders and I&APs

The identification and registration of I&APs is an on-going activity during the course of the BA Process. GIBB Environmental will develop, maintain and constantly update an electronic I&AP database for the project during the BA phase (see **Appendix H**). As such, I&APs were identified using the following:

- Existing I&AP databases obtained from the Applicant (where available / applicable);
- Existing I&AP databases for other projects within the study area (where available);
- Placement of an advertisement in two local newspapers in English and Afrikaans;
- Placement of site notices at strategic locations near the site, as well as at libraries and other public places; and

As indicated above an I&AP database is included in **Appendix H**. I&APs representing the following sectors of society were identified:

- National, provincial and local government;
- Affected landowners/ occupiers
- Adjacent landowners/ occupiers
- Ward councillors and committees;
- Rate Payers Associations;

- Community Based Organisations;
- Non-Governmental Organisations;
- Business, Religious and Civic Organisations;
- Service Providers; and
- Relevant Parastatals.

4.4.3 Public Announcement of the Project

Interested and Affected Parties (I&APs), as listed above, were informed of the Proposed Development and have been requested to register and submit their comments to GIBB by means of the following:

- Publication of newspaper advertisements in the Noordkaap Bulletin and Express (**Appendix H**);
- Distribution of notification letters by email;
- On-site notices placed at the following locations, detailing the Proposed Development, the BA Process and an invitation to register as an I&AP and provide comment on the Proposed Development (**Appendix H**); and

4.4.4 Draft Basic Assessment Report for Public Review

Hardcopies of the DBAR will be made available as follows:

- Dealesville Primary School, 1 Brand Street, Dealesville
- Bloemfontein City Library, Corner of 64 Charles Street/ West Burger Street, Bloemfontein

CD copies of the report can be made available to I&APs on request.

Note: The proof of notification of the availability of the DBAR will be provided in the final submission.

4.4.5 Final Basic Assessment Report

All comments made on the DBAR during public review will be captured and adequately responded to in the Comments and Response Report (CRR). Once the DBAR has been finalised into a Final Basic Assessment Report (FBAR), it will be submitted to the DFFE for decision making.

Registered I&APs will then be notified of the decision issued by the DFFE within the legislated timeframe.

5 Baseline Environment

5.1 Climate

The site is located between 1,215m and 1,250m above mean sea level. The mean annual temperature of 16 - 17˚C. Summer temperatures can rise to 30 ˚C and winter temperatures fall below 0˚C with frost occurring. The average annual precipitation for the area is 457mm with the highest precipitation occurring between November and March (Mucina and Rutherford, 2006).

5.2 Topography

The terrain on site is gently undulating and generally flat with the exception of two rocky outcrops located adjacent to the north-east boundary of SPH5. The topography slopes gently from north to south down towards the Modder River which is located approximately 5km to the south of the study area.

5.3 Geology

The soil types on site are described in section 5.4 Soils and Agricultural Potential.

The Geological Map Series, 2824, Kimberley to scale 1:250 000 indicates that the study area is underlain by sand and calcrete from the quaternary deposits. Underlying the quaternary deposits are dolerite sills and shale, siltstone and sandstone from the Tierberg Formation in the Ecca Group (**Figure 5-1**). No fault structures are mapped in the surrounding area of the study area (GEOSS, 2022).

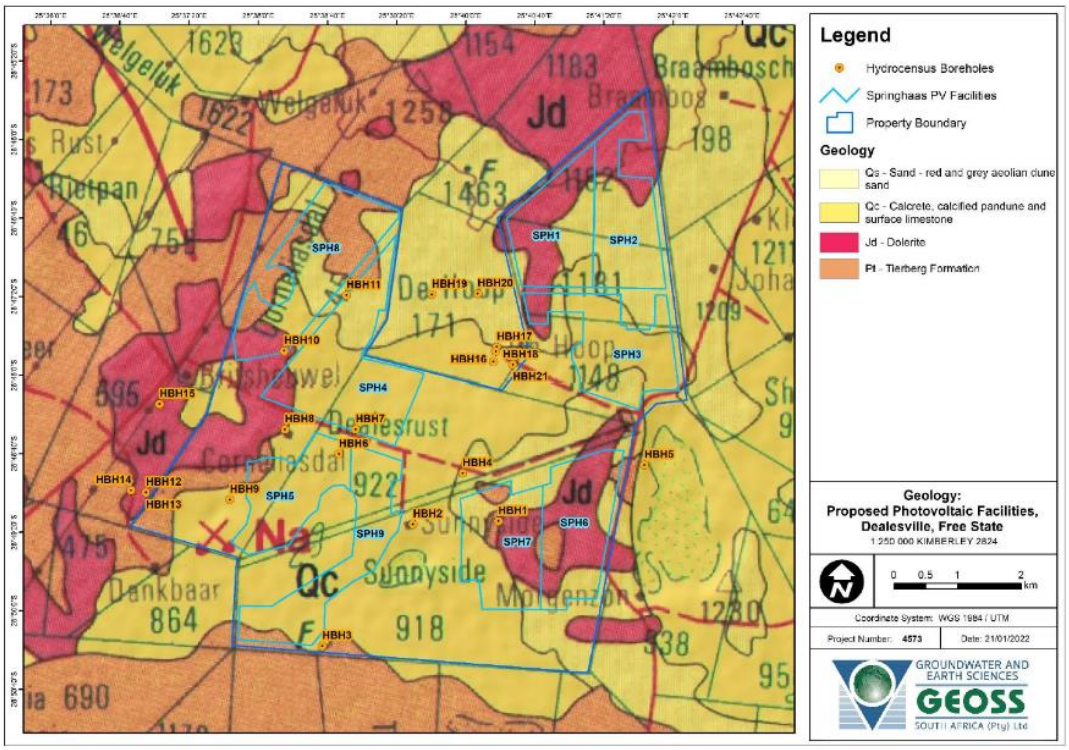


Figure 5-1: Geological setting of the area (source, GEOSS, 2022)

5.4 Engineering Geology

GCS undertook geotechnical investigations for the Springhaas solar PV facilities. The description of the underlying geology on site is adapted from the Geotechnical Investigation reports (refer to **Appendix 6 of Appendix J**).

Three soil profiles were recorded across the site, siltstone, dolerite and calcrete. The soil profiles are ascribed based on the bedrock geology or material in which the TLB refused. None of the soil profiles are considered as problem soils in terms of construction.

Pre bored rammed piles were recommended for the foundation of the PV structures and reinforced strip foot foundations for the buildings and structures.

5.5 Soils and Agricultural Potential

An Agricultural Compliance Statement was prepared, in accordance with the Protocols for Agricultural Assessment in Government Notice (GN) 320 of 2020, by TerraAfrica. The following section summarises the findings of the impact assessment report. The full version of the report is available in **Appendix F1.**

Soil mapping was undertaken as part of the Agricultural Assessment. There are 23 different soil types across the broader study area. Of these 23 soil types only 17 occur within the solar PV development footprints (**Table 5-1)**. The majority of the footprint is located within Mispah or Coega soil types, both of these soils have low to very low agricultural potential.

Table 5-1: Study are soil type and descriptions (source, adapted from TerraAfrica, 2022)

Soil type	Agricultural Potential of Soil Type	Facilities Containing Soil Type
Clovelly 1500	Moderate	SPH3
Coega 50 – 350	Low – very low	SPH4, SPH5, SPH6, SPH8, SPH9
Coega 300	Low- very low	SPH6
Glenrosa 600	Low – moderate	SPH1, SPH3
Mispah 50 – 300	Low – very low	SPH4, SPH5, SPH8
Mispah 150 - 350	Low – very low	SPH1, SPH3, SPH6
Nkonkoni 1000	Moderate	SPH1, SPH3
Nkonkoni 500	Moderate	SPH1
Olienhout 500	Low - moderate	SPH6
Prieska 1000	Moderate	SPH4, SPH8
Prieska 400	Moderate	SPH4, SPH5, SPH8
Spoienberg 450	Low – moderate	SPH6
Swartland 400	Low - moderate	SPH1
Vaalbos 1000	Low - moderate	SPH4
Vaalbos 400	Low – moderate	SPH6
Vaalbos 600	Low- moderate	SPH6

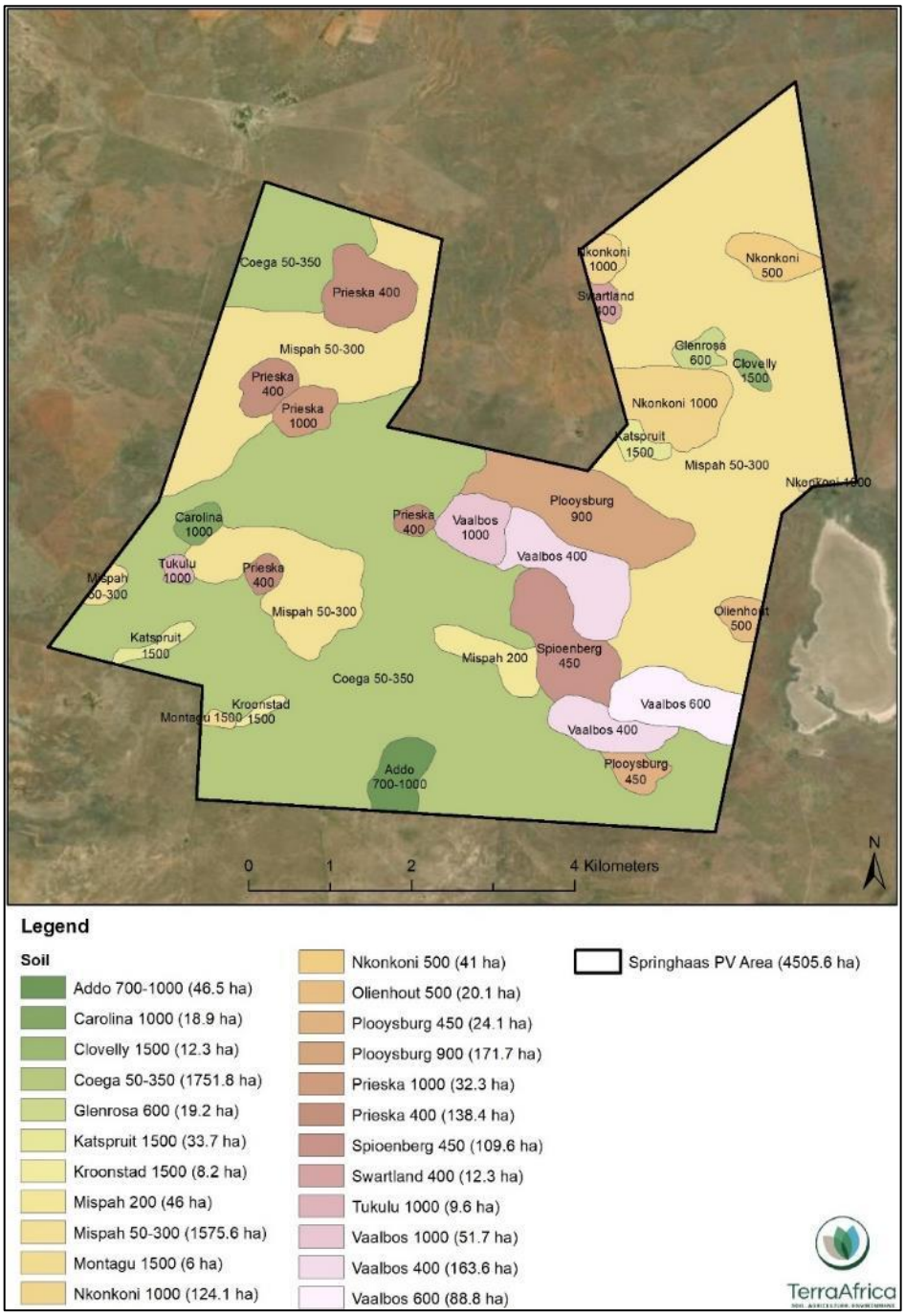


Figure 5-2: Soil types (supplied by TerraAfrica)

5.5.1 Agricultural Potential and Sensitivity

The footprints of the seven solar PV facilities are currently used for livestock grazing. The grazing capacity of the site is 10ha per large stock unit (LSU).

The agricultural potential of the site is largely of low sensitivity. There are pivots near the centre of the broader study area which are rated as very high sensitivity. These pivots have been avoided by the facility layouts/ development footprint. Agricultural potential and sensitivity per facility are detailed in **Table 5-2** below and shown in **Figure 5-3** and **Figure 5-4**.

The Protocol for Agricultural Specialist Assessment (GN 320 of 2020) sets allowable development limits in hectares per megawatt based on the priority rating of the land. Where the development footprint of the solar PV facilities exceeds these limits, it is indicated in the table below.

Table 5-2: Agricultural potential and sensitivity (adapted from TerraAfrica, 2022)

Facility	Agricultural potential	Agricultural sensitivity to proposed development	Area (ha) that exceeds allowable limit i.t.o GN 320 of 2020
SPH1	Mostly low – very low	Approx. 85% low	0
SPH3	Mostly low – very low	Low - medium	6.7ha in medium sensitivity land. Note, the medium sensitivity land is surrounded by land which is not suitable for crop production (i.e. land with low and very low agricultural potential) and hence development of this land will not impact on crop production in the broader area.
SPH4	Approx. 90% of the site low – very low Remainder low – moderate/ moderate	Approx. 95% of the site is low.	0
SPH5	Approx. 90% low – very low Remainder low – moderate/ moderate	Approx. 95% of the site is low	0
SPH6	Low – very low Low – moderate	Low	0
SPH8	Approx. 95% low-very low Remainder low – moderate/ moderate	Approx. 95% - low	0
SPH9	Low	Low	0

It is noted in the Agricultural Specialist study that although areas of medium sensitivity agricultural land are located within the boundaries of some facilities (refer to **Figure 5-3**) these areas are surrounded by low sensitivity land (i.e. land with low agricultural potential) which is not suitable for crop production due to the limited extent and isolation from other area of moderate potential land. Therefore the loss of these areas of medium sensitivity land will not impact on the production of crops in the broader study area.

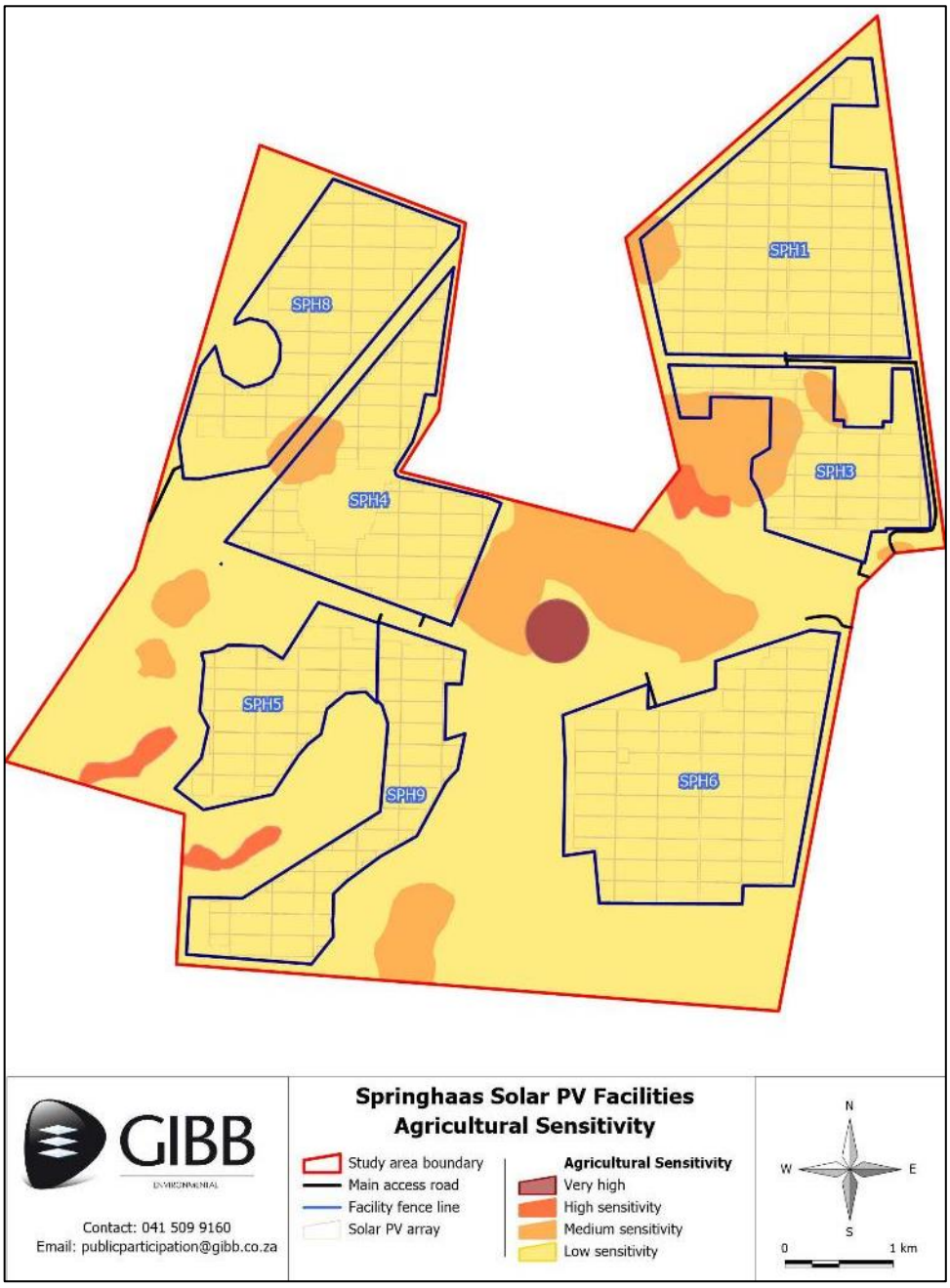


Figure 5-3: Agricultural sensitivity (data source TerraAfrica)

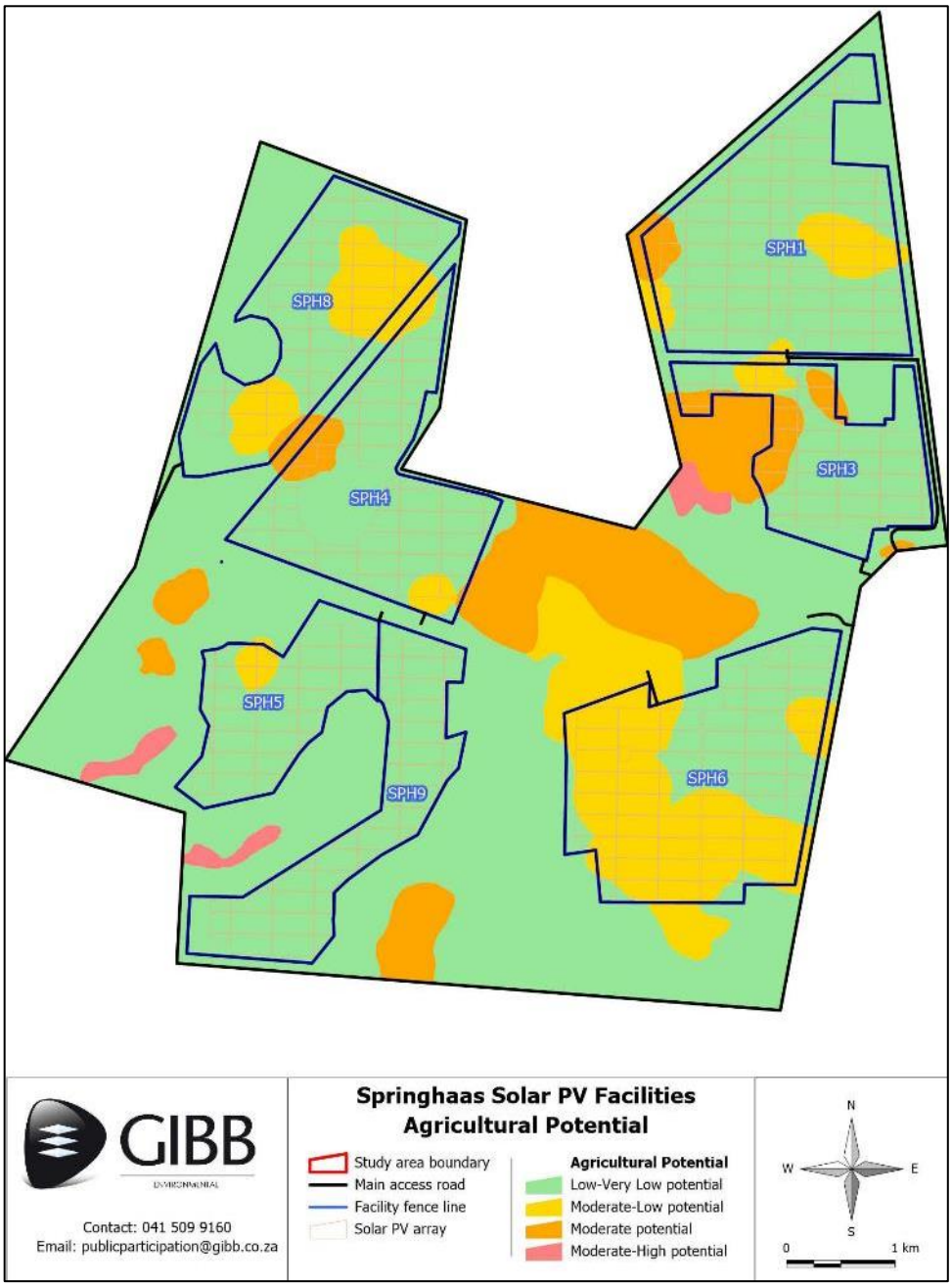


Figure 5-4: Agricultural potential (data source, TerraAfrica)

The Agricultural Impact Assessment concluded that based on the agricultural potential land sensitivity the footprints proposed for each facility are suitable for the development of solar PV facilities.

5.6 Groundwater

A Groundwater Impact Assessment was undertaken by GEOSS South Africa (GEOSS). The following section summarises the findings of the impact assessment report. The full version of the report is available in **Appendix 6 of the EMPr which is available in Appendix I**.

The underlying geology of the study area is sands and calcrete from quaternary deposits. Dolerite sills and shale, siltstone and sandstone from the Tierberg Formation in the Ecca Group underlies the quaternary deposits.

The site is underlain by a fractured aquifer with an average borehole yield of 0.5L/s. Based on regional Department of Water and Sanitation (DWS) datasets the regional groundwater quality of the aquifer is classified as good to marginal in terms of domestic supply.

The national scale groundwater vulnerability map indicates that the site has a low vulnerability to surface based contaminants.

Groundwater depth varies from 2.5 meters below ground level (mbgl) to 8.25mblg on site. The groundwater depth can however rise significantly on site to a much shallower depth (an arm length deep).

All operational boreholes in the study area are being used to provide water for livestock with the exception of one borehole on Dealesrust 922, which is used for irrigation. A number of unused boreholes and associated wind pumps were also noted.

One borehole on site was sampled with a yield of approximately 9.4L/s. The water quality from this borehole was found to be "acceptable" according to the SANS241-1:2015 classification. The overall water quality in terms of turbidity and total dissolved solids was classified as 'good' to 'marginal'.

The groundwater flows from a south to south-westerly direction on site as shown in **Figure 5-5.**

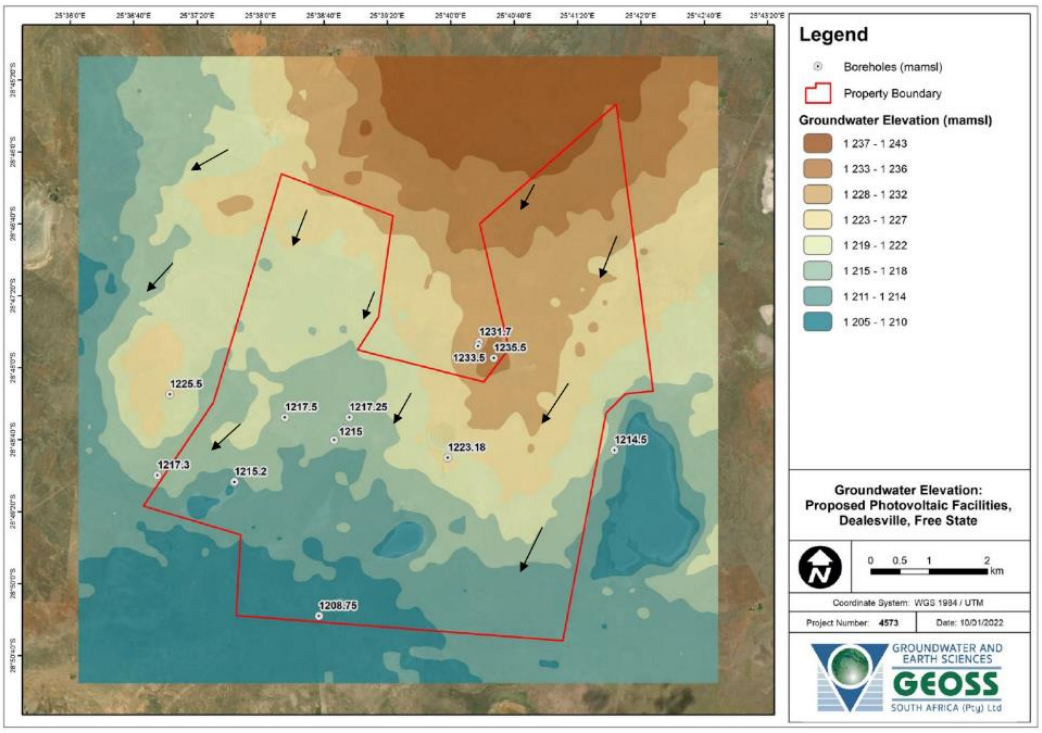


Figure 5-5: Groundwater elevation and flow (source: GEOSS, 2022)

There is a General Authorisation (GA) in place for the catchment, the abstraction limit is 0m^3/ha/annum. There are no plans to utilise groundwater for the proposed construction or operation of the solar PV facilities. If this should change then an amendment to the GA, or an application for a Water Use License would be needed the application would assess the impact of abstraction of groundwater.

The Groundwater Assessment concluded that although the development of the solar PV facilities would have a low potential to contaminate groundwater due to existing groundwater users, mitigation measures need to be implemented to ensure activities do not impact on groundwater. Vegetation

5.6.1 Regional Vegetation

The study area is situated within the Dry Highveld Grassland Bioregion within the Grassland Biome (SANBI, 2018). The Grassland Biome consists mainly of sweet and sour grasses and plants with perennial underground storage organs, such as bulbs and tubers. Trees are restricted to specialised habitats such as rocky outcrops or kloofs. The majority of the non-grassy herbaceous species (forbs) remain dormant during winter or very dry seasons, and re-sprout during early summer if rains are sufficient. Rare and Threatened species in grasslands are mostly small, very localised and visible for only a few weeks in the year when they flower (Cossypha, 2022). A detailed plant species list is included in the Botanical Assessment (**Appendix F5**).

The study area is fully located within Western Free State Clay Grassland vegetation type (**Figure 5-6)**.

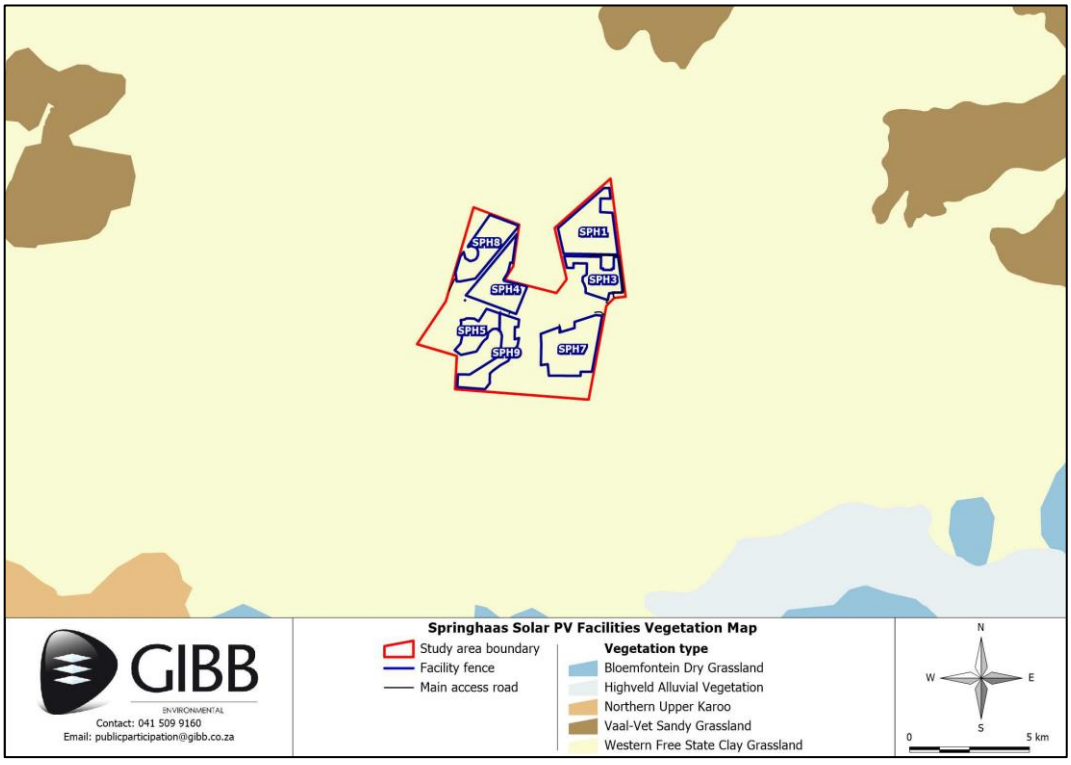


Figure 5-6: Study area vegetation (SANBI, 2018)

5.6.2 Listed Protected Ecosystems

The National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA) provides a list of threatened or protected ecosystems. The ecosystems are classified as Critically Endangered (CR), Endangered (EN), Vulnerable (V) or Protected (Pr). A list of these ecosystems is gazetted in the National List of Ecosystems that are Threatened and in Need of Protection (GN 1002 of 2011). The study area is located within Western Free State Clay Grassland, this vegetation type is classified as Least Concern (SANBI, 2018).

5.6.3 National Protected Areas

The National Environmental Management Protected Areas Act (Act 57 of 2003) (NEMPAA) provides the framework for proclamation of protected areas. The NEMPAA aims to protect and conserve South Africa's biodiversity through conserving ecologically viable areas that are representative of South Africa's biodiversity. There are no protected areas within the study area. The Nielsview Nature Reserve does however border on the south-western portion of the site. Other protected areas in the vicinity of the site are the Rooikraal Game Reserve and Steenbokkraal Nature Reserve which are located approximately 10km southeast of the study area. Further afield, approximately 20km east of the site are the Soetdoring Nature Reserve and Krugersdrift Dam. The Soetdoring Nature Reserve is one of the 112 sites demarcated by BirdLife International as an important bird area (IBA). IBA's are sites of global significance of bird conservation (web reference 1).

The National Protected Area Expansion Strategy for South Africa, 2008 (NPAES) was developed in response to concerns raised in the National Spatial Biodiversity Assessment, 2004 that the current national protected area system does not adequately conserve a representative sample of South Africa's biodiversity or allow key ecological processes to be maintained. The NPAES identified a need to add 2.7 million hectares of land to the protected area network and an additional 80km to the inshore marine protected area network. The NPAES identified 42 focus areas for land-based protected area expansion. The NPAES focus areas are typically expansive, unfragmented areas and present the opportunity to establish new protected areas or expand existing protected areas.

The Free State Highveld Grassland focus area is focus area 12. The focus area has been identified due to the possibility of conserving a relatively large area of highly threatened grassland. A portion of NPAES focus area 12 occurs approximately 1km west of the study area (refer to **Figure 5-7**).

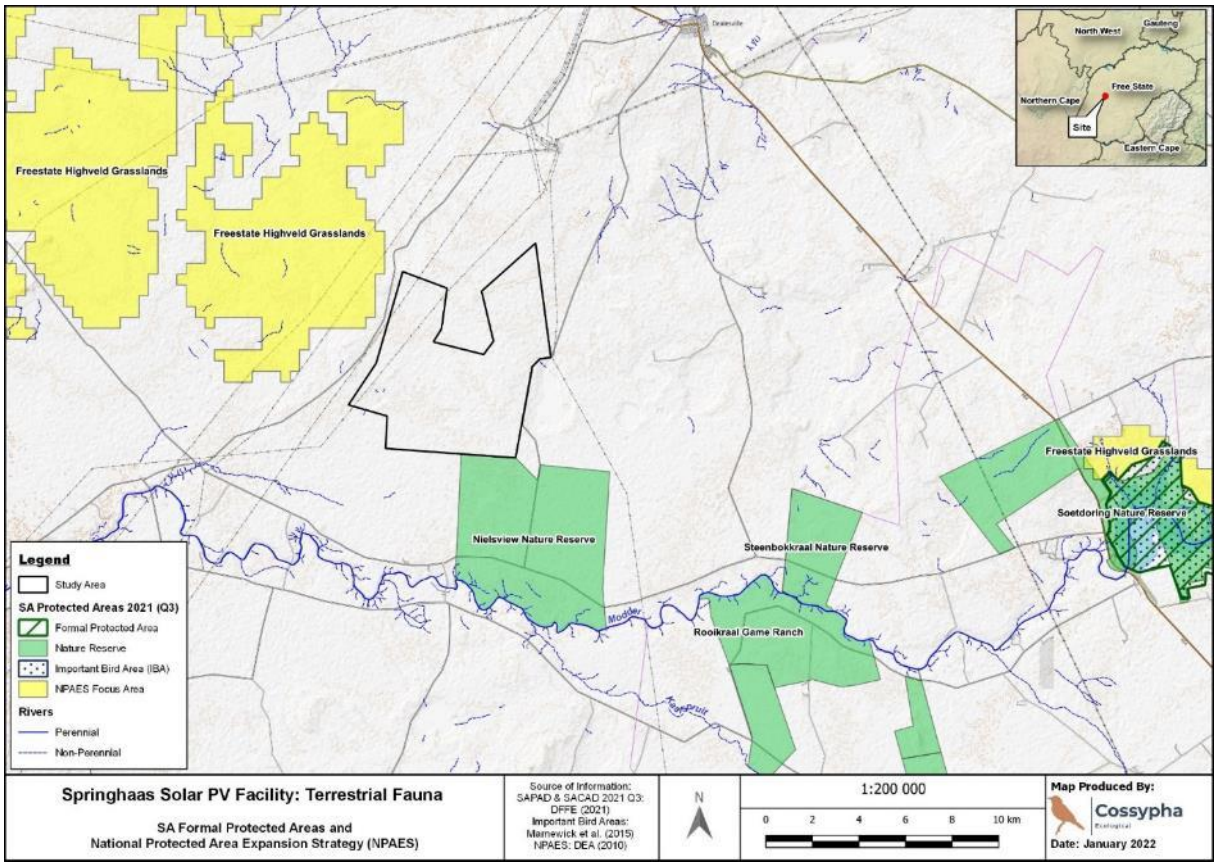


Figure 5-7: National Protected Areas and NPAES (source, Cossypha, 2022)

5.6.4 Free State Biodiversity Plan

Critical biodiversity areas (CBAs) were mapped as part of the development of the Free State Biodiversity Plan, 2015 (FSBP). The entire Free State provincial area was assessed during a spatial assessment and mapped according to six categories (**Table 5-3)**. The plan identifies areas that are important for the representation and persistence of terrestrial and aquatic species and ecosystems. These areas are classified as CBAs.

Table 5-3: FSBP mapping categories (source, DETEA, 2015)

Category	Description
CBA 1	**Irreplaceable:** A site that is irreplaceable or near irreplaceable for meeting biodiversity targets. There are no or very few other options for meeting biodiversity targets for the features associated with the site. Such sites are therefore critical, and they need to be maintained to ensure that features targets are achieved and that such features persist.
CBA 2	**Optimal:** A site that has been selected based on its complementarity for meeting biodiversity targets. CBA Optimal sites are therefore important, but their maintenance is not critical to ensure that features targets are achieved and that such features persist.
ESA (ecological support area)	An area that plays an important role in supporting the ecological functioning of a protected area or CBA, or in delivering ecosystem services. In most cases ESAs are currently in at least fair ecological condition and should remain in at least fair functioning condition. • **ESA1:** Sites with minimal degradation. • **ESA2:** Sites with degradation, i.e. they can be totally degraded, but not totally transformed.
Other	An area of natural habitat not required to meet biodiversity targets for ecosystem types,

Category	Description
	species or ecological processes, i.e. natural areas not selected as CBA or ESA.
Degraded	An area of degraded or transformed habitat that has not been selected as an ESA, i.e. all remaining areas

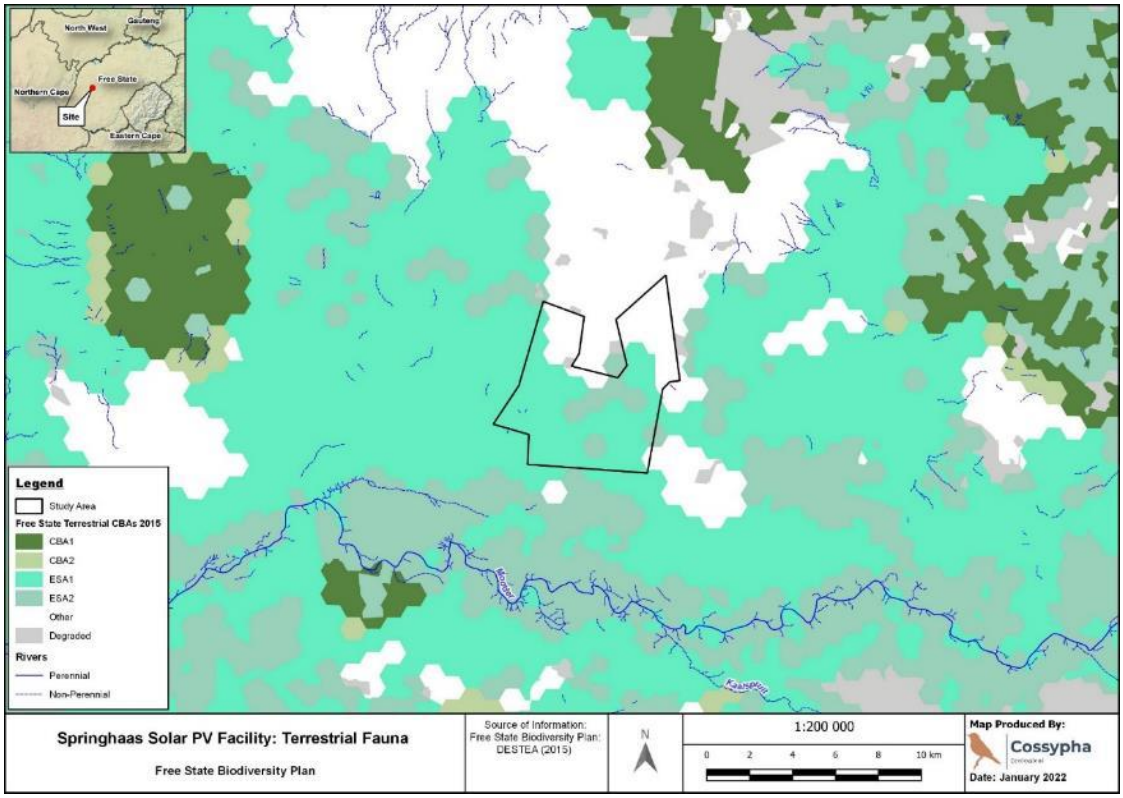


Figure 5-8: Critical biodiversity areas (source, Cossypha, 2022)

The majority of the study area of the Springhaas Solar PV is natural grassland interspersed with scattered salt pans. The study area is made up of ESA1 with a few areas classified as ESA2 or other (**Figure 5-8)**.

5.6.5 Study Area Vegetation

The vegetation descriptions included in this section are sourced from the Botanical Assessment undertaken by Bergwind Botanical Surveys and Tours (2022). A full version of the report is available in **Appendix F5.**

A single vegetation type, Western Free State Clay Grassland occurs on site (**Figure 5-6)**. Grasses are the dominant species occurring on site, few geophytes were noted during fieldwork.

The grassland vegetation is uniform over extensive areas of the site showing low diversity.

The grassland has been disturbed to varying degrees by grazing by cattle and small mammals. The presence of burrowing mammal species has resulted in localised disturbance and termites have caused de-vegetation of areas through the establishment of termite mounds.

Some of the study area had burned in the winter of 2021.

Figure 5-9: Fence-line contrast due to intense grazing on the left side of the fence (source Bergwind, 2022)

Vegetation descriptions per facility are provided below (**Table 5-4**). These descriptions are based on observations made at the waypoints surveyed. For detailed descriptions and lists of all species noted during the site survey refer to the Botanical Assessment **(Appendix F5).**

Table 5-4: Vegetation descriptions (adapted from Bergwind, 2022)

Facility	Species present	Description
SPH1	The dominant species are *Eragrostis lehmanniana* and *Aristida congesta.* These species indicate moderate to high grazing pressure. *Themeda triandra* is dominant in areas where the veld is in a good condition. Dwarf shrubs *Pentzia globosa* and *Chrysocoma ciliate* are present in areas heavily disturbed by livestock and the grasses have been reduced to a grazing lawn. Exotic cactus *Opuntia* sp. occur sporadically across the veld.	In the western area, *Themeda triandra* is dominant and vigorous around waypoint SPR45 and the veld is in good condition. In the northern section of SPHJ1 *T. triandra* is dominant but the veld is old and moribund and would benefit from a managed burn. The southern section of the site is dominated by *Eragrostis lehmanniana*, indicating that it has been heavily grazed.
SPH3	*Themeda triandra* is the dominant species in areas removed from waterpoints and *Eragrostis lehmanniana* and *Aristida congesta* are co-dominant species grass (*Cynodon dactylon*) and dwarf shrubs (i.e. *Pentzia globosa* and *Chrysocoma ciliata*) dominate around drinking areas	Vegetation around waterpoints is heavily grazed. Areas of the veld are old and moribund and would benefit from short-term intensive grazing or burning.
SPH4	*Themeda triandra* is dominant in mixed grassland	The veld is grazed by cattle and is in a

Facility	Species present	Description
	patches. *Eragrostis echinochloidea* and/ or *Eragrostis lehmanniana* are dominant in more heavily grazed areas.	moderate condition. Mixed grassland patches where *Themeda triandra* is dominant is in need for a controlled burn. There is one small areas that presents signs of a controlled burn. More heavily grazed areas have a greater prevalence of shrub *Hertia pallens.*
SPH5	*Fingerhuthia Africana, Eragrostis echinochloidea, Eragrostis lehmanniana* dominate the footprint with some other grass species, low shrubs and forbs present at a finer scale. A dense population of *Ammocharis coranica* commonly known as the sore eye flower, bible flower, karoo lily or ground lily was found in the southern section of SPH5.	Section of SPH5 burnt in the winter of 2021. Moderate to heavy grazing has occurred across the site. The grazing regime on the western side of the site is better.
SPH6	The landscape is strongly dominated by *Themeda triandra* and other plant species include, *Aristida congesta*, *Aristida diffusa*, *Berkheya annectens*, *Chloris virgata*, *Chlorophytum* sp., *Cucumis zeyheri*, *Cynodon dactylon*, *Eragrostis echinochloidea*, *Eragrostis lehmanniana* (not much), *Eragrostis superba*, *Indigofera alternans*, *Melolobium candicans*, *Microchloa caffra*, *Oxalis depressa*, *Panicum coloratum* and *Pentzia globosa.*	The plant community is uniform and extensive over a wide area, probably over most of the western part of SPH6. The vegetation consists of mixed grasses and shrubs, with some areas consisting of dead grass which would benefit from burning. The general matrix of the veld varies across the site due to heavy grazing and burrowing activities by mammals (ground squirrels). A small population of geophyte *Ammocharis coranica* was found in the north-western section of SPH6. *Ammocharis coranica* is not a SCC.
SPH8	In areas of low disturbance *Themeda triandra* dominates. In areas of disturbance *T. triandra* is absent and species indicative of disturbance are present.	The grassland vegetation is typically dominated by *Themeda triandra*, in areas where heavy disturbance has occurred *T. triandra* is absent, and disturbance-related species are dominant .This pattern is found over a large area, virtually the whole of SPH8. The veld has not been burnt recently and when the veld is heavily grazed, the composition of grasses changes and woody, dwarf-shrubs become prominent.
SPH9	A high diversity of species are present in SPH9. *Themeda triandra, Eragrostis lehmanniana and Fingerhuthia* are dominant in the grassland in the northern portion and middle of the site. *Digitaria eriantha* is common, even dominant around the waypoint in the south of the site. Various species were noted around depression none of which are SCCs.	The grassland, consisting of mixed grasses has burnt in the winter of 2021 but was lush following summer rains. Grazing and trampling has cause localised disturbance.

5.6.6 Plants of Conservation Concern

No species of conservation concern were found in the area surveyed. This is most likely due to the disturbed nature of the site.

5.6.7 Alien Invasive Plants

The control of alien invasive species is managed by the Alien and Invasive Species Regulations, published in GN R598 of 1 August 2014, in terms of the NEMBA. Updated lists of Invasive Species were published on the 29th of July 2016 in GN 864.

Previously, the control of alien and invasive species was managed under the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA). The amended Regulations (Regulation 15) of CARA identified three categories of problem plants. NEMBA lists 181 more species than CARA (which it supersedes) with the following categories updated in July 2017:

(a) Category 1a (PROHIBITED): Listed Invasive Species

A person in control of a Category 1a Listed Invasive Species must comply with the provisions of Section 73(2) of the Act; immediately take steps to combat or eradicate listed invasive species in compliance with Sections 75(1), (2) and (3) of the Act; and allow an authorised official from the Department to enter onto land to monitor, assist with or implement the combatting or eradication of the listed invasive species.

(b) Category 1b (PROHIBITED / Exempted if in Possession or Under control): Listed Invasive Species

A person in control of a Category 1b Listed Invasive Species must control the listed invasive species in compliance with Sections 75(1), (2) and (3) of the Act. A person contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or comply with the Invasive Species Management Programme contemplated in Section 75(4) of the Act.

(c) Category 2 (PERMIT REQUIRED): Listed Invasive Species

Species listed by notice in terms of Section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be. A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit. Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to Regulation 3. Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.

(d) Category 3 (PROHIBITED): Listed Invasive Species

Species that are listed by notice in terms of Section 70(1)(a) of the Act, as species which are subject to exemptions in terms of Section 71(3) and prohibitions in terms of Section 71A of the

Act, as specified in the Notice. Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3.

A number of alien plant species were recorded within the study area, and included:

- Cockle-bur (*Xanthium strumarium)* (Category 1b)
- *Schkuhria pinnata* (not listed in terms of NEMBA)
- Mesquite tree (*Prosopus* sp). (not listed in terms of NEMBA)
- Cactus (*Opuntia* sp.) (Category 1b)

5.7 Fauna

A Terrestrial Biodiversity and Animal Species Assessment was undertaken by Cossypha Ecological for the seven solar PV facilities. The following section summarises the findings of the study. A full version of the study is available in **Appendix F13**. The Terrestrial Biodiversity Assessment was undertaken in line with the following protocols and guidelines:

- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species, published in GN 1150 of 30 October 2020; and
- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity, published in GN 320 of 20 March 2020
- Species Environmental Assessment Guideline for the implementation of the Terrestrial Fauna Species Protocols for Environmental Impact Assessments (SANBI, 2020).

5.7.1 Faunal Habitat

The study area consists largely of natural to near natural grassland which is used for grazing of livestock. There are some cultivated areas which are planted with crops or are lying fallow. The sites have been modified by the development of farm roads, buildings and cultivation. Alien trees are associated with disturbed areas and buildings. Trampling has occurred in areas where cattle congregates, such as water points.

The vegetation on site comprises of short grassland. Numerous termite mounds and animal burrows occur in the grassland. Taller grassland with shrubby species occurs in the western section of the study area. The grassland provides habitat for burrowing animal species.
Two rocky outcrops occur within the broader study area. These rocky outcrops provide habitat diversity by providing a refuge to floral and faunal species. These rocky outcrops are located outside the footprint of the solar PV facilities.

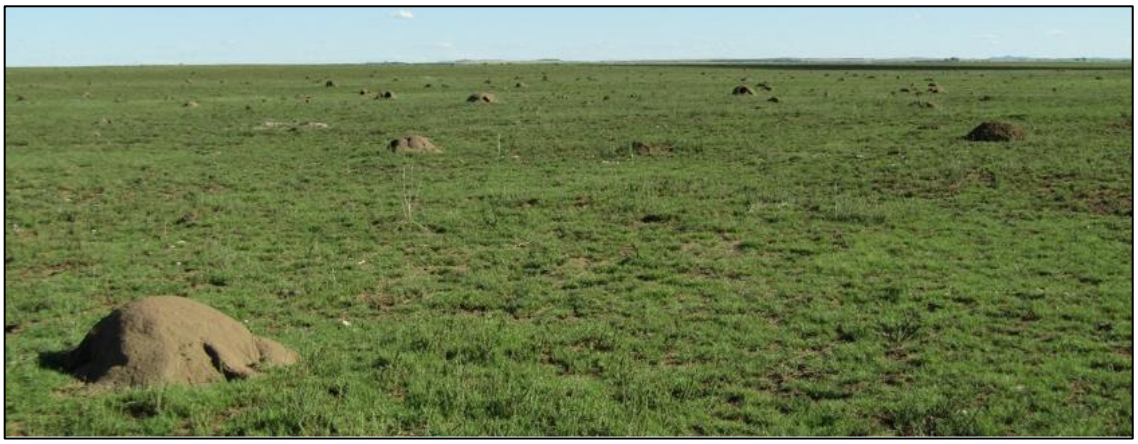


Figure 5-10: Grassland habitat with animal burrow and termite mounds (source: Cossypha, 2022)

Natural pans and wetlands occur throughout the study area, the infrastructure avoids all large pans and wetlands and their respective buffers (**Figure 5-11)**. These features provide a source of drinking water for fauna when water is present and also provide habitat for amphibians.

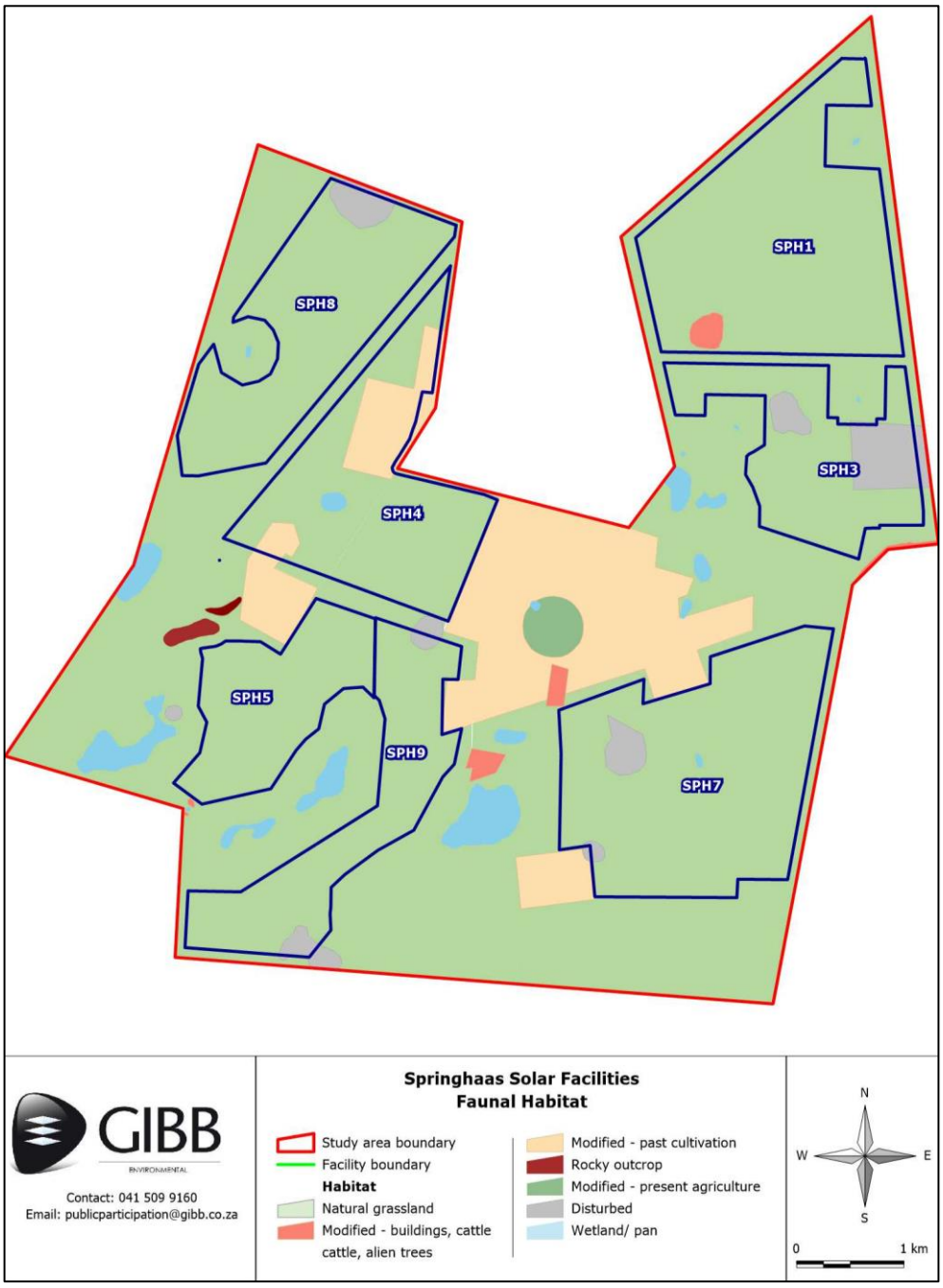


Figure 5-11: Faunal habitats (data source, Cossypha)

5.7.2 Faunal Species

(a) Mammals

A total of 16 mammal species were confirmed to occur in the study area, through sighting, spoor, burrows, mounds or droppings, and are listed in **Table 5-5** below together with their conservation status. No species of conservation concern were confirmed to occur on site, however Aardvark (*Orycteropus afer)* is a protected species at a national level. It is likely that additional mammal species will occur within the study area.

Table 5-5: Mammal species confirmed to occur in the study area (source: Cossypha, 2022)

Scientific Name	Common Name	Conservation Status		Field Evidence
		Field Evidence	Field Evidence	
Orycteropus afer	Aardvark	LC; Pr	LC	Burrows, broken termite mounds, spoor, droppings
Hystrix africaeaustralis	Cape Porcupine	LC	LC	Droppings, quills, spoor, burrows
Phacochoerus africanus	Common Warthog	LC	LC	Sighting, droppings
Raphicerus campestris	Steenbok	LC	LC	Sighting, spoor, droppings
Xerus inauris	Southern African Ground Squirrel	LC	LC	Sighting, burrows
Cynictis penicillata	Yellow Mongoose	LC	LC	Sighting
Procavia capensis	Rock Hyrax	LC	LC	Sighting, burrows
Chlorocebus pygerythrus	Vervet Monkey	LC	LC	Sighting
Herpestes sanguineus	Slender Mongoose	LC	LC	Sighting
Pedetes capensis	Springhare	LC	LC	Spoor, droppings, burrows
Canis mesomelas	Black-backed Jackal	LC	LC	Sighting
Antidorcas marsupialis	Springbok	LC	LC	Sighting
Cryptomys hottentotus	Common Mole-rat	LC	LC	Mounds
Gerbilliscus brantsii	Highveld Gerbil	LC	LC	Burrows
Lepus cf. saxatilis	Scrub Hare	LC	LC	Sighting, droppings
Suricata suricatta	Suricate	LC	LC	Sighting, burrows

Pr = Protected; LC = Least Concern

(b) Herpetofauna

Three amphibian species were observed on site in and around pans and a further seven species are likely to occur in the study area. The large pans are located outside of the development footprint and no infrastructure will encroach on them.

According to the ReptileMAP, 28 reptile species are confirmed to occur within QDGV 2825DC which encompasses the study area. Only two reptile species were observed on site, both of which are classified as Least Concern at a national and global level.

Amphibian and reptile species observed on site are listed in **Table 5-6** below along with their conservation status.

Table 5-6: Amphibian and reptile species confirmed to occur on site (source: Cossypha, 2022)

Scientific Name	Common Name	Conservation Status		
		National	Global	
			IUCN	CITES
Amphibians				
Pyxicephalus adspersus	Giant Bull Frog	LC; Pr	LC	
Sclerophrys capensis	Raucous Toad	LC	LC	
Phrynobatrachus natalensis	Snoring Puddle Frog	LC	LC	
Reptiles				
Stigmochelys pardalis	Leopard Tortoise	LC	LC	CITES App II
Bitis arietans arietans	Puff Adder	LC	LC	

Pr = Protected; LC = Least Concern

5.7.3 Bats

A Bat Assessment was undertaken by Arcus. A full version of the report is available in **Appendix F4**. The following section summarises the findings of the study.

The study area falls within the actual or predicted range of approximately 12 bat species (**Table 5-7**). All of the species which could occur on site have a conservation status of Least Concern with the exception on the Straw-coloured Fruit Bat (*Eidolon helvum*) and Dent's Horseshoe Bat (*Rhinolophus denti*) which are both classified as Near Threatened on a global and national level respectively. It must be noted that the distribution of some bat species, in particular the rarer ones, are not well known so other species may occur on site. No bat roosts were identified on site within any of the seven facility boundaries.

Table 5-7: Bat species occurrence within the broader study area (source, Arcus 2022)

Scientific Name	Common Name	Conservation status	
		National	Global
Scotophilus dinganii	African Yellow Bat	LC	LC
Neoromicia capensis	Cape Serotine	LC	LC
Rhinolophus darlingi	Darling's Horseshoe Bat	LC	LC
Rhinolophus denti	Dent's Horseshoe Bat	NT	LC
Pipistrellus hesperidus	Dusky Pipistrelle	LC	LC
Tadarida aegyptiaca	Egyptian Free-tailed Bat	LC	LC
Nycteris thebaica	Egyptian Slit-faced at	LC	LC
Rhinolophus clivosus	Geoffroy's Horseshoe Bat	LC	LC
Eptesicus hottentotus	Long-tailed House Bat	LC	LC
Miniopterus natalensis	Natal Long-fingered Bat	LC	LC
Eidolon helvum	Straw-coloured Fruit Bat	LC	NT
Myotis welwitschii	Welwitsch's Bat	LC	LC

LC = Least Concern; NT = Near Threatened

In terms of habitat for bats, the area within the facility boundaries presents few roosting opportunities for bats. No roosts were observed in existing buildings of tree stands. No cliffs

or rocky outcrops fall within the development footprint. The rocky outcrops located adjacent to SPH5 are located outside the development footprint.

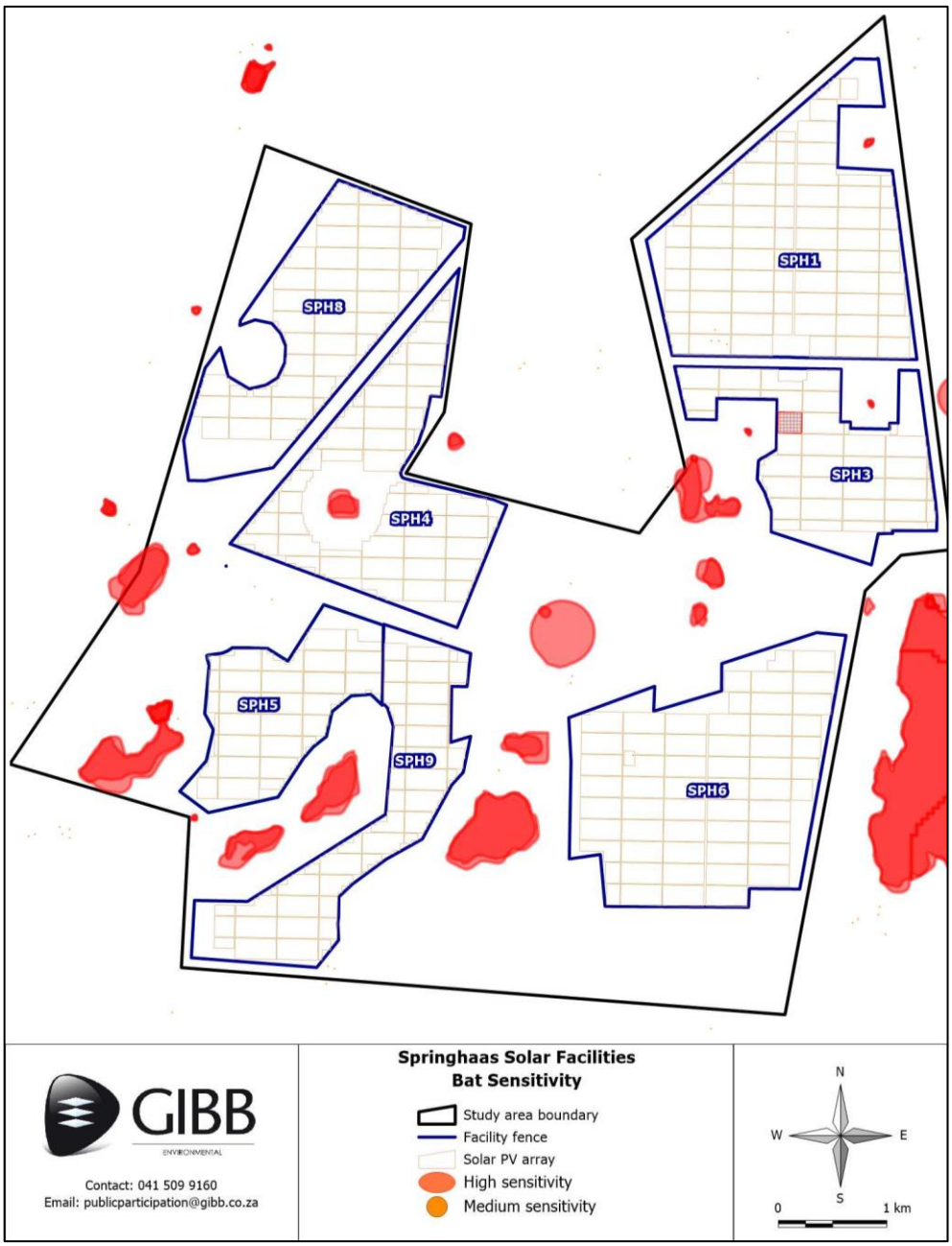


Figure 5-12: Bat sensitivity (data source, Arcus)

5.7.4 Avifauna

An Avifaunal Impact Assessment was undertaken by WildSkies Ecological Services. A full version of the report is available in **Appendix F3**. The following section summarises the findings of the study.

There are no Important Bird Areas (IBA) within the study area. The closest IBA is approximately 24km east of the site. Due to the relatively uniform nature of the habitat on site, a high diversity of bird species was not recorded. Wetlands and pans on site were identified as

sensitive areas for avifauna. These features were ascribed a 250m no-development buffer by the avifaunal and aquatic biodiversity specialists. The facility layouts avoid the 250m buffers of the features.

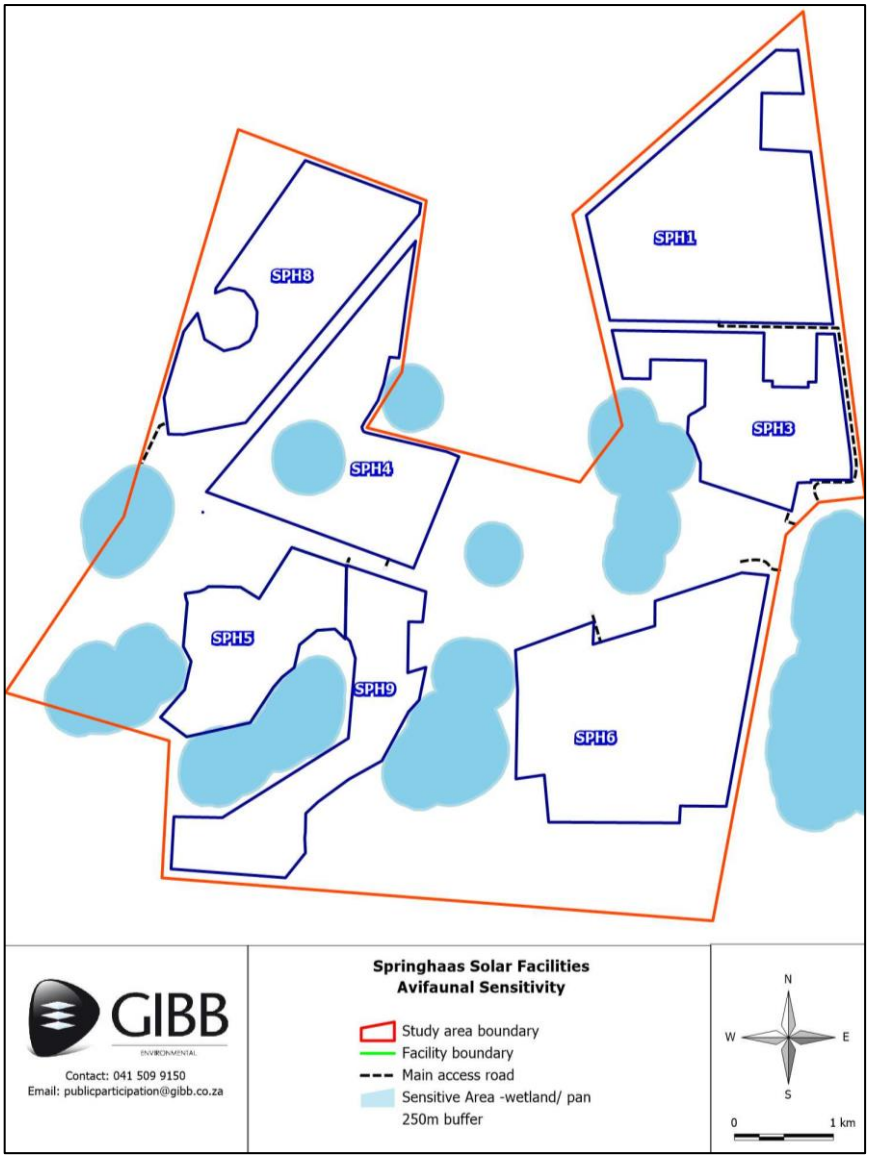


Figure 5-13: Avifauna sensitivity (data source, WildSkies)

Approximately 273 bird species occur in the broader study area. Of the 273 one is listed as Critically Endangered, five are listed as Endangered, six are listed as Vulnerable and 10 are Near Threatened (**Table 5-8)**.

An initial site visit was undertaken, followed by the requisite avifauna surveys which were undertaken over two seasons (spring and peak summer) in-line with the BirdLife SA Birds & Solar Energy Best Practice Guidelines (2017). During these site visits and surveys a total of 133 species were recorded on site.

Eleven Species of Conservation Concern (SCC) were recorded on site. None of the SCC were endemic to the area.

Table 5-8: Avifauna Species of Conservation Concern (source, adapted from WildSkies, 2022)

Common name	Scientific name	RD (Regional, Global)	Importance of site for species
White-backed Vulture	*Gyps africanus*	CR, CR	Low – this species has a very large range and will not be affected by the construction of this facility
Martial Eagle	*Polemaetus bellicosus*	EN, VU	Low – this species ranges widely and can be expected on site occasionally, but the site is not particularly important for the species' survival
Ludwig's Bustard	*Neotis ludwigii*	EN, EN	Low – this species is nomadic and can be expected on site when conditions are right but the site is not considered to be particularly important for the species
Secretarybird	*Sagittarius serpentarius*	VU, VU	Medium - this species is typically resident in an area
Burchell's Courser	*Cursorius rufus*	VU, LC	Low – this is a nomadic species and the site cannot be considered of high importance for it
Lanner Falcon	*Falco biarmicus*	VU, LC	Medium – this species is typically resident in an area
Blue Crane	*Grus paradisea*	NT, VU	Medium – pairs such as this are typically resident in an area
Red-footed Falcon	*Falco vespertinus*	NT, NT	Low – this is a migrant and is nomadic when in our region
Pallid Harrier	*Circus macrourus*	NT, NT	Low – migrant species
Black-winged Pratincole	*Glareola nordmanni*	NT, NT	Low – nomadic species
European Roller	*Coracias garrulus*	NT, LC	Low – migrant species

CR- critically endangered; EN – endangered; VU vulnerable; NT- near threatened; LC – least concern; RD (Regional, Global) – Regional Red List – Taylor *et al*, 2015; Global Red List – IUCN 2022

The site was of low to medium importance for the SCC. Species such as Secretary Bird, Lanner Falcon and Blue Crane, which are typically resident in the area, derive a medium importance from the site. Natural grassland would be used for foraging by Secretary Bird (Cossypha, 2022).

5.7.5 Ecological Importance within the Study Area

Site ecological importance (SEI) from a faunal perspective was determined based on conservation value, ecological function and considered the receptor resilience to impacts.

The methodology for determining SEI is detailed in the Species Environmental Assessment Guideline for the implementation of the Terrestrial Fauna Species Protocols for Environmental Impact Assessments (SANBI, 2020). A detailed description of the methodology is presented in the full Terrestrial Biodiversity and Animal Species Assessment **(Appendix F13)**.

The following SEI was determined for the different habitat in the study area (**Table5-9**).

Table 5-9: Evaluation of Site Ecological Importance (SEI) of habitats in the Project Area of Influence (adapted from Cossypha, 2022)

Habitat	Site Ecological Importance	Brief description
Pans and Wetlands	High	Avoided by the facility layouts These habitats perform important ecological functions and provide specific habitats for fauna.
Rocky Outcrops	High	
Natural / Near-natural Grassland	Medium	The main habitat for fauna in the study area. Used for foraging by 2 SCC (Ludwig's Bustard and Secretarybird). Important for habitat connectivity and movement. Includes sensitive features such as large, active burrows for species such as Aardvark.
Disturbed Natural Areas (heavy use by cattle)	Low	Natural areas which have been disturbed by agriculture and human activities. These areas can be rehabilitated.
Modified (past cultivation / fallow land)	Low	
Modified / Transformed (cultivated; buildings, alien trees)	Very low	Areas modified or transformed by human activities.

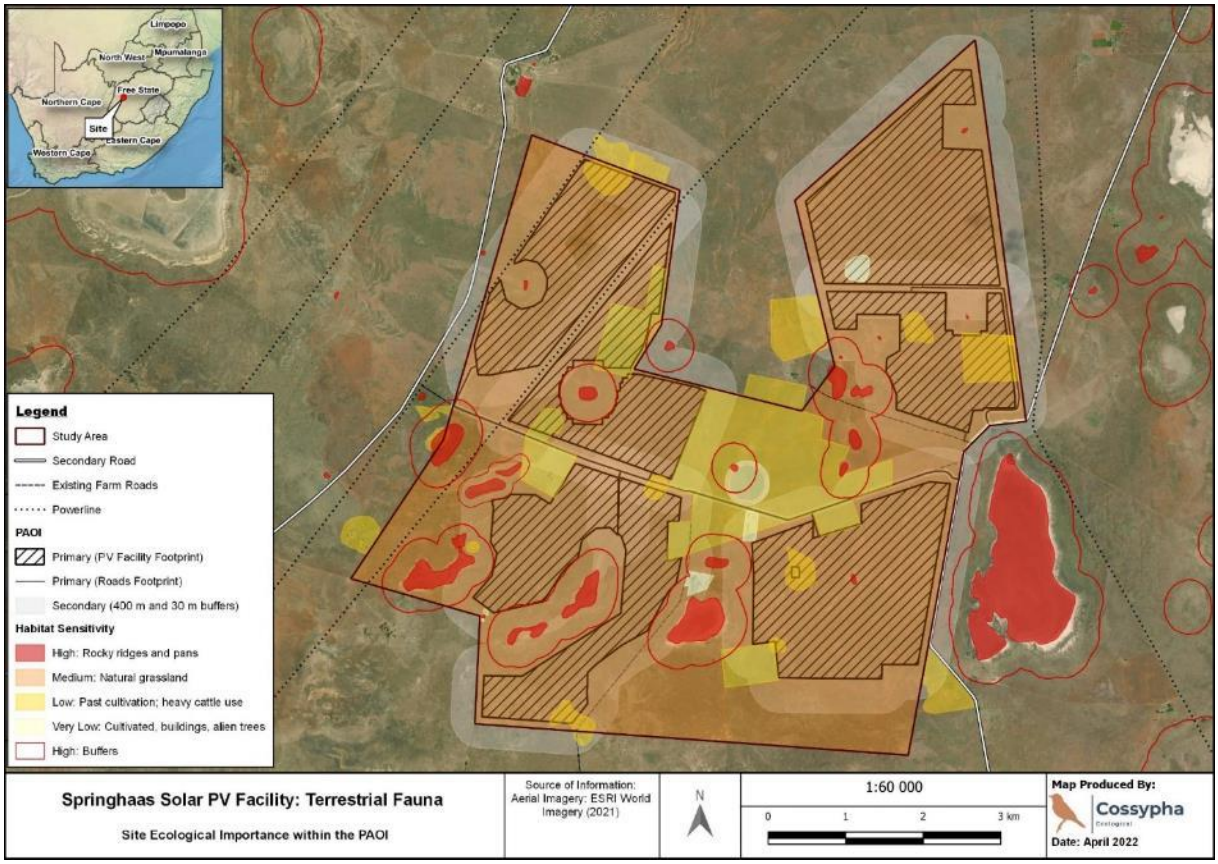


Figure 5-14: Areas of ecological importance and sensitivity in the study area (source Cossypha, 2022)

5.8 Hydrology

Floodline determination was undertaken for the study area. All seven facilities are located outside the 1:100 year floodline. The 1:100 year floodline coincides with the ecological buffer applied to pans and wetlands and hence these areas have been excluded from the development footprint. The Baseline Hydrological Study and Stormwater Management Strategy is included as **Appendix 7 of the EMPr which is contained in Appendix J.**

An Aquatic Biodiversity and Species Assessment was undertaken for the proposed PV facilities by Ms Toni Belcher, in 2022. The below section incorporates information from the specialist report. A full version of the specialist report is available in **Appendix F2.**

5.8.1 Site Overview

The site is located approximately 5.5km north of the Modder River which is a tributary of the Vaal River in the larger Orange River System. The site is located within the catchment of the Modder River and the site slopes from north to south.
Several large salt pans and several smaller wetlands occur in the study area. The vegetation on site is Western Free State Clay Grassland. In areas which have been disturbed around pans dwarf karoo shrublands occur and Highveld Salt Pans vegetation occurs in the larger pans. All of the watercourses on site are non-perennial and only contain water for brief periods following local rainfall events.

Due to the continued deposition of lime-rich sediments from surface water run-off endorheic pans, mostly salt pans have formed. The site becomes increasing wet in the southern portions and drainage features transport water from north to south. Smaller depression wetlands occur in these drainage regions. A minor fractured aquifer occurs in the area with water table depths of 2.5 – 8.25m below ground level. The site is not located in a Strategic Water Source Area for ground or surface water (Belcher, T. 2022).

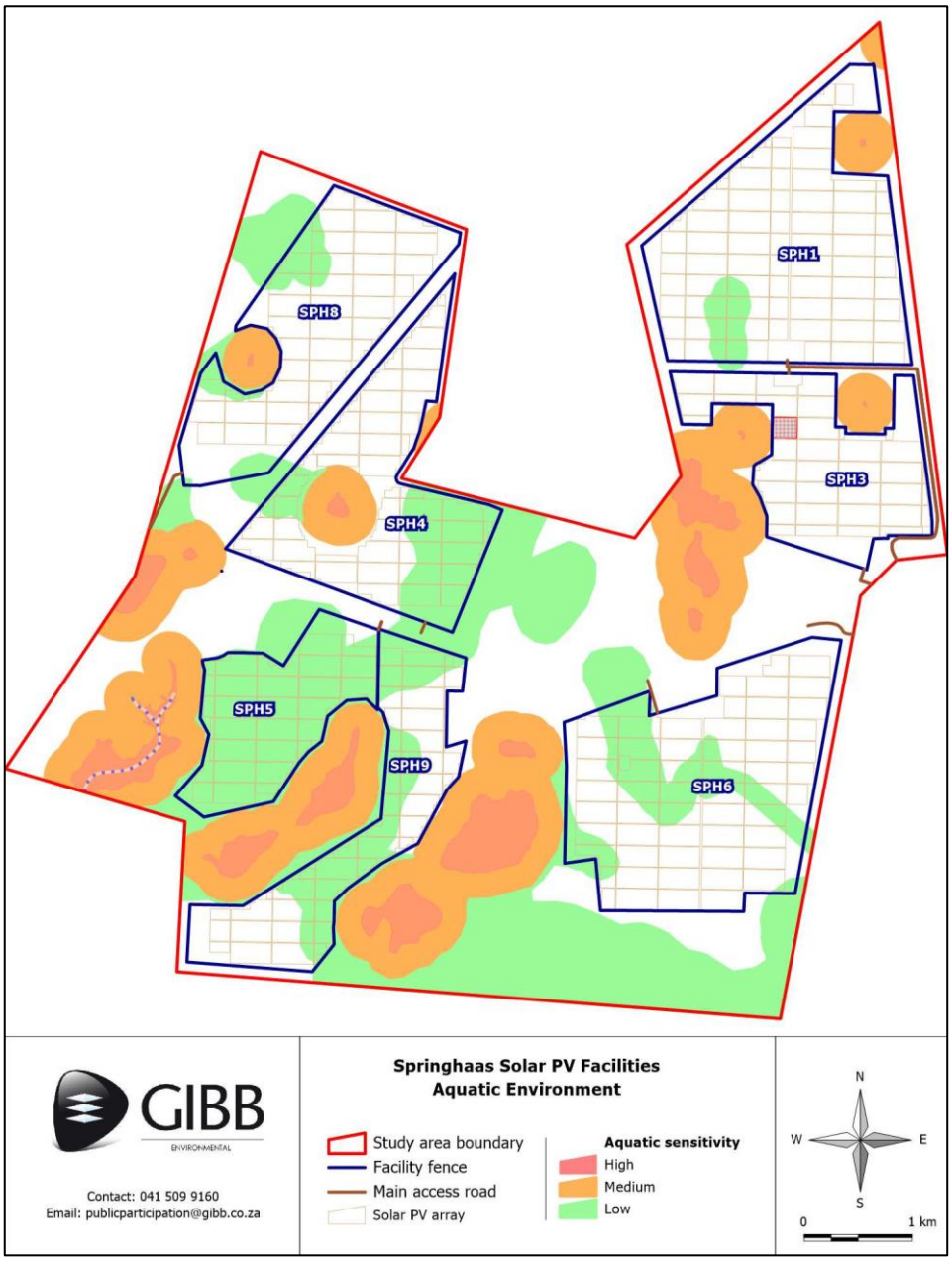


Figure 5-15: Aquatic environment (data source, T. Belcher)

5.8.2 Aquatic Biodiversity Conservation Importance

The National Freshwater Ecosystem Priority Areas (NFEPA) map and the Free State Biodiversity Plan, 2015 (FSBP) map the aquatic ecosystems in the area in terms of conservation and biodiversity importance. There are no rivers on site so the site is not located within any River FEPA sub-quaternary catchment. There are FEPA wetlands which comprise the larger pans and wetland clusters in the southern half of the site. Wetland clusters, when located in a relatively natural landscape allow the important ecological processes such as the migration of frogs and insects between wetlands (Belcher, T 2022).

5.8.3 Aquatic Ecosystem Assessment

The Present Ecological State (PES) was determined for the pans in the study area. The larger pans were classified as having a PES of category B/C (largely natural to moderately modified) and the smaller depression wetlands were classified as category C (moderately modified). The smaller wetlands have been subject to physical habitat disturbance and flow and water quality modification from farming activities.

The Wetland Ecological Importance and Sensitivity (EIS) assessment was also completed. The larger pans are considered of moderate ecological importance and sensitivity. The larger pans were ascribed a 250m buffer and the layout incorporates these buffers. The smaller depressions and associated watercourses are considered as moderate to low ecological important sensitivity.

5.8.4 Aquatic Species

Highveld Salt Pans vegetation and the surrounding Western Free State Clay Grassland vegetation are both classified as Least Threatened. There is no specific aquatic vegetation species which are solely dependent on aquatic habitat in the study area.

There is low amphibian diversity in the study area. *Pyxicephalus adspersus* (Giant Bull Frog) which is protected at a national level was observed on site. All other species of amphibians which may occur on site are considered as Least Concern.

A facility specific sensitivity analysis was undertaken for each of the seven solar PV facilities (**Table 5-10**).

Table 5-10: Aquatic biodiversity combined sensitivity (adapted from Belcher, T. 2022)

Facility	Aquatic biodiversity combined sensitivity	Comments
SPH1	Low	SPH1 is dry with few aquatic features, those present are relatively small and of limited ecological importance. There is one drainage feature within the site. No wetlands are associated with the drainage feature. SPH1 avoids the 250m buffer of wetlands. No aquatic constraints of any significance thus occur within SPH1. Development in the drainage area would need to consider stormwater management measures to avoid impacting on the movement of water through the more seasonally wet areas.
SPH3	Low	No aquatic constraints. The site avoids the 250m buffer of wetlands.
SPH4	Low	SPH4 is a slightly wetter site, drainage features feeds large pans in the south of the site. Development in the drainage area would need to consider stormwater management measures to avoid impacting on the movement of water through the more seasonally wet areas. No aquatic constraints of any significance occur within SPH4.
SPH5	Low	Largely located in a drainage area which contains a mosaic of smaller grassy season wetlands, it does however avoid FEPA wetlands and the 250m buffer applied to these wetlands. Development in the drainage area would need to consider stormwater management measures to avoid impacting on the movement of water through the more

Facility	Aquatic biodiversity combined sensitivity	Comments
		seasonally wet areas.
SPH6	Low	The eastern portion of SPH6 is relatively dry, there are a few drainage features in the western portion. No aquatic constraints of any significance occur in SPH6. Development in the drainage area would need to consider stormwater management measures to avoid impacting on the movement of water through the more seasonally wet areas.
SPH8	Low	SPH8 is located in the drier north-western portion of the site. One drainage area is located within the proposed facility. No aquatic constraints of any significance exist within SPH8. The site avoids FEPA wetlands the 250m buffer of wetlands. Development in the drainage area would need to consider stormwater management measures to avoid impacting on the movement of water through the more seasonally wet areas.
SPH9	Low	SPH9 is located in the southern-central portion of the site which is wetter in summer and contains a mosaic of smaller grassy seasonal wetlands. SPH9 avoids FEPA wetlands the 250m buffer of wetlands. It is located partially in a drainage areas. Development in the drainage area would need to consider stormwater management measures to avoid impacting on the movement of water through the more seasonally wet areas.

5.9 Socio-Economic Environment

5.9.1 Demographic Profile

This section summarises the baseline findings of the Socio-Economic Impact Assessment Report (**Appendix F11**) undertaken by Urban-Econ Development Economists (Pty) Ltd.

(a) Land Use Profile

The site consists of expansive natural grassland with sparse areas of shrubland. The site is currently used for grazing of livestock. The large area of land available confirms the suitability for the development of a solar PV facility.

(b) Population Data

The Tokologo Local Municipality (LM) has a population of approximately 31,334 people, with around 9,274 households—this amounts to 5% of the total population in the Lejweleputswa District Municipality (LDM). The Tokologo LM has an average household size of 3.38 people, which is on par with that of the LDM (3.43) and Free State province (3.37). However, it is slightly lower than the national average of 3.59 people per household(**Table 5-11)** (Urban-Econ, 2021).

Table 5-11: Tokologo LM demographic profile 2020 (adapted from Urban-Econ, 2021)

Population	31,334
Population density	3.36 people/ square km
Average household size	3.38 people

No. households	9,274
Gender ratio female: male	51.3% : 48.7%
Age group distribution (% of population)	Children (0 -14 years): 28% Youth (15 – 19 years): 9% Adult (20 – 59 years): 51% Elderly (60+ years): 12%
Life expectancy	2016: 59.7 years 2019: 60.7 years

The municipality has a low population density, with an average of 3 people per square kilometre, this is significantly lower than both the district and national population density. This suggests that the Tokologo LM is rural, expansive and sparsely populated (Urban-Econ, 2021).

The majority of the population (51%) are of working age (20 - 59 years) and hence are potentially economically active or desire to become economically active (Urban-Econ, 2021). The life expectancy in the Tokologo LM has increased from 59.7 years in 2016 to 60.7 years in 2019.

(c) Crime Statistics

Crime statistics indicate a reduction in crime levels from 2018 to 2020 (**Table 5-12)**. The number of serious crimes, common robbery and property-related crimes is decreasing. Cases related to sexual offences has increased since 2018.

Table 5-12: Tokologo LM crime statistics (source, Urban-Econ, 2021)

Crime	2018	2019	2020
Serious crimes	939	892	861
Murder	6	11	6
Sexual offences	34	46	60
Common robbery	9	7	10
Property-related crimes	302	305	255

(d) Economy

The Tokologo LM Gross Value Add (GVA) shows an average growth rate of 1.8% per year. The Tokologo LM is the smallest contributor to the LDM GVA, contributing R2.17 million in 2020 (3% of the LDM GVA). The downward trends indicates that the majority of the working population is not economically active. Due to the positive GVA growth rate, the Springhaas Solar PV facilities could result in the local economy creating new employment opportunities in the area.

The local economy is dominated by the services sector (52%), with the second largest contributor being agriculture, forestry and fishing (32%). In general, the primary and tertiary sectors are the drivers of economic growth in the area.

(e) Labour Force and Employment Structure

In 2020, the Working Age Population was around 20,049 people, of which 42% were not economically active and 9% were unemployed (**Figure 5-16**). A relatively small portion of the

labour force is employed as either semi-skilled (14%) or low skilled (16%) workers (refer to **Figure 5-16**). Thus, the labour force in the Tokologo LM is relatively skilled with a smaller portion of the labour force employed informally or with low-skill levels.

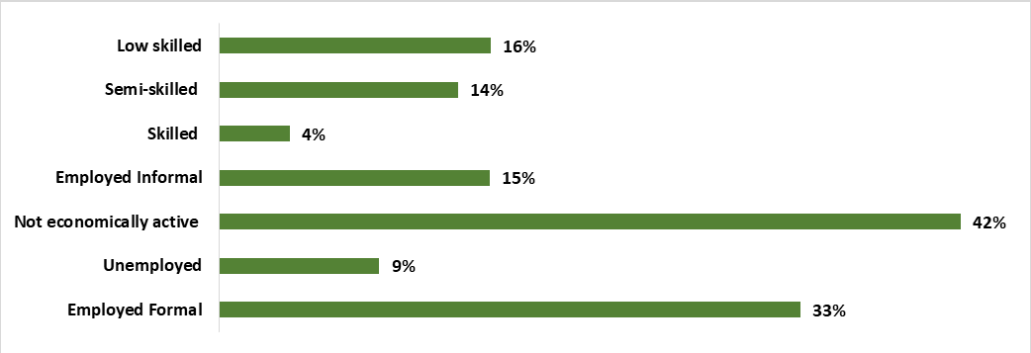


Figure 5-16: Labour force profile for Tokologo LM (source, Urban-Econ, 2021)

The tertiary sector is the largest employer in the Tokologo LM, 54% of the employed population. The primary, secondary and tertiary sectors also indicate an overall decline in employment between 2016 and 2020, indicating about 726 jobs lost over the period. This shows that the municipal area would benefit from the Springhaas Solar PV facilities employment opportunities (Urban-Econ, 2021).

(f) Income Level and Education

The average annual household income in the Tokologo LM is estimated to be R15,000 per month. The low average monthly household income may be attributed to the large portion of households which have no income (10.2%). The Tokologo LM is not considered the economic hub of the Lejweleputswa DM which can help explain the low household income patterns observed.

A large portion of the population have unspecified levels of education (22.0%), a further 28.5% have no schooling. This indicates that the majority of the population are relatively well educated and therefore likely to work as skilled or semi-skilled labour.

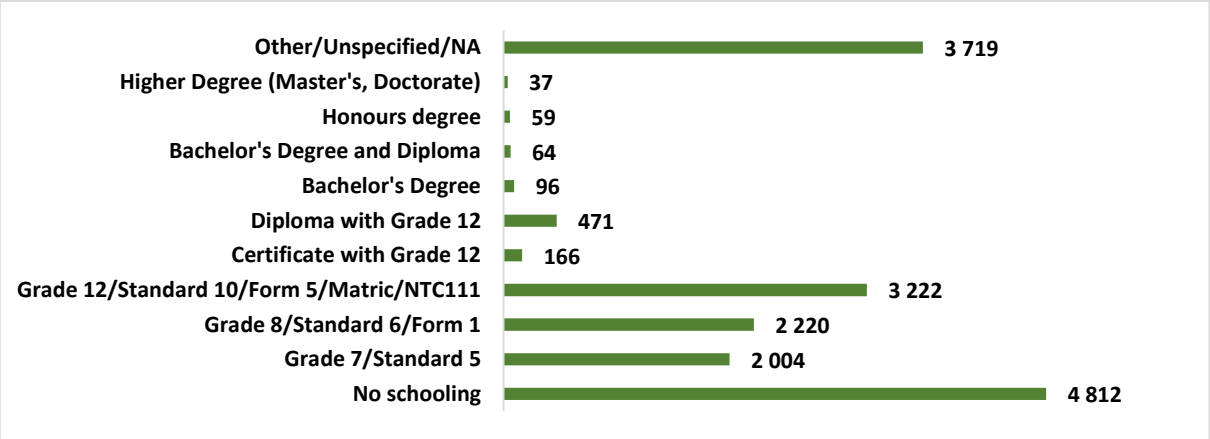


Figure 5-17: Tokologo LM levels of education for 2020 (source, Urban Econ, 2021)

(g) Access to Basic Services

The majority of households have access to piped water (85.5%) and electricity (84.1%). Access to sanitation (18.4%) and refuse removal (45.7%) are both low and well below the district and national average (**Figure 5-18**). It can be deduced that the level of service delivery in the areas is relatively poor and unreliable.

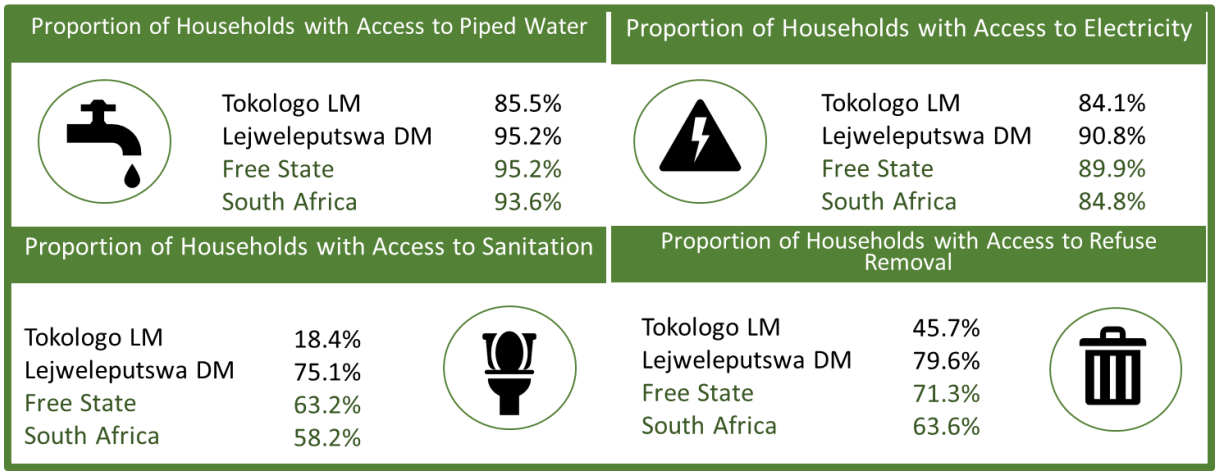


Figure 5-18: Access to basic services, 2020 (Source, Urban Econ 2021)

5.10 Visual

A Landscape and Visual impact assessment was undertaken by Afzelia Environmental Consultants & Environmental Planning and Design in 2022. The information below has been sourced from this report. A copy of the full report is attached in **Appendix F8.**

The site is relatively flat and slopes from north to south towards the Modder River. The vegetation on site is also relatively low and there are few built elements.

The study area for the Visual Impact Assessment extended 11.3km from the edge of the site. In order to align with the precautionary principal, the distance is based on the height of the tallest elements of the development. In this case the collector substation which has busbars which are up to 10m in height, noting that only SPH3, SPH4 and SPH8 have a collector substation.

The land cover in the study area can be described by the following four categories.

- The unirrigated cultivation which occurs largely to the north and south of the study area.
- Irrigated cultivation which occurs largely in a band either side of the Modder River which flows approximately 4km to the south of the proposed site area;
- Natural grassland which is interspersed with areas of cultivation but is largely uninterrupted by cultivation in the vicinity of the proposed site. In this area however, probably due to the lack of landscape transformation, it is punctuated by natural drainage pans; and

- Settlement that occurs in the form of isolated homesteads throughout the study area that are generally related to agricultural uses and the urban area of Dealeseville which is located to the north of the study area (Afzelia, 2022).

Roads in the study area include the R64 which links Boshof and Dealesville to Bloemfontein. The road is located approximately 11.3km from the site at its closest point. This road has minor recreation and tourism use but is not considered a major tourism link.

A number of unsurfaced local roads, including roads which run close to the eastern and western boundaries, link Dealesville to the S264 which run close to the Modder River to the south.
The landscape character areas can be split into four distinct areas:

- **Cultivated Rural Landscape Character Areas**. This area has gently undulating topography and a predominance of cultivated fields that are generally separated by areas of natural grassland. This is a relatively open landscape with little VAC which is only provided by minor ridgelines and alien vegetation;
- **Natural Grassland Landscape Character Areas**. This area has gently undulating topography and a predominance of natural drainage pans separated by areas of natural grassland. This is a relatively open landscape with little VAC which is only provided by minor ridgelines and alien vegetation;
- **Modder River Corridor Landscape Character Area**. The river is located within a slightly depressed river channel which is lined with tall woody vegetation. Agriculture close to the river is generally irrigated. This character area has significant VAC that is provided by the depressed river channel as well as the adjacent woody vegetation; and
- **The Urban LCA**. This area is comprised entirely of the urban area of Dealesville. VAC is generally high, with views of the surrounding landscape only possible from the urban edges.

The following Receptors within the landscape were noted:

- Area receptors – the town of Dealesville, 11km north-east of the site, the Krugersdrift Dam, 25km east of the site.
- Point receptors – local farmsteads and homesteads within the surrounding landscape.
- Linear receptors – the R64 and unsurfaced roads which run through the study area. These appear to have little tourism/ recreational importance.

High voltage overhead powerlines are common in the area. The Nielsview Nature Reserve is located immediately to the south of the study area. The section of the reserve which borders the site is comprised of grassland and does not appear to be a significant visitor attraction in its own right.

5.10.1 Cultural Landscape

The cultural landscape was assessed in the Heritage Impact Assessment **(Appendix F7).**
The landscape is strongly rural in nature. Occasional arable lands occur, including a centre pivot field within the study area, but the vast majority is grassland used for grazing.

The cultural landscape features scattered homesteads – either occupied, unoccupied and derelict, or completely ruined archaeological sites – in a sea of grass. These homesteads are often, but not always, marked by groves of trees. The older and more ruined ones do not always have associated trees (ASHA, 2022).

5.11 Noise Generation

The noise levels on the site are low, the site is used for livestock grazing with some areas of cultivation in the broader study area. The site is well removed from major roads and surrounding areas are also used for agriculture.

5.12 Cultural and Heritage

5.12.1 Archaeology and Cultural Heritage

In terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a development area larger than 5 000m^2 requires that a Heritage Impact Assessment (HIA) is conducted prior to the development, thereof. ASHA Consulting undertook a Heritage Impact Assessment for the proposed Springhaas Solar PV facilities in 2021. A copy of the HIA is available in **Appendix F7**. A description of the baseline from the HIA is summarised below.

(a) Stone Artefacts

Stone Age material occurs widely across southern Africa, while the Iron Age, which only occurred within the last 2,000 years, is present only in the eastern parts where summer rainfall allowed for the cultivation of summer crops (ASHA, 2021).

Stone artefacts were observed in a number of places across the site, most of which were associated with water. Three background scatter artefacts associated with dolerite gravel were found away from a water source. These were likely middle stone age (MSA) in age. A single MSA artefact was also seen on a dolerite ridge in the western part of the study area.

All the other artefacts observed on site were younger in age and likely from the late stone age (LSA) (**Figure 5-19**).

Figure 5-19: Hornfeld artefacts (source, ASHA, 2021)

Rocks with evidence of grinding ascribable to the LSA were noted on the dolerite ridge on site and a single MSA was also noted. The dolerite ridge is located outside the boundary of the solar PV facilities.

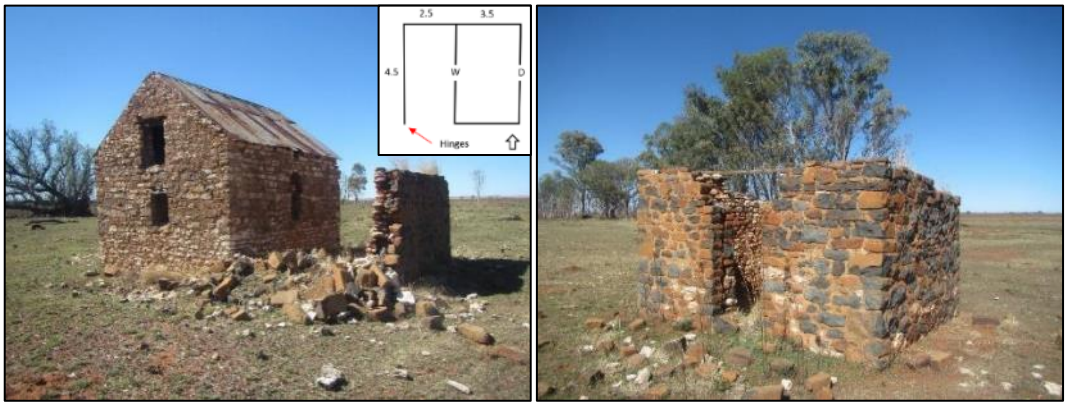
(b) Archaeological Sites

More commonly encountered were historical archaeological sites. Historical glass and ceramics were found at the entrance of an animal burrow in an earthen-walled dam. A number of ephemeral remains of older structures were also seen. These structures would have related to earlier farm complexes in the area most likely from the 19th century, with some possibly from the early 20th century. Historical artefacts were largely absent from the other sites.

Fairly extensive stone walling was located in the dolerite ridge on site consisting of double skin stone walled enclosures and single lines of stone.

A number of water reservoirs were seen on site. These are hollows in the ground that have been lined with rocks, and presumably also clay which has now weathered away, and their age post-dates the mid-19th century.

Several historical farm complexes from the 19th and 20th century were observed on site. These structures were in varying states of repair. Structures included houses/ cottages, farm complex remnants, sheds, walled structures, wells and kraals (**Figure 5-20**).



`Figure 5-20: Examples of structures on site (source, ASHA, 2021)

(c) Engravings/ Graffiti

Engravings/ graffiti, names and an indeterminate motif (**Figure 5-21**) were found on the dolerite ridge on site. The dolerite ridge is beyond the proposed limits for the development footprint. The age of these engravings is unknown, if they are younger than 100 years which may be the case they are not considered as archaeology under the NHRA.

Figure 5-21: Historical hand pecked graffiti (source, ASHA, 2021)

(d) Graves

Graves (**Figure 5-22**) were seen in four locations and another possible grave in an additional location. Graves ranged from simple stone-packed mounds to formalised graves with carved headstones.

Figure 5-22: Examples of graves observed on site

(e) Grading of Heritage Resources

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), ''cultural significance'' means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The heritage resources found on site were graded according to the requirements of the NHRA. Heritage resources were graded and mapped (**Figure 5-23**). None of the graded heritage resources are located within the proposed development footprint.

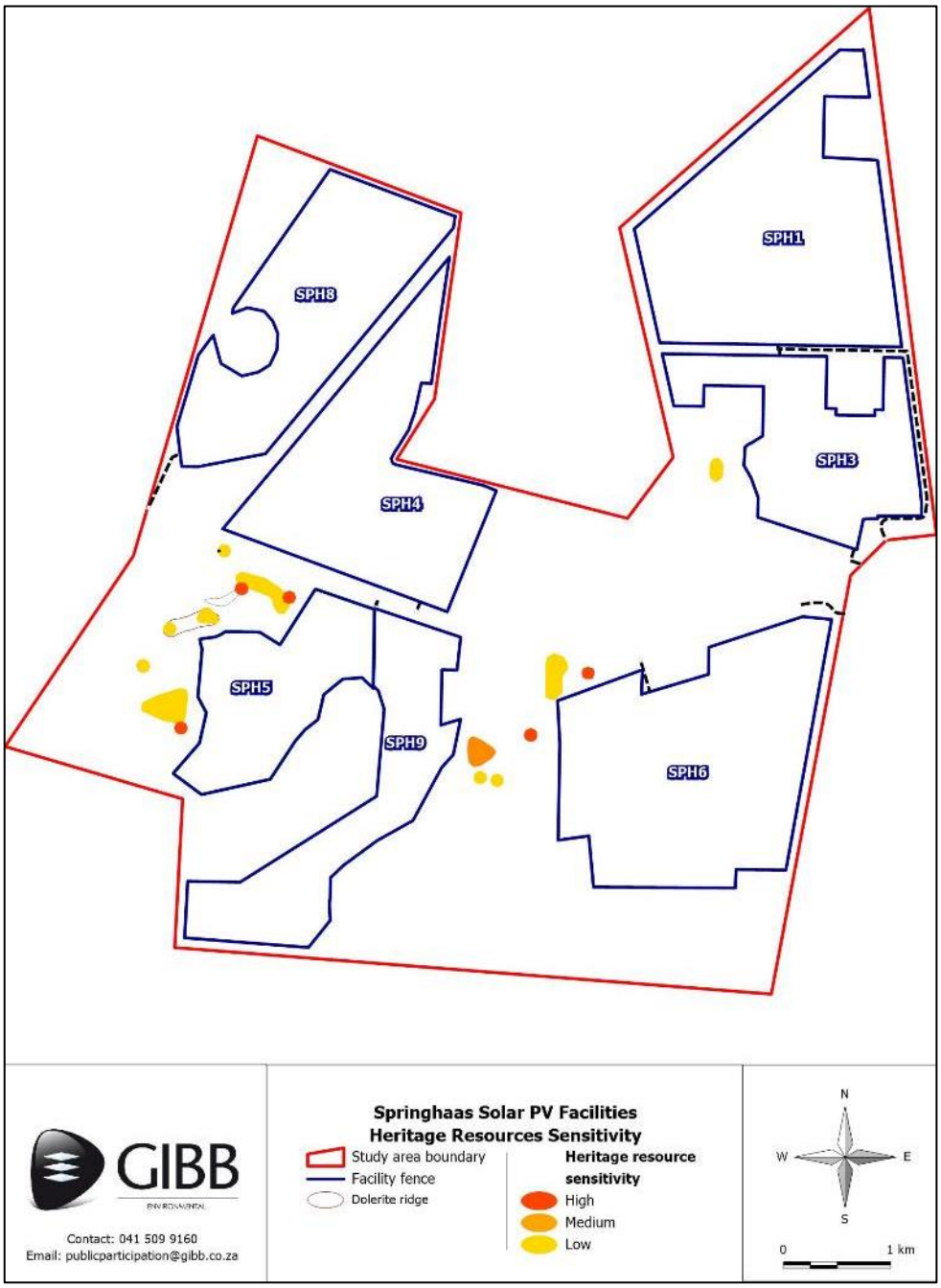


Figure 5-23: Heritage resource distribution and sensitivity (data provided by ASHA)

5.13 Palaeontological Impact Assessment

A Phase 1 Paleontological Impact Assessment was undertaken in 2021 (**Appendix F9**) by Professor Marion Bamford.

The project is located in the north central part of the Karoo Basin where Karoo Supergroup rocks (**Figure 5-24)** cover a very large proportion of South Africa and have preserved a diversity of fossil plants, insects, vertebrates and invertebrates (Bamford, M. 2021).

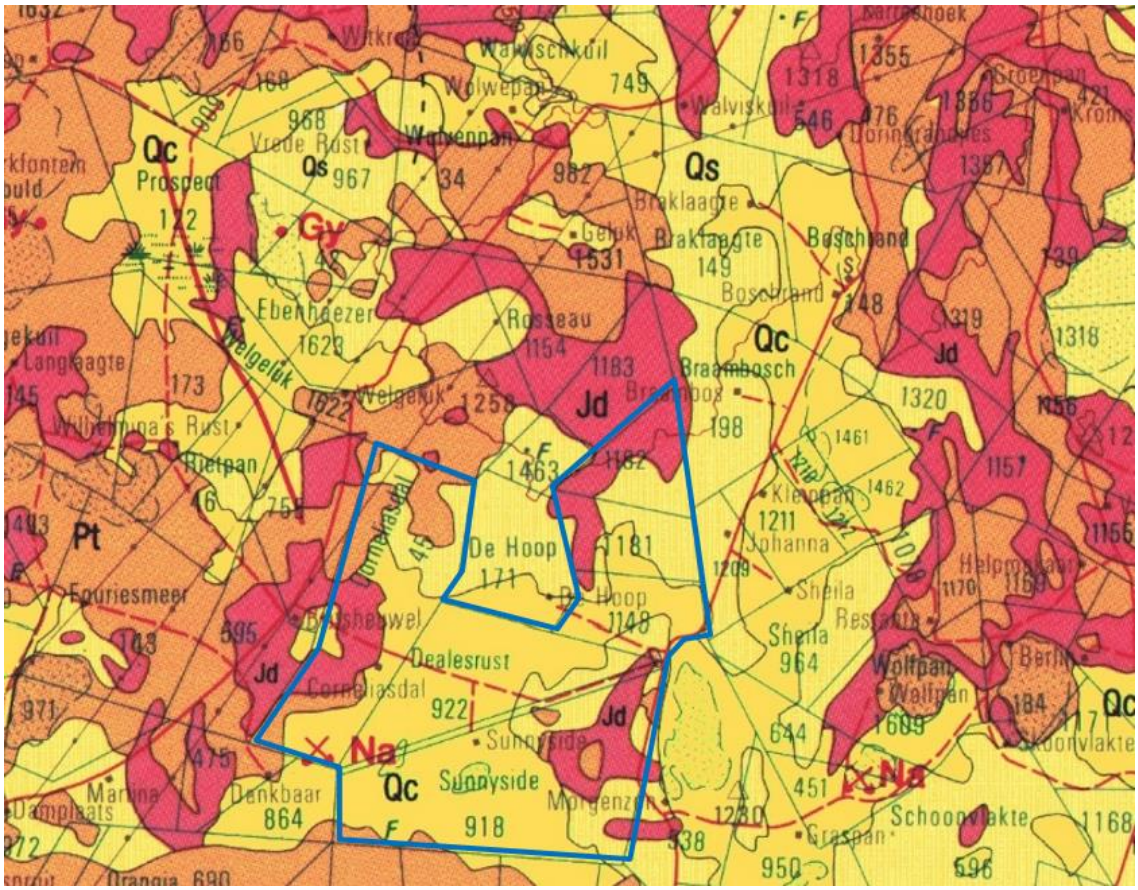


Figure 5-24: Geological map of the study area. The location of the proposed project is indicated within the blue polygon. Map enlarged from the Geological Survey 1: 250 000 map 2824 Kimberley (sourced from Bamford, M. 2021)

Table 5-13: Explanation of symbols for the geological map and approximate ages (Johnson et al., 2006; Matmon et al., 2015; Partridge et al., 2006). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project (source, Bamford, M. 2021)

Symbol	Group/Formation	Lithology	Approximate Age
Qs	Quaternary	Alluvium, sand, calcrete	Quaternary, ca 1.2 – 1.0 Ma
Qc	Kalahari sands	Calcrete. Calcified pan dune	Quaternary, ca 1.2 – 1.0 Ma
Jd	Jurassic dykes	Dolerite dykes, intrusive	Jurassic, approx. 180 Ma
Pt	Tierberg Fm, Ecca Group, Karoo SG	Shales, siltstones, sandstone,	Early Permian, ca 290 Ma

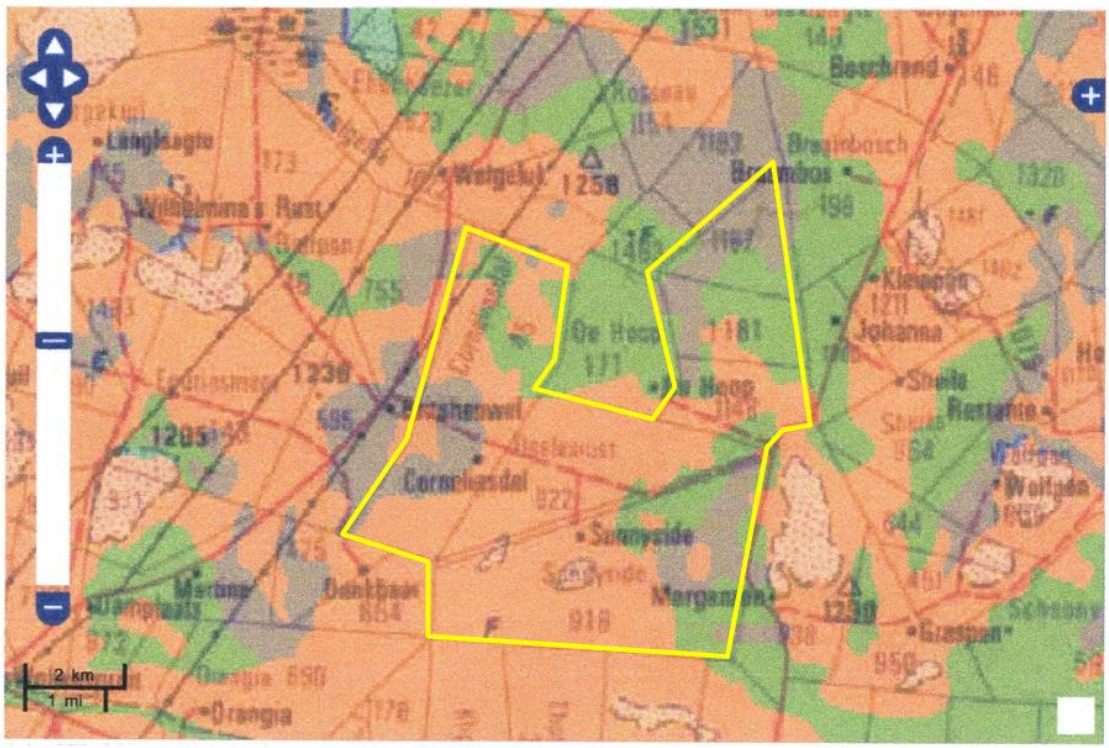


Figure 5-25: SAHRIS PalaeoSensitivity map for the site for the proposed Dealesville Springhaas PV project shown within the yellow polygon. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero (source Bamford, M. 2022)

The PalaeoSensitivity map (**Figure 5-25**) indicates are of high palaeontological sensitivity (orange), moderate sensitivity (green) and low sensitivity (blue). No fossils were observed on site during fieldwork. The entire study area, including the pans and associated dunes, was surveyed by the project archaeologist for archaeological artefacts and fossils. undertaken by the Archaeologist. Based on this, the site as a whole can be considered to be of low paleontological significance.

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the aeolian sands of the Quaternary but might be trapped in pans or their associated dunes, all of which are avoided by the proposed facilities. There is a very small chance that trace fossils may occur in the shales of the early Permian Tierberg Formation so a Fossil Chance Find Protocol (see Section 8 below) should be added to the EMPr (Bamford, M, 2022). The Fossil Chance Find Protocol has been added to the EMPr (**Appendix I**).

5.14 Road Network

A Transport Impact Assessment was undertaken by JGAfrika (2022) (**Appendix F12**).
The study area is bounded by two secondary roads S266 and S322. These are gravel roads are Free State provincial roads and the ownership of the roads reside with the Department of Police, Roads and Transport.

6 Site Sensitivity Verification

6.1 DFFE Screening Tool

A Screening Report for the proposed Springhaas Solar PV facilities was generated, using the online DFFE Screening Tool, in August 2021. A copy of the Screening Report generated by the online tool is available in **Appendix C.**

Table 6-1 lists the sensitivities of the proposed development area as per the Screening Tool and a description of how the theme has been addressed in the BA process.

Table 6-1: Environmental sensitivity as per DFFE screening report

Theme	Sensitivity	Approach in BAR
Agricultural	**Very high**	A specialist was appointed to undertake an Agricultural Assessment **(Appendix F1).** It was established that a Compliance Statement is the appropriate level of assessment and reporting. The assessment was undertaken in accordance with the Protocol published in GN 320 of 20 March 2020.
Animal species	**High**	A specialist was appointed to undertake a Terrestrial Biodiversity and Animal Species Assessment **(Appendix F13)** and the species likely occur on site are described therein.
Aquatic biodiversity	**Very high**	A specialist was appointed to undertake an Aquatic Biodiversity and Species assessment **(Appendix F2).** This assessment was undertaken in accordance with the Protocol published in GN 320 of 20 March 2020.
Archaeological and cultural heritage theme	**Low**	A specialist was appointed to undertake a Heritage Impact Assessment **(Appendix F7).** This was assessed in conjunction with a palaeontological impact assessment **(Appendix F9).** As the site triggers Section 38 of the National Heritage Resources Act as Heritage Impact Assessment was required.
Avian	**High**	A specialist was appointed to undertake an Avifauna Impact Assessment **(Appendix F3).**
Bats	**Low**	A specialist was appointed to undertake a Bat Impact Assessment **(Appendix F4).** The distribution range of bats is poorly known in South Africa, particularly for rarer species. A bat impact assessment was undertaken to determine whether any bat SCC were likely to occur on site.
Civil Aviation	**Low**	No specialist study was deemed necessary as this theme was rated as low sensitivity. The South African Civil Aviation Authority (SACAA) and Air Traffic Navigation Services have been included in the I&AP database and will be informed of the application for environmental authorisation.
Defence theme	**Low**	No specialist study was deemed necessary as this theme was rated as low sensitivity. In addition there is no military infrastructure located nearby.
Landscape	**Very high**	A specialist was appointed to undertake a Landscape and Visual Impact Assessment **(Appendix F8)**.
Palaeontology	**High**	A specialist was appointed to undertake a Palaeontological Impact Assessment **(Appendix F9).**
Plant species	**Low**	The terrestrial biodiversity theme was indicated as high, and so the botanical impact assessment was carried out as part of the assessment of impacts on terrestrial biodiversity and this included identification of plant species by virtue of the nature of the assessment, and so plant species have been assessed and considered through the need for another assessment. A specialist was appointed to undertake a Botanical Impact Assessment **(Appendix F5).**

RFI	**Medium**	No specialist assessment was undertaken. The South African Radio Astronomy Observatory (SARAO) has been included in the interested and affected party database and will be informed of the application for environmental authorisation.
Terrestrial biodiversity	**Very high**	A specialist was appointed to undertake a Terrestrial Biodiversity and Animal Species Assessment **(Appendix F13).** This assessment was undertaken in accordance with the Protocol published in GN 320 of 20 March 2020.

The appointed specialists undertook a Site Sensitivity Verification (SSV) to confirm the sensitivity ratings listed in the Screening Report.

Applying the Precautionary Principle, the ratings given (**Table 6-2**) are based on the highest sensitivity rating assigned to a facility. For example, in terms of the Terrestrial Biodiversity Theme, SPH4 is located in natural grassland (medium sensitivity) with areas of past cultivation and heavy cattle use (low sensitivity) but there is a pan in the centre of the site (high sensitivity). The site is therefore rated as high sensitivity. It is important to note that the infrastructure for SPH4 avoids the pan and the pan has been assigned a 250m buffer. No infrastructure is placed within any high sensitivity area as identified by the screening tool with the exception of one small pan in SPH6 (refer to **Figure 6-1**).

6.2 Specialist Sensitivity Ratings

Table 6-2: Specialist sensitivity ratings

Theme	Screening Tool Sensitivity Rating	SPH1	SPH3	SPH4	SPH5	SPH6	SPH8	SPH9	Comments
Agricultural	**Very high**	**Low - medium**	**Low - medium**	**Low – medium**	**Low – medium**	**Low**	**Low - medium**	**Low**	SPH1, SPH4, SPH5 & SP8, 85 – 95% of the area is considered as low sensitivity. Small pockets of medium sensitivity land are situation within areas low sensitivity land. These pockets are not deemed viable for production due to their isolated nature
Animal species*	**High**	**Medium**	**Medium**	**High**	**Medium**	**Medium / High**	**Medium**	**Medium**	SPH4 contains a pan which is rated as high sensitivity. This pan is avoided by the layout. SPH6 contains one small pan which is rated as high sensitivity.
Aquatic biodiversity	**Very high**	**Low**	**Low**	**High**	**Low**	**Low**	**Low**	**Low**	SPH4 contains a pan which is rated as high sensitivity. The pan is avoided by the layout. The areas on which infrastructure will be located in classified as low sensitivity.
Archaeological and cultural heritage theme	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	Low sensitivity rating identified by the Screening Tool is accurate.
Avian	**High**	**Low - medium**	**Low - medium**	**Low - medium**	**Low - medium**	**Low - medium**	**Low - medium**	**Low - medium**	The High sensitivity predicted by the Screening Tool was shown, in reality, to be a Low-Medium sensitivity.
Bats	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	Low sensitivity rating identified by the Screening Tool is accurate.
Civil Aviation	**Low**								N/A, no specialist study necessary
Defence theme	**Low**	.							N/A, no specialist study necessary
Landscape	**Very high**	**Medium**	**Medium**	**Medium**	**Low**	**Medium**	**Medium**	**Low**	The site was mapped as no-go (high sensitivity), sensitive (medium sensitivity) and not sensitive (low sensitivity).
Palaeontology	**High**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	The High sensitivity predicted by the Screening Tool was shown, in reality, to be a Low sensitivity.
Plant species	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	Low sensitivity rating identified by the Screening Tool is accurate.
RFI	**Medium**								N/A, no specialist study necessary.
Terrestrial biodiversity*	**Very high**	**Medium**	**Medium**	**High**	**Medium**	**Medium / High**	**Medium**	**Medium**	The Very High sensitivity predicted by the Screening Tool was shown, in reality, to be a Medium to Medium-High / High sensitivity. The sensitivity rating is based on the highest sensitivity. There are areas of low sensitivity (disturbed areas) across the site.

**Animal Species Theme and Terrestrial Biodiversity Theme ratings are both based on the Faunal and Terrestrial Biodiversity impact assessment findings*

6.3 Sensitivity Mapping

A series of maps have been developed to overlay the environmental sensitivities with the facility boundaries. These maps serve to illustrate how the facility layouts have been designed in response to (and to avoid) environmental sensitivities on site.

6.3.1 Terrestrial Biodiversity Sensitivity

The natural grassland on site has been classified as having a medium sensitivity. This accounts for the majority of the area affected by the seven proposed Solar PV facilities.

The high sensitivity areas, wetlands and pans and the two rocky outcrops have all been avoided by the layout with the exception of a small wetland in SPH6 and a large pan in SPH4. It must be noted that the infrastructure for SPH4 avoids the pan (red), with a 250m no-development buffer (pink) applied to these areas for their protection (refer to **Figure 6-1**). The larger pans and wetlands were given a 250m buffer and the rocky outcrops were assigned a 100m buffer. These buffers have been avoided by infrastructure (refer to **Figure 6-1**).

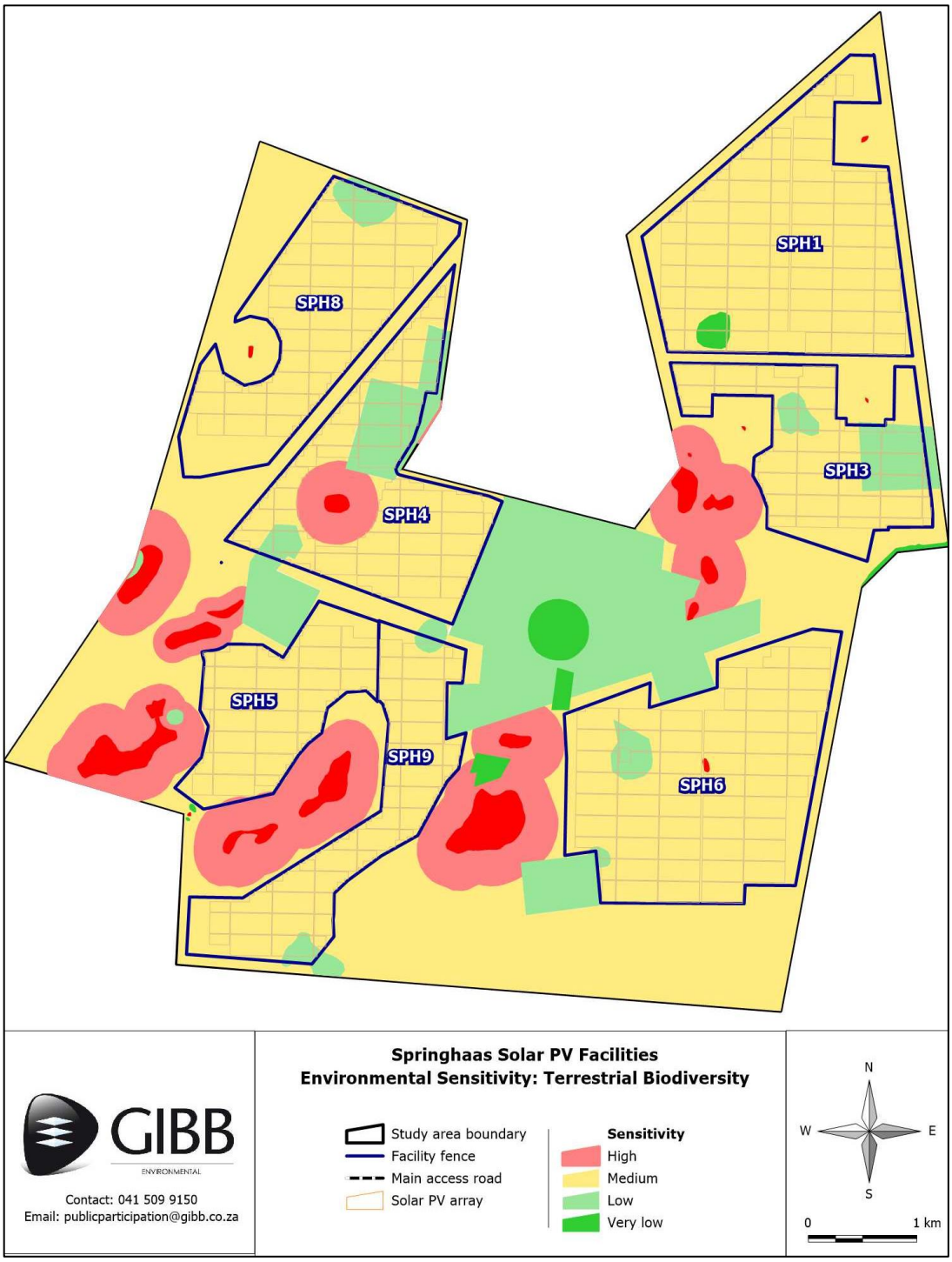


Figure 6-1: Terrestrial biodiversity sensitivity map (data source, Cossypha)

6.3.2 Agricultural Assessment

The agricultural sensitivity was determined based on the soil profile and associated agricultural potential of the proposed development site. The majority of the land covered by the proposed PV facilities was determined to be low sensitivity. SPH1, SPH3, SPH4 and SPH8 do contain sections of medium sensitivity. As these sections of medium sensitivity agricultural land are surrounded by low sensitivity (low value) agricultural land, these areas of medium sensitivity

land are not viable for cultivation (being fragmented and isolated from other areas of medium-high-value agricultural land) (refer to **Figure 6-2**).

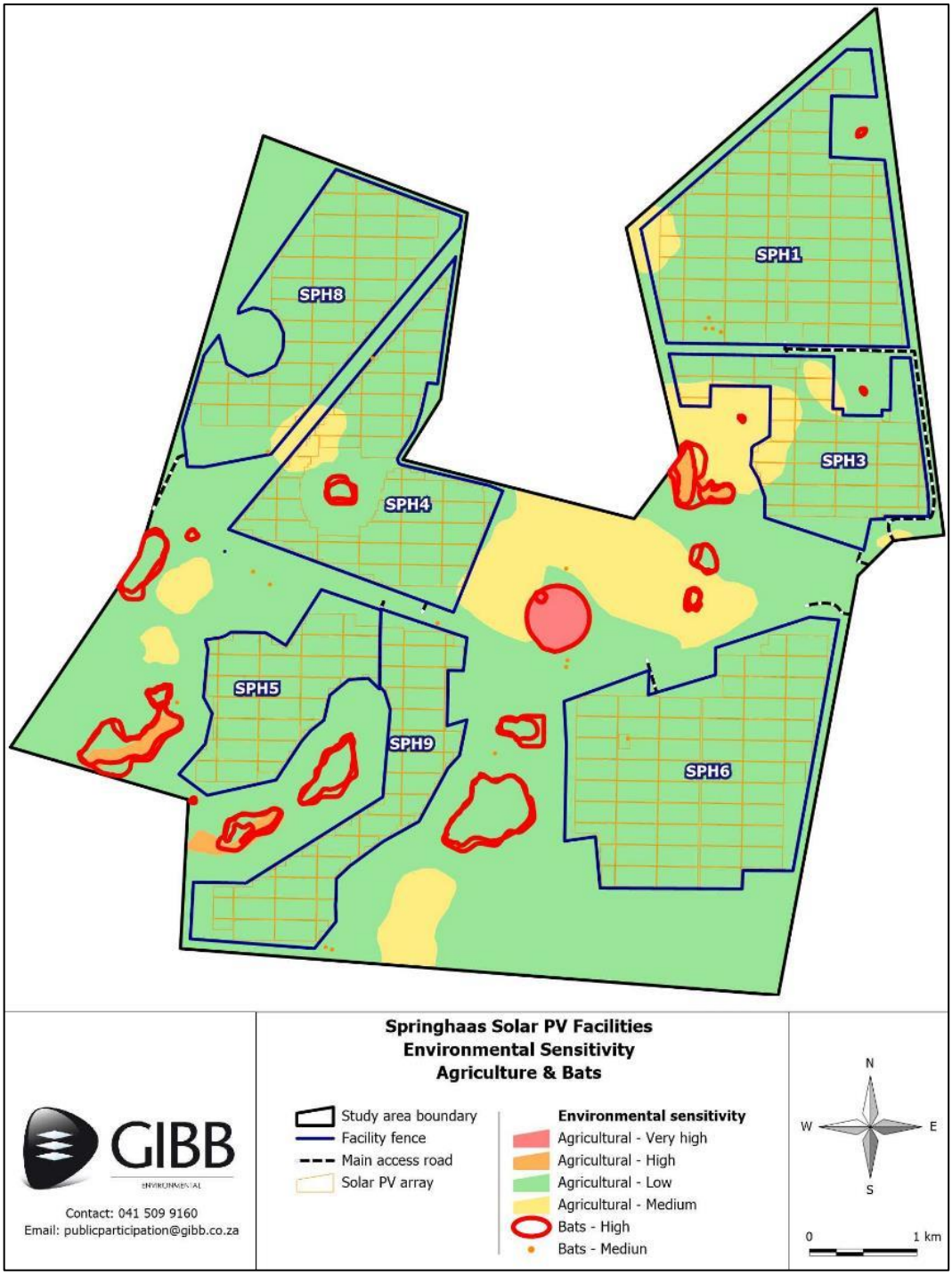


Figure 6-2: Agricultural and bat sensitivity map

6.3.3 Bats

Pans are high sensitivity features for bats as they provide a drinking source and foraging habitat. Man-made features such as drinking troughs and reservoirs also provide a drinking source and foraging habitat and are of medium sensitivity. As can be seen from **Figure 6-2**, the proposed layout avoids all areas of high bat sensitivity with the exception of SPH4. The SPH4

facility boundary encompasses a large pan, however no infrastructure encroaches on the pan or the 250m buffer of the pan (refer to **Figure 1-2**). Some areas of medium bat sensitivity are, however affected by the proposed layout, namely SPH1 and SPH8.

6.3.4 Visual

Highly sensitive areas from a visual perspective are the pans across the site and the southern portion of the site which borders on the Nielsview Nature Reserve. As can be seen from **Figure 6-3**, the proposed layout avoids all areas with a high visual sensitivity.

Areas with a medium visual sensitivity are the ridge lines which typically run north to south across the site, and areas located adjacent to external access roads. All of the facilities, with the exception of SPH5 and SPH9, contain areas of medium sensitivity from a visual perspective. Although the facility footprints encroach on medium sensitivity areas the tallest elements, the collector substation have been placed outside medium sensitivity areas.

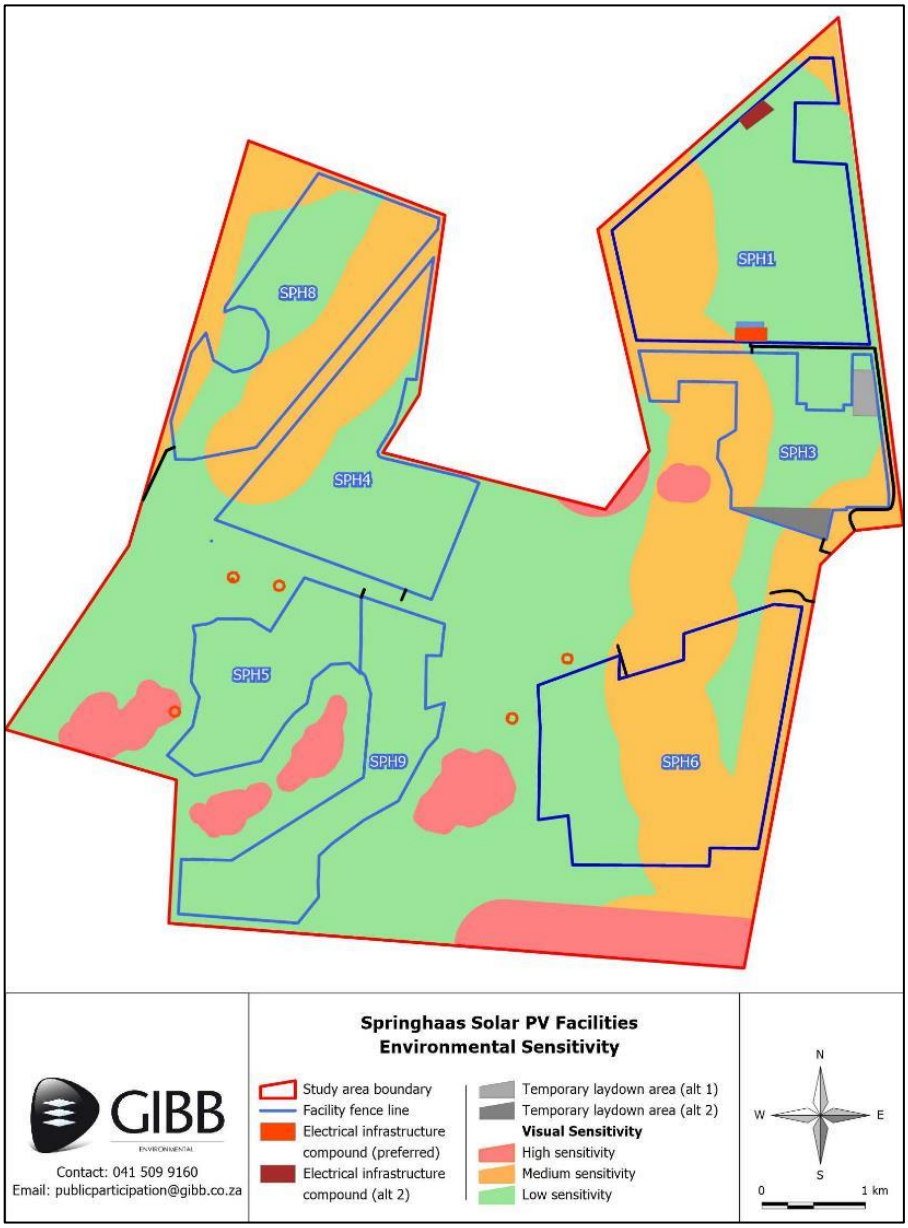


Figure 6-3: Visual and heritage sensitivity

6.3.5 Heritage

As shown in **Figure 6-3**, based on the HIA undertaken for the site, there are no identified high or medium sensitivity heritage resources within the boundary of any of the seven proposed facilities.

6.3.6 Aquatic Biodiversity

The aquatic sensitivity on site ranges from high (the larger pans), to medium (the 250m buffer applied to the pans) and low (broad drainage regions) (refer to **Figure 6-4**). The facilities avoids all high and medium sensitivity areas, with the exception of a small pan in SPH6 and a large the pan located in SPH4. However, as previously explained, none of the SPH4 infrastructure will encroach on the pan or the 250m ecological buffer.

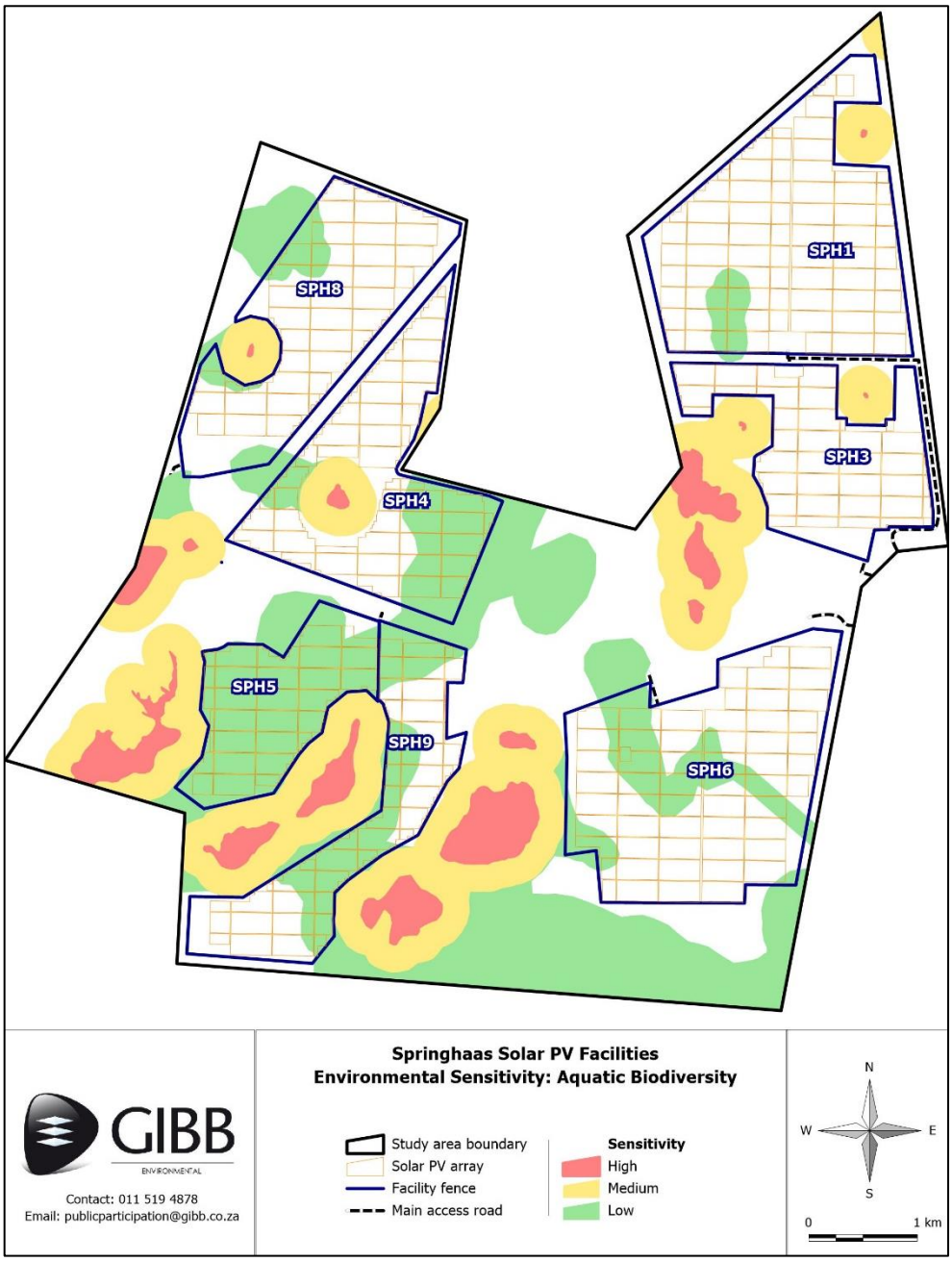


Figure 6-4: Aquatic biodiversity sensitivity

All infrastructure is located beyond the 1:100 year floodline which coincides with the aquatic buffers for larger pans.

6.3.7 Palaeontology

The entire site was classified as having low sensitivity from a palaeontological perspective.

6.3.8 Plant Species (Botanical)

The entire site was classified as having low sensitivity from a botanical perspective.

6.3.9 Geotechnical Conditions

A geotechnical investigation (**refer to Appendix 6 of EMPr in Appendix J**) was undertaken of all seven facilities. No undevelopable areas from a geotechnical perspective occur within any of the facility footprints. Recommendations related to the geotechnical conditions will be incorporated into the detailed design of each facility.

6.3.10 Socio-Economic

No socio-economic sensitivities occur on site or within close proximity to the site which would preclude development.

6.3.11 Health and Safety – BESS

A High Level Safety Health and Environmental Risk Assessment (**Appendix F10**) was undertaken for the BESSs. All of the electrical infrastructure compounds (which contain the BESS) are located in excess of 500m from any farm house. The risks of the BESS on farm houses is therefore negligible

6.3.12 Traffic

There is a good road network in the broader area and the site is well position between two secondary roads the S266 and SS32. There is a need to realign a short section of the existing access road which traverses the study area from east to west to allow for the turning radius of large trucks which will access the site during the construction phase. This access road realignment has been considered in the impact assessment. The fencelines/development footprint of the facilities are also located sufficiently far from the edge of the provincial roads to allow for the statutory 25m wide road reserve.

6.3.13 Aviation

The civil aviation theme was rated as low by the DFFE screening tool. There are no air fields in close proximity to the site. The South African Civil Aviation Authority (SACAA) and Air Traffic Navigation Services have been included in the I&AP database and will be informed of the application for environmental authorisation.

6.3.14 Defence

The defence theme was rated as low by the DFFE screening tool. There is no military infrastructure in close proximity to the site, thus a study was not required.

6.3.15 Radio Frequency Interference

The radio frequency interference (RFI) theme was rated as low. The site is sufficient far enough away from Astronomy Advantage Areas in which the MeerKAT and SKA project are being developed in the Northern Cape Province which are sensitive in terms of RFI.

6.4 Specialist Input into Facility Layouts

Inputs from the specialist team were used to develop the initial facility layouts and to revise them. The main input from the specialists was to avoid the pans on site, and to apply a 250m no-development buffer to these features, since the pans were identified as sensitive features for avifauna, bats, botanical, terrestrial biodiversity, aquatic and landscape and visual aspects. Areas of high agricultural potential such a pivots and cultivated land have been avoided by the layout.

A further input to the layout was made based on the recommendations of the Fauna and Terrestrial Biodiversity Assessment. The study identified rocky outcrops in SPH5 as no-go areas. These rocky outcrops were removed from development footprint of SPH5 and a 100m buffer was applied to them. This layout change was proposed after a number of other specialist reports had been finalised. In these cases the specialists reviewed the new layout and provided a brief statement to confirm if the change affected their study in any way. The reduction in the footprint of SPH5 did not result in a change in impact rating or any new impacts.

The change in layout of SPH5 is shown in **Figure 6-5** below.

As mentioned in Section 6.3.1.1 a realignment to the existing access road, referred to as the eastern access road realignment was required to allow large vehicles to safely access the site.

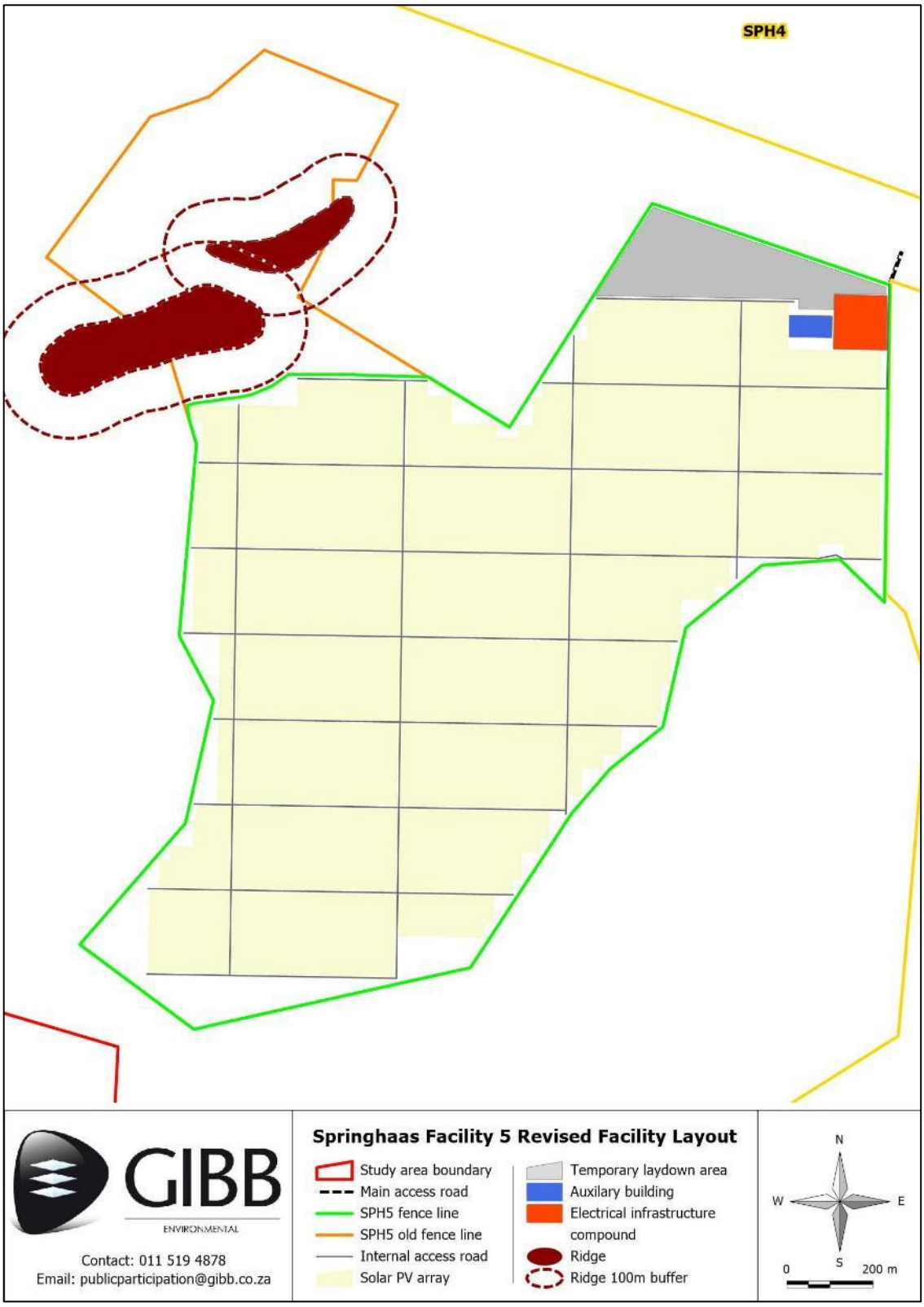


Figure 6-5: Change to SPH5 development footprint