ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
DRAFT SCOPING REPORT

WOODHOUSE SOLAR 2 PV FACILITY, NORTH WEST PROVINCE

NOVEMBER 2015

Prepared for:

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PROJECT DETAILS

Title	:	Environmental Impact Assessment Process Draft Scoping Report: Proposed Woodhouse Solar 2 PV Facility, North West Province.
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Client	:	Genesis Woodhouse Solar 2 (Pty) Ltd
Report Status	:	Draft Scoping Report for Review
Review period	:	13 November 2015 – 14 December 2015

When used as a reference this report should be cited as: Savannah Environmental (2015) Draft Scoping Report: Proposed Woodhouse Solar 2 PV Facility, North West Province.

PURPOSE OF THE SCOPING REPORT

Genesis Woodhouse Solar 2 (Pty) Ltd proposes the construction of a commercial photovoltaic (PV) solar energy facility (known as the Woodhouse Solar 2 PV Facility) as well as associated infrastructure on the Remaining Extent of Farm Woodhouse 729, situated approximately 10km south east of Vryburg. The proposed site falls under the jurisdiction of the Naledi Local Municipality and within the greater Dr Ruth Segomotsi Mompati District Municipality in the North West Province. The contracted capacity of the proposed solar energy facility will be up to 100 MW.

Genesis Woodhouse Solar 2 (Pty) Ltd has appointed Savannah Environmental as the independent environmental consultant to undertake the Environmental Impact Assessment (EIA) for the proposed PV facility. The EIA process is being undertaken in accordance with the requirements of the EIA Regulations of December 2014 (of GNR982) promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This Draft Scoping Report represents the findings of the Scoping Phase of the EIA process and contains the following sections:

» **Chapter 1** provides background to the proposed solar energy facility and the environmental impact assessment process.
» **Chapter 2** describes the components of the proposed project.
» **Chapter 3** outlines the process which was followed during the Scoping Phase of the EIA process.
» **Chapter 4** describes the existing biophysical and socio-economic environment affected by the proposed project.
» **Chapter 5** provides a desktop assessment of the potential environmental and social impacts associated with the development of the PV facility.
» **Chapter 6** presents the conclusions of the scoping evaluation.
» **Chapter 7** describes the Plan of Study for the EIA phase.
» **Chapter 8** provides references used in the compilation of this Scoping Report.

INVITATION TO COMMENT ON THE DRAFT SCOPING REPORT

This **Draft Scoping Report** is available for review from **13 November 2015 – 14 December 2015** at the **Vryburg Public Library**, which lie in the vicinity of the proposed project area**.**

The report is also available for download on:

» www.savannahsa.com

Please submit your comments to
Gabriele Wood of **Savannah Environmental** PO Box 148, Sunninghill, 2157 Tel: 011 656 3237 Fax: 086 684 0547 Email: gabriele@savannahsa.com
The due date for comments on the Draft Scoping Report is **14 December 2015**

Comments can be made as written submission via fax, post or e-mail.

EXECUTIVE SUMMARY

Background

Genesis Woodhouse Solar 2 (Pty) Ltd, an Independent Power Producer (IPP), proposes the establishment of a commercial solar energy facility on the Remaining Extent of the Farm Woodhouse 729, North West Province. The proposed facility will have a generating capacity of up to 100MW and will be known as the Woodhouse Solar 2 PV Facility.

The Woodhouse Solar 2 PV Facility is proposed to accommodate several arrays of tracking or static photovoltaic (PV) panels within the proposed site. From a regional perspective, the greater area is considered favourable for the development of commercial solar electricity generating facilities by virtue of the prevailing climatic conditions (primarily as the economic viability of a solar energy facility is directly dependent on the annual solar irradiation values for a particular area), relief and aspect, the extent of the site, the availability of a direct grid connection (i.e. point of connection to the Eskom National grid) and the availability of land and consent from the landowner to develop. The proposed site for the development of the PV facility is also situated within a Renewable Energy Development Zone (Vryburg REDZ 6) which has been identified as an area earmarked for the development of renewable energy facilities.

An EIA process and public participation process is being undertaken for the development of the PV facility. The nature and extent of the facility, as well as potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this Draft Scoping Report.

Project Location

The Remaining Extent of the Farm Woodhouse 729 (the site) is located approximately 10km south east of Vryburg. The PV facility will be developed within this farm portion. The proposed site falls under the jurisdiction of the Naledi Local Municipality and within the greater Dr Ruth Segomotsi Mompati District Municipality.

Project Components

The PV facility is envisaged to make use of **photovoltaic (PV)** technology with a maximum generating capacity of up to **100 MW** and will include the following infrastructure:

» Arrays of PV panels with a capacity of up to 100MW
» Mounting structures to support the PV panels.
» On-site inverters to convert the power from a direct current to an alternating current and a substation to facilitate the connection between the solar

energy facility and the Eskom electricity grid.

» A new 132kV power line between the on-site substation and the Eskom grid connection point. Three alternatives are being considered for the grid connection:
  - A direct connection to the proposed Eskom Bophirima substation to be constructed on-site, or
  - A direct connection to the existing Mookodi 400/132KV substation located to the west of the site, or
  - A connection to the existing Woodhouse 88/22KV Substation located on the boundary of the site in the north.
» Cabling between the project components, to be laid underground where practical.
» Offices and workshop areas for maintenance and storage.
» Temporary laydown areas.
» Internal access roads and fencing around the development area.

The overarching objective for the solar energy facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. In order to meet these objectives local level environmental and planning issues will be assessed in the EIA process through site-specific studies in order to delineate areas of sensitivity within the broader site which will serve to inform the design of the facility.

Evaluation of the Proposed Projects

The main issues identified through this scoping study associated with the proposed solar energy facility are summarised in **Table 1** below.

As is evident from the table below, the majority of potential impacts identified to be associated with the construction of the Woodhouse Solar 2 PV facility are anticipated to be localised and restricted to the proposed site itself (apart from social impacts – job creation, impacts on ephemeral drainage areas and loss of agricultural land which could have more of a regional negative impact) , while operation phase impacts range from local to regional to national (being the positive impact of contribution of clean energy as part of the energy mix in South Africa).
However, areas of potential environmental sensitivity were identified through the scoping phase. An area expected to be of a very high to high ecological sensitivity within the site is a wetland located in the center of the site. This wetland is classified as a Critical Biodiversity Areas (CBA1) and is considered as a no-go area in terms of the construction of the development. High ecological sensitivity areas within the site is a buffer zone (Ecological Support Area) around the wetland described above as well as wetlands that are classified as CBA 2 areas as well as an Ecological Support Area. Other sensitivities

present on site is potential visual receptors within the surrounding areas of the site as well as specific locations within the site which could possibly contain heritage resources specifically relating to water features

Table 1: Summary of the extent of the potential impacts associated with the Woodhouse Solar 2 PV Facility, as identified at the scoping phase

Construction / Decommissioning Impacts	Extent
Disturbance to and loss of indigenous natural vegetation	L
Disturbance or loss of threatened / protected plants	L
Loss of protected trees	S-L
Loss of habitat for fauna species of conservation concern	L
Disturbance to migration routes and associated impacts to species populations	S-L
Impacts on wetlands	L-R
Impact on Critical Biodiversity Areas	L-R
Establishment and spread of declared weeds and alien invader plants.	L-R
Loss of agricultural land use	L
Soil erosion and loss of topsoil	L
Soil Contamination	L
Disturbance and destruction of archaeological sites and graves.	L
Loss of Palaeontological Heritage	L
Nuisance impacts associated with the generation of noise and dust.	L
Direct employment opportunities and skills development and economic multiplier effects	L-R
Safety and security impacts	L
Impacts on daily living and movement patterns	L
Pressure on economic and social infrastructure impacts from an in-migration of people	L-R

Operational Impacts	Extent
Disturbance, loss or alteration of the species composition (vegetation)	L
Altered runoff patterns due to rainfall interception by PV panels and compacted areas	S-L
Disturbance to migration routes and associated impacts to species populations.	S-L
Increase in mortalities of low-flying and perching birds	L
Impacts on wetlands	L-R
Establishment and spread of declared weeds and alien invader plants.	L-R
Implementation of a tracking/static PV system	L
Loss of agricultural land use	L
Soil erosion	L
Industrialisation of a natural landscape	L
Impact on small holdings located in the surrounding areas	L
Industrialisation of views from the southern edge of Vryburg.	L
Impact of the visibility of the facility to the N14, the N18 and the R34.	L
Impact on farmsteads located in the surrounding areas	L
Nuisance impacts associated with glare including effects on flight paths and adjacent roads.	L
Direct employment opportunities and skills development and economic multiplier effects	L-R
Socio-Economic Development (SED), Enterprise Development (ED) and share ownership in the project company with local communities	L
Development of clean, renewable energy infrastructure	L-R-N
Visual impact and impacts on sense of place	L
Impacts associated with the loss of agricultural land	

S	**Site**	L	**Local**	R	**Regional**	N	**National**

The potentially sensitive areas/environmental features/issues that have been identified for further study include:

» **Ecologically sensitive areas on the site**

Most of the impacts associated with the ecological functioning and features within the site are considered to be probable, although the extent, duration, and magnitude of these impacts can be minimised to levels where these impacts can be regarded as low significance through implementation of appropriate mitigation measures as well as the avoidance of sensitive areas within the site. Probably the most significant impacts that the proposed development will have are the impacts on Critical Biodiversity Areas and Broad-Scale Ecological Processes. The development is located within a Critical Biodiversity Area and the presence of the facility would potentially impact the ecological functioning of the CBA. However, after a site inspection was conducted it was determined that the sensitivity of the majority of the CBA areas within the site is considered as medium-low as a result of previous disturbance that has taken place. These medium-low CBA features include dams, Ecological Support Areas, a CBA corridor and a CBA link. Other CBA features within the site includes hills which are classified as a medium –high sensitivity, drainage lines classified as a medium-high/high sensitivity and wetland areas ranging from a high to very high sensitivity. As the majority of the site is classified as medium-low sensitivity the PV facility can be placed within a suitable location which avoids any major ecological impacts.

This sensitivity analysis is a preliminary assessment that is required to be verified and fully explored in detail during a field visit, which will be undertaken during the growing season (November to April) when the majority of plant species in the area are actively growing. It is important to realise that a field study may reveal more or less areas with high sensitivity, based on localised species composition and habitat configuration.

» **Visual / Social Receptors**

The scoping assessment indicates that there are potential visual receptors located within the surrounding areas of the site proposed for the development of the PV facility. These receptors includes a Semi-rural Landscape Character Area, an Urban Landscape Character Area and particularly the southern edges of Vryburg that overlook the site, the Vryburg airport which is located approximately 5.5km to the west of the proposed site, impacts particularly relate to glare that could extend to flight paths, linear receptors or routes through the area that include the N14, N18 and R34 and point receptors that include isolated and small groups of farmsteads that are generally associated with and located within the Rural Landscape Character Areas.

» **Possible archaeological sensitive areas**

Water bodies present within the site, including wetlands, dams and drainage lines, could potentially be areas where archaeological resources are located. This will have to be investigated further within the EIA phase with the undertaking of a site visit.

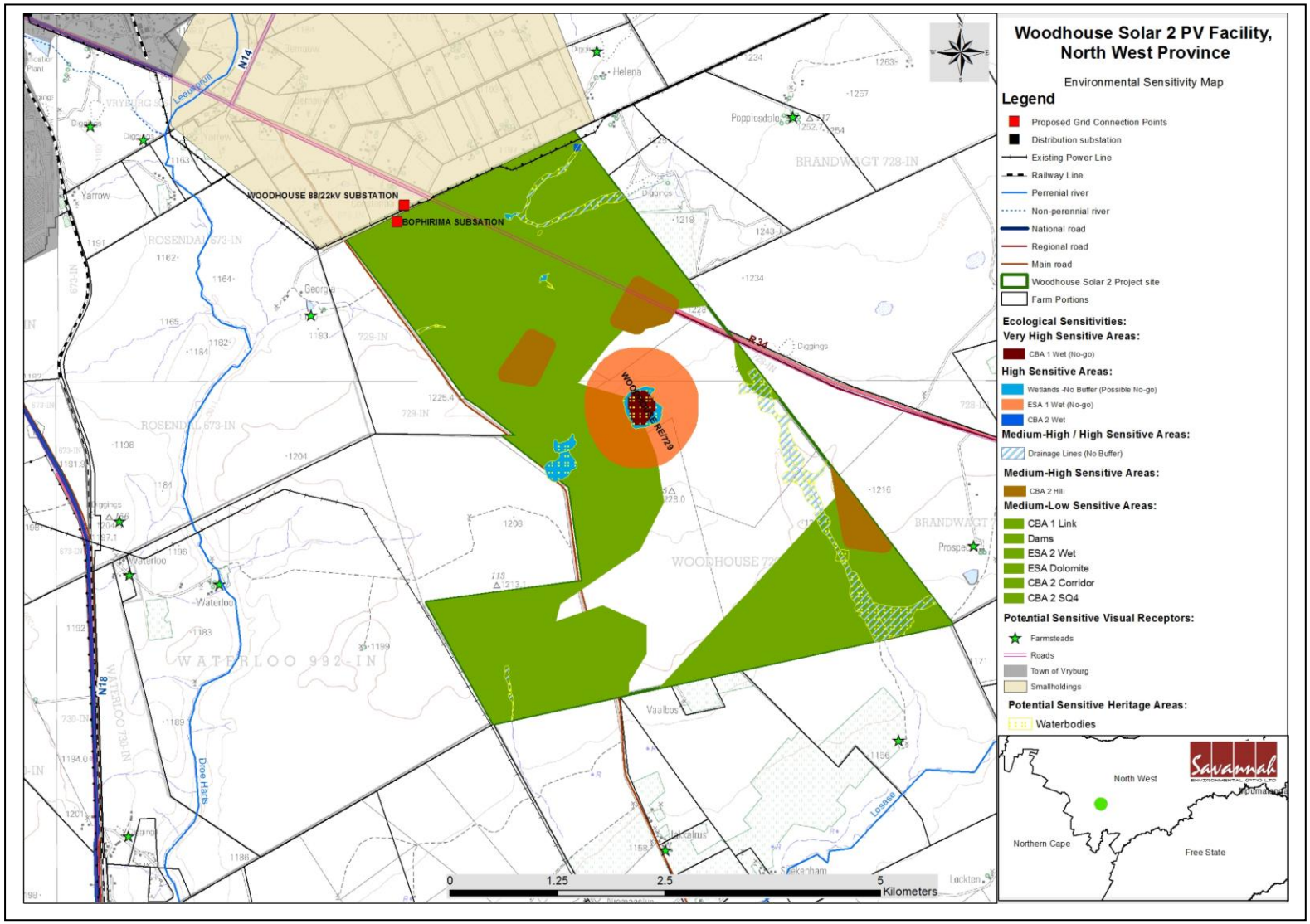

Figure 1: Environmental Sensitivity Map of the proposed Woodhouse Solar 2 PV Facility

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DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Archaeological material: Remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Article 3.1 (*sensu* Ramsar Convention on Wetlands): "Contracting Parties "shall formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory"".(Ramsar Convention Secretariat. 2004. Ramsar handbooks for the wise use of wetlands. 2nd Edition. Handbook 1. Ramsar Convention Secretariat, Gland, Switzerland.) (see http://www.ramsar.org/)

Calcrete: A soft sandy calcium carbonate rock related to limestone which often forms in arid areas.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

Demand-side Management Programme (DSM): A joint initiative between the DME, the National Electricity Regulator (NER) and Eskom which aims to provide lower cost alternatives to generation system expansion by focusing on the usage of electricity. Consumers are incentivised to use electricity more efficiently and at times of the day outside of Eskom's peak periods.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Early Stone Age: A very early period of human development dating between 300 000 and 2.6 million years ago.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

i. the land, water and atmosphere of the earth;
ii. micro-organisms, plant and animal life;
iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and Affected Party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

Late Stone Age (LSA): In South Africa this time period represents fully modern people who were the ancestors of southern African KhoeKhoen and San groups (40 000 – 300 years ago).

Middle Stone Age (MSA): An early period in human history characterised by the development of early human forms into modern humans capable of abstract though process and cognition 300 000 – 40 000 years ago.

Midden: A pile of debris or dump (shellfish, stone artefacts and bone fragments) left by people after they have occupied a place.

Miocene: A geological time period (of 23 million - 5 million years ago).

National Integrated Resource Plan (NIRP): Commissioned by NERSA in response to the National Energy Policy's objective relating to affordable energy services, in order to provide a long-term, cost-effective resource plan for meeting electricity

demand, which is consistent with reliable electricity supply and environmental, social and economic policies.

Natural properties of an ecosystem (*sensu* Convention on Wetlands): Defined in Handbook 1 as the "…physical, biological or chemical components, such as soil, water, plants, animals and nutrients, and the interactions between them". (Ramsar Convention Secretariat. 2004. Ramsar handbooks for the wise use of wetlands. 2nd Edition. Handbook 1. Ramsar Convention Secretariat, Gland, Switzerland.) (see http://www.ramsar.org/)

Palaeontological: Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Pleistocene: A geological time period (of 3 million – 20 000 years ago).

Pliocene: A geological time period (of 5 million – 3 million years ago).

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Sustainable Utilisation (*sensu* Convention on Wetlands): Defined in Handbook 1 as the "human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations". (Ramsar Convention Secretariat. 2004. Ramsar handbooks for the wise use of wetlands. 2nd Edition. Handbook 1. Ramsar Convention Secretariat, Gland, Switzerland.) (refer http://www.ramsar.org/).

Structure (historic): Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.

ABBREVIATIONS AND ACRONYMS

BID	Background Information Document
CBOs	Community Based Organisations
CDM	Clean Development Mechanism
CO_2	Carbon dioxide
DEA	National Department of Environmental Affairs
DMR	Department of Mineral Resources
DOT	Department of Transport
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
GWh	Giga Watt Hour
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEP	Integrated Energy Planning
km^2	Square kilometres
kV	Kilovolt
m^2	Square meters
m/s	Meters per second
MW	Mega Watt
NEMA	National Environmental Management Act (Act No 107 of 1998)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NGOs	Non-Governmental Organisations
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework
SIA	Social Impact Assessment
ZVI	Zone of visual influence

INTRODUCTION CHAPTER 1

Genesis Woodhouse Solar 2 (Pty) Ltd propose the construction of a commercial photovoltaic (PV) solar energy facility (known as the Woodhouse Solar 2 PV Facility) on the Remaining Extent of Farm Woodhouse 729, situated south east of Vryburg (refer to **Figure 1.1**). The proposed site falls under the jurisdiction of the Naledi Local Municipality and within the greater Dr Ruth Segomotsi Mompati District Municipality in the North West Province. The contracted capacity of the solar energy facility will be up to 100 MW.

From a regional perspective, the greater Vryburg area is considered favourable for the development of commercial solar electricity generating facilities by virtue of the prevailing climatic conditions (primarily as the economic viability of a solar energy facility is directly dependent on the annual solar irradiation values for a particular area), relief and aspect, the extent of the site, and the availability of a direct grid connection (i.e. point of connection to the Eskom National grid). The proposed site is also situated within a Renewable Energy Development Zone (Vryburg REDZ) which has been earmarked for the development of Renewable Energy Facilities within South Africa

The proposed facility is planned to be bid into the Department of Energy's Renewable Energy Independent Power Producers Procurement (REIPPP) Programme with the aim of evacuating the generated power into the Eskom national electricity grid and aiding in the diversification and stabilisation of the country's electricity supply.

The nature and extent of this facility, as well as potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this Scoping Report.

1.1. Legal Requirements as per the EIA Regulations, 2014

This Scoping report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(a)(i) the details of the EAP who prepared the report and (ii) the expertise of the EAP to carry out scoping procedures; including a	The details and expertise of the EAP who has undertaken this scoping report is included in section 1.3 of the chapter and

curriculum vitae	Appendix A of this scoping report.
(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 and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties	The location of the proposed PV facility is included in section 1.2, and within Table 1.1 of this chapter
(c) a plan which locates the proposed activity or activities applied for 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	A locality map illustrating the proposed site for the development of the PV facility is included under section 1.2 as Figure 1.1 of this chapter and in Appendix B of this scoping report. (The alternative power line routes (linear activity) will be assessed within the EIA phase of the projects). All other maps relating to the project are also included in Appendix B.

1.2. Overview of the project

The Remaining Extent of the Farm Woodhouse 729 has been identified by the developer as a suitable site which has the potential for the development of a solar energy facility. The identified site is located approximately 10 km south east of the town of Vryburg in the North West Province. Access to the site is possible via the regional road (R34) which traverses the northern portion of the site. Alternatively, access can be gained via the national route (N18) situated to the west of the site or a secondary main road traversing the western portion of the site. The facility footprint will occupy an area of 300 hectares. The broader site considered for the development is approximately 2263 hectares in extent, allowing sufficient space to avoid any major environmental sensitivities which may be identified within the site. It can therefore be anticipated that the PV panels and the associated infrastructure of the facility can be placed at appropriate locations within the boundaries of the site to avoid any identified environmental sensitivities or constraints identified through the EIA process.

The exact location of the facility within the farm portion is not explicitly defined at this stage, but will be defined and assessed during the EIA Phase. Therefore, the full extent of the broader farm portion, identified as the Remaining Extent of the Farm Woodhouse 729, and referred to as the site, has been considered within this Scoping Report. On the basis of the findings of the Scoping Study, the solar PV facility and associated infrastructure can be appropriately designed and sited taking environmental and any other identified constraints into consideration.

Table 1.1: A detailed description of the farm Woodhouse 729

Province	North West Province
District Municipality	Dr Ruth Segomotsi Mompati District Municipality
Local Municipality	Naledi Local Municipality
Ward number(s)	5
Nearest town(s)	Vryburg, Huhudi, Delareyville, Stella and Schweizer-Reneke
Farm name(s) and number(s)	Woodhouse 729
Portion number(s)	Remaining Extent
SG 21 Digit Code (s)	T0IN00000000072900000
Current zoning	Agricultural

Photovoltaic (PV) technology is proposed to be utilised for the generation of electricity. The Woodhouse Solar 2 PV facility will have a contracted capacity of up to 100MW. The facility will include the following infrastructure:

» Arrays of PV panels with a capacity of up to 100MW
» Mounting structures to support the PV panels.
» On-site inverters to convert the power from a direct current to an alternating current the power and a substation to facilitate the connection between the solar energy facility and the Eskom electricity grid.
» A new 132kV power line between the on-site substation and the Eskom grid connection point. Three alternatives are being considered for the grid connection:
    - A direct connection to the proposed Eskom Bophirima substation to be constructed on-site, or
    - A direct connection to the existing Mookodi 400/132KV substation located to the west of the site, or
    - A connection to the existing Woodhouse 88/22KV Substation located on the boundary of the site in the north.
» Cabling between the project components, to be laid underground where practical.
» Offices and workshop areas for maintenance and storage.
» Temporary laydown areas.
» Internal access roads and fencing around the development area.

The power line routes to be constructed for the distribution of the generated solar power to the national electricity grid will be situated either within the Remaining Extent of the Farm Woodhouse 729 or outside of the property depending on the final grid connection point(s) identified for the facility. If either the existing Woodhouse Substation or the authorised Bophirima Substation is identified as the grid connection point for the facility the power line routes would most likely be located within the Remaining Extent of the Farm Woodhouse 729. If the Mookodi Substation, located to the west of the site, is identified as the grid connection

point for the facility then the power line routes will fall outside of the site. The alternative power line routes for the facility will be assessed in detail within the EIA phase of the projects.

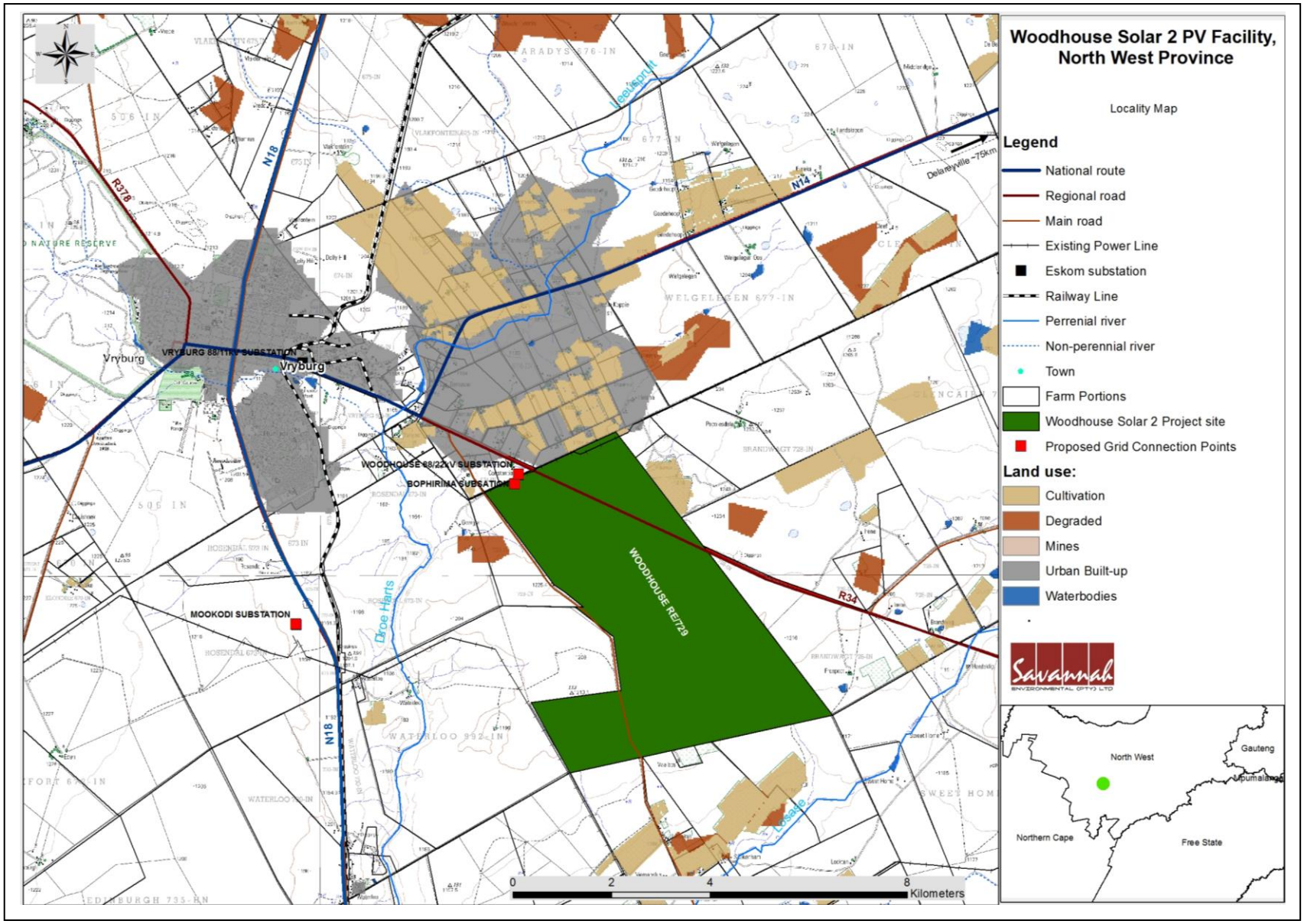

Figure 1.1: Locality map illustrating the location of the project site on the Remaining Extent on the Farm Woodhouse 729.

The overarching objective for the Woodhouse Solar 2 PV facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. In order to meet these objectives, local level environmental and planning issues will be assessed through the EIA with the aid of site-specific specialist studies in order to delineate areas of sensitivity within the site; this will serve to inform and optimise the design of the facility.

1.3. Requirement for an Environmental Impact Assessment Process

The construction and operation of the proposed Woodhouse Solar 2 PV facility is subject to the requirements of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA) 107 of 1998. This section provides a brief overview of the EIA Regulations and their application to this project.

NEMA is the national legislation that provides for the authorisation of 'listed activities'. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these activities must be considered, investigated, assessed and reported on to the competent authority that has been charged by NEMA with the responsibility of granting environmental authorisations. As this is a proposed electricity generation project and thereby considered to be of national importance, the National Department of Environmental Affairs (DEA) is the competent authority[1] and the North West Department of Rural, Environmental and Agricultural Development (READ) will act as a commenting authority.

The need to comply with the requirements of the EIA Regulations ensures that the competent authority is provided with the opportunity to consider the potential environmental impacts of a project early in the project development process and to assess if potential environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental specialist studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision. Genesis Woodhouse Solar 2 (Pty) Ltd (a Special Purpose Vehicle created as the applicant for the project by Genesis Eco-energy Developments (Pty) Ltd) has appointed Savannah Environmental as the independent Environmental consultants to conduct an EIA process for the proposed facility.

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be forewarned of

[1] In terms of the Energy Response Plan, the DEA is the competent authority for all energy related applications.

potential environmental issues, and allows for resolution of the issues reported on in the Scoping and EIA Reports as well as dialogue with interested and affected parties (I&APs).

The EIA process comprises two phases – i.e. Scoping and Impact Assessment - and involves the identification and assessment of environmental impacts though specialist studies, as well as public participation. The process followed in these two phases is as follows:

» The **Scoping Phase** includes the identification and description of potential impacts associated with the proposed facility through a desktop study and consultation with affected parties and key stakeholders. Areas of sensitivity within the broader site are identified and delineated on the basis of this desk-top study in order to identify any environmental fatal flaws, and sensitive or no go areas. Following a review period of the draft report, this phase culminates in the submission of a Final Scoping Report and Plan of Study for EIA to the competent authority for acceptance and approval.
» The **EIA Phase** involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase includes detailed specialist investigations (including field surveys) and public consultation. Following a public review period of the draft report, this phase culminates in the submission of a Final EIA Report and an Environmental Management Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to the competent authority for review and decision-making.

Another PV facility is proposed to be constructed within the Remaining Extent of the Farm Woodhouse 729. This facility will be known as the Woodhouse Solar 1 PV Facility. A separate application for the development has been submitted to DEA and a separate EIA process is being undertaken for this facility.

1.4 Details of the Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA Phases

Savannah Environmental was contracted by Genesis Woodhouse Solar 2 (Pty) Ltd as the independent consultant to undertake both Scoping and EIA processes for the proposed Woodhouse Solar 2 PV facility. Neither Savannah Environmental nor any of its specialist sub-consultants on this project are subsidiaries of or are affiliated to Genesis Woodhouse Solar 2 (Pty) Ltd. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed facility.

Savannah Environmental is a specialist environmental consulting company providing holistic environmental management services, including environmental

impact assessments and planning to ensure compliance and evaluate the risk of development; and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team has considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with electricity generation.

» *Lisa Opperman* - the principle author of this report holds a Bachelor degree with Honours in Environmental Management and has 8 months experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management plans and programmes, as well as mapping using ArcGIS for a variety of environmental projects. She is currently involved in several EIAs for renewable energy projects across the country.
» *Karen Jodas* - is a registered Professional Natural Scientist and holds a Master of Science degree and is the registered EAP on the proposed projects. She has 18 years of experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently responsible for the project management of EIAs for several renewable energy projects across the country.
» *Gabriele Wood* - has eight (8) years consulting experience in public participation and social research. Her experience includes the design and implementation of public participation programmes and stakeholder management strategies for numerous integrated development planning and infrastructure projects. Her work focuses on managing the public participation component of Environmental Impact Assessments and Basic Assessments undertaken by Savannah Environmental.

In order to adequately identify and assess potential environmental impacts associated with the proposed facility, Savannah Environmental has included the following specialist consultants to conduct specialist assessments:

» Ecology – Gerhard Botha (Savannah Environmental)
» Soils and Agricultural Potential – Jaco Jansen (Savannah Environmental)
» Archaeology - Jaco van der Walt (Heritage Contracts and Archaeological Consulting CC (HCAC))

» Palaeontology – Elize Butler (Bloemfontein National Museum)
» Visual – Jon Marshall (Afzelia Environmental Consultants)
» Social – Candice Hunter (Savannah Environmental)

Appendix A includes the curricula vitae for the environmental assessment practitioners from Savannah Environmental and the specialist consultants.

DESCRIPTION OF THE PROPOSED PROJECT CHAPTER 2

This chapter provides an overview of the Woodhouse Solar 2 PV facility and details the project scope which includes the planning/design, construction, operation and decommissioning activities. This chapter also explores the need and desirability of the project at the preferred site location, site and technology alternatives as well as the 'do nothing' option. Lastly, it explores the use of solar energy as a means of power generation.

2.1 Legal Requirements as per the EIA Regulations, 2014

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	Legislation, policies, plans, guidelines, municipal development planning frameworks and instruments associated and considered with the development of the PV facility are included within section 2.3 of this chapter and Table 3.4 and section 3.6 of chapter 3 of this report.
(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	The need and desirability for the development of the PV facility within the Remaining Extent of Farm Woodhouse 729 is included within section 2.2 of this chapter.
(h)(i) details of all the alternatives considered	The details of all alternatives considered (including site alternatives, layout and design alternatives, technology alternatives, grid connection alternatives, access road(s) alternatives and the 'Do-nothing' alternatives) are included within section 2.4 of this chapter.
(h)(ix) the outcome of the site selection matrix	The outcome of the site selection process is supported by the assessment of the receptiveness of the study area for the development of a PV facility. This outcome is included within section 2.2.1 of this chapter
(h)(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such	All information regarding alternatives considered or not considered as included within section 2.4 of this chapter.

2.2 The Need and Desirability of the Development at the preferred site location and on a local and national level

The North West Province has been identified as an area where the development of solar PV energy facilities is a feasible and suitable option for electricity generation (refer to **Figure 2.1**).

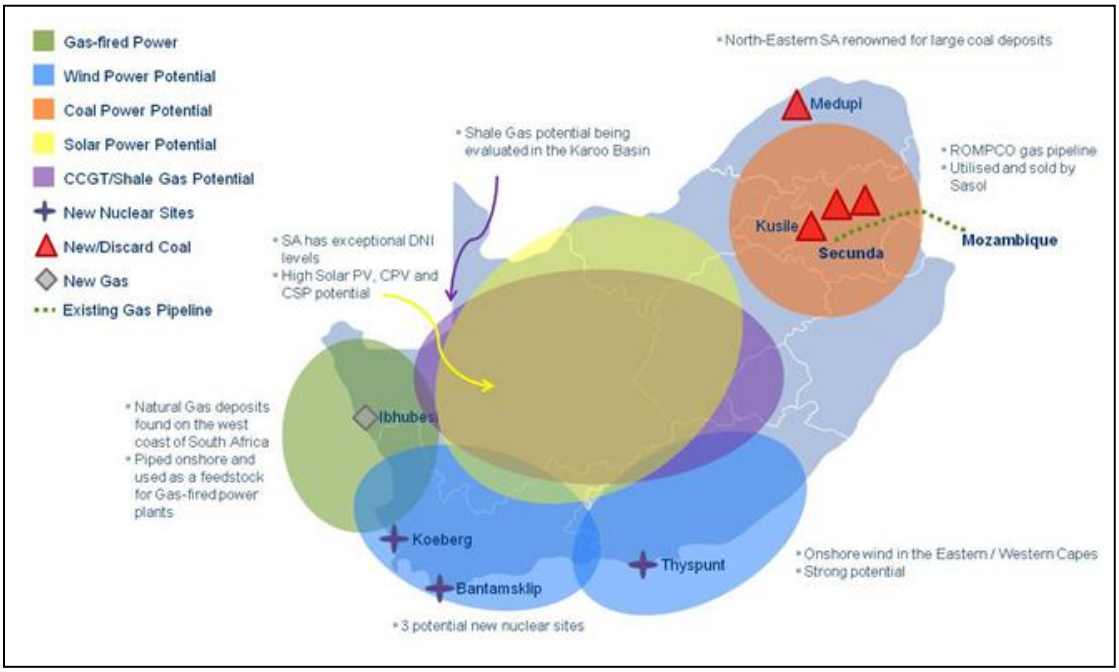

Figure 2.1: Indicative map illustrating the general areas within South Africa where the above Solar PV, CSP and Wind allocations could be developed, as well as other options (source: http://www.greenbusinessguide.co.za/power-in-south-africa-striking-a-balance/)

The overarching objective for the Woodhouse Solar 2 PV facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. From a regional site selection perspective, this region is considered to be preferred for solar energy developments by virtue of its annual solar irradiation values (refer to **Figure 2.2**).

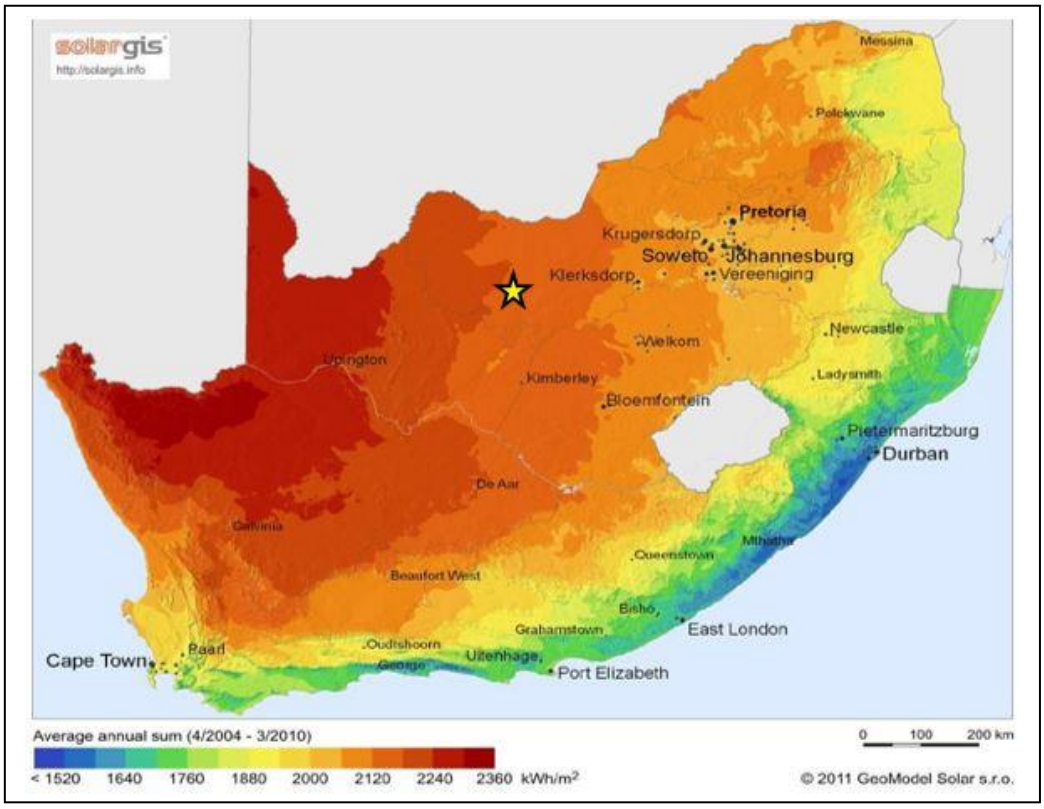

Figure 2.2: Solar irradiation map for South Africa; the proposed Woodhouse Solar 2 position is shown by the yellow star on the map. (Source: adapted from GeoModel Solar, 2011).

From a local perspective, the site has specifically been identified by Genesis Woodhouse Solar 2 as being highly desirable for the development of a solar PV facility due to its suitable topography (i.e. in terms of slope and local topography), site access (i.e. to facilitate the movement of machinery during the construction phase), land availability, the extent of the site, and enabling optimal placement of the infrastructure considering potential environmental sensitivities or technical constraints.

The North West Province aims toward integrated and sustainable growth and economic development for the province and its people. The North West Provincial Growth and Development Strategy (PGDS) provides a framework for integrated and sustainable growth and economic development. Challenges facing the province are as follows: the province is mostly rural in nature; it has a low population density and relatively inadequate infrastructure, especially in the remote rural areas; the province has inherited an enormous backlog in basic service delivery and maintenance that will take time to eradicate; the population is predominantly poor with high levels of illiteracy and dependency that seriously affect their productivity and ability to compete for jobs; the province is characterized by great inequalities between the rich and poor as well as

disparities between urban and rural areas; the province is faced with HIV/AIDS as a social and economic challenge; available resources are unevenly distributed and there is limited potential for improved delivery of services and growth. From the above, job creation and poverty eradication together with the low level of expertise and skills stand out as the greatest challenges to be resolved within the province. The proposed development of the PV facility will contribute to employment creation and skills development which is in line with the goals and objectives of the North West PGDS. The proposed PV facility will also contribute to growth and development of the study area by expanding the economic base as well as increasing infrastructure in the area.

The Dr Ruth Segomotsi Mompati District Municipality and the Naledi Local Municipality are the municipalities who hold jurisdiction over the study area within which the site is located. The Dr Ruth Segomotsi Mompati District Municipality aims to ensure optimal utilization of available resources through effective, efficient, sustainable integrated planning and corporate governance (IDP) (2015/2016)). One of the primary and most sought after objectives of the Naledi Local Municipality is to create a new vision for future local economic development based on its unique strengths and its capacity to leverage existing assets to generate revenue. The development of the PV facility will contribute to the realisation of the municipal goals on a local and district level and are considered appropriate for the visions of both the Local and District Municipalities. The facility will optimise the use of a renewable resource for energy generation within the province, which will lead to sustainable development within the district. Economic development and growth will also be realised through the development and it will also result in an increase in local procurement of the surrounding towns, including Vryburg, Delareyville, Stella and Schweizer-Reneke as well as the township Huhundi.

The government of South Africa has identified a need for the integration of renewable energy, including solar energy, into the national energy mix. This initiative aims to reduce the country's carbon emissions levels, to help address its growing electricity generation needs (DEA draft Integrated Energy Planning report, 2012). The use of solar radiation for power generation is considered a non-consumptive use of a natural resource which produces zero greenhouse gas emissions during its operation. The generation of renewable energy will contribute to the diversification of South Africa’s electricity market which has, to date, been heavily dominated by coal-based power generation. The advancement of renewable energy is a priority for South Africa as the government has set a target for 17GW of electricity from renewable sources by 2030 as part of the Integrated Resource Plan for electricity (IRP) 2010-2030, IRP 2013. This plan refers to the co-ordinated schedule for generation expansion and demand-side intervention programmes, taking into consideration multiple criteria to meet electricity demands. Furthermore, recent policy highlights the desirability of

clean, green energy and solar generated energy that will play a significant role in reaching these quotas.

The site for the proposed PV facility is situated within an area which has been classified under areas best suited for the roll-out of wind and solar photovoltaic (PV) energy projects in South Africa (as per the Council for Scientific and Industrial Research (CSIR) on behalf of DEA). These renewable energy nodes are known as REDZ (Renewable Energy Development Zones) which indicate preferred locations where renewable energy developments can take place. Once gazetted, the establishment of the REDZ will result in the creation of renewable energy hubs which will lead to areas being intensely developed for specific technologies, focusing the environmental and economic impact of the developments in specific areas. The site for the PV facility falls within the REDZ zone 6 (Vryburg REDZ) (**Figure 2.3**). This is considered a beneficial characteristic associated with the spatial location of the PV facility and should be regarded as a positive attribute in terms of the location of the proposed development.

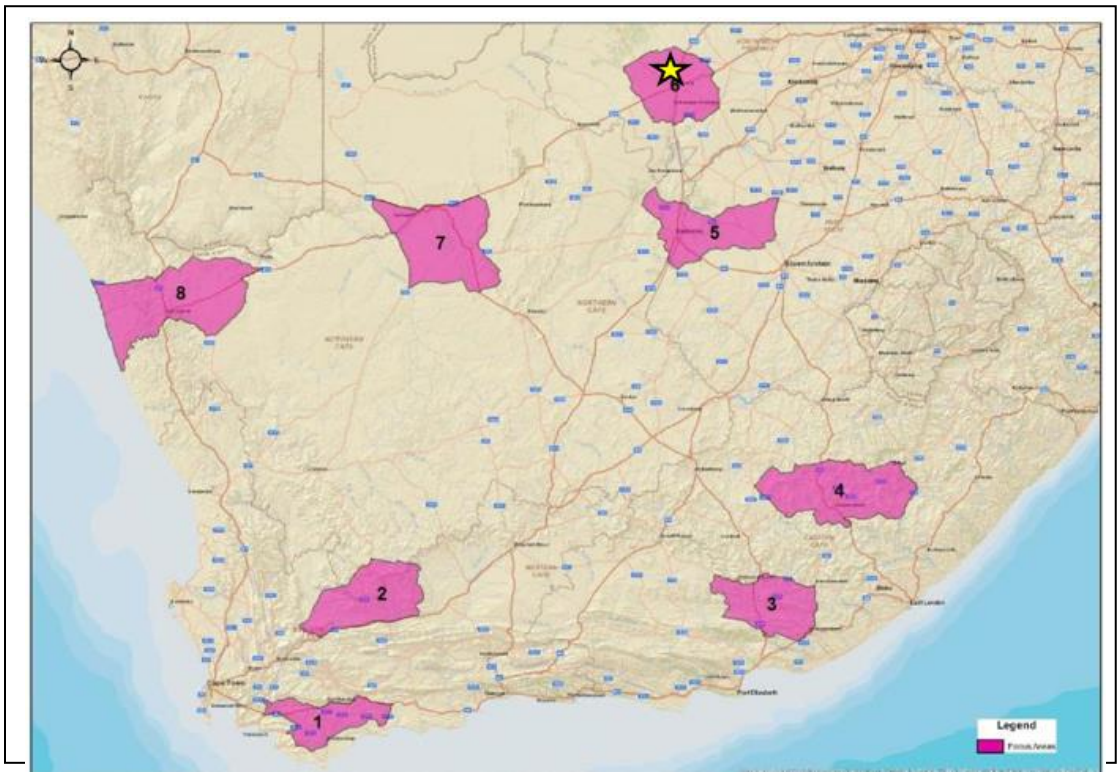

Figure 2.3: Renewable Energy Development Zones (REDZ) (CSIR 2014), the Woodhouse Solar 2 PV Facility (shown by the yellow star) falls within REDZ 6.

From the above analysis on a local, provincial and national level, the need and desirability of the proposed PV facility can be considered to be supported and the proposed development will contribute on all levels with regards to the achievement of relevant aims and objectives.

2.2.1 Strategic Context for Energy Planning: National and Local Policy level

According to the DEA Guideline on Need and Desirability (October 2014) in terms of the Environmental Impact Assessment (EIA) Regulations 2010, and in the requirements outlined in Appendix 2 of the EIA Regulations 2014, a motivation for the need and desirability of a development must be measured against the contents of the Integrated Development Plan (IDP), Spatial Development Framework (SDF) and Environmental Management Framework (EMF) for an area, and the sustainable development vision, goals and objectives formulated in, and the desired spatial form and pattern of land use reflected in the area's IDP and SDF. This section of the report provides a summary of the findings from the review of relevant policies and guidelines at a national, provincial and local scale regarding the need for renewable energy and the Woodhouse Solar 2 PV Facility.

2.2.1.1 The Integrated Resource Plan (IRP)

The primary objective of the Integrated Resource Plan (IRP 2010) is to determine the long term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing and cost. However, the IRP 2010 also serves as input to other planning functions, *inter alia* economic development, and funding, environmental and social policy formulation. The accuracy of the IRP 2010 is to be improved by regular reviews and updates. The National Integrated Resource Plan 2010 projected that an additional capacity of up to 56 539MW of generation capacity will be required to support the country's economic development and ensure adequate reserves over the next twenty years. The required expansion is more than two times the size of the existing capacity of the system. A significant component of the plan, amongst others, is the expansion of the use of renewable energy sources to reduce carbon emissions involved in generating electricity. In this regard, the IRP supports the development of 17GW of renewable energy generation by 2030. The proposed Woodhouse Solar 2 PV Facility aims to contribute to meeting the targets in this policy.

Although an update was published for comment in 2013, the IRP 2010 remains the official government plan for new generation capacity until replaced by a full iteration. The IRP update is intended to provide insight into critical changes for consideration on key decisions in the interim.

The following considerations were taken into account within the updated IRP:

» Changes in electricity demand and the underlying relationship with economic growth;
» New developments in technology and fuel options (locally and globally);
» Scenarios for carbon mitigation strategies and the impact on electricity supply beyond 2030; and

» The affordability of electricity and its impact on demand and supply beyond 2030.

The following approaches are adapted within the IRP update of 2013:

» The development of a new Base Case from the IRP 2010 by updating some of the underlying assumptions based on new information; and
» The consideration of different scenarios or test cases based on alternative government policies or strategies and differences in future economic and resource terrains

2.2.1.2 Strategic Integrated Projects (SIPs)

The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have five core functions: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration. SIP 8 of the energy SIPs supports the development of the Solar Energy Facility which is as follow:

» SIP 8: Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010) and supports bio-fuel production facilities.

Genesis Woodhouse Solar 2 (Pty) Ltd is proposing the establishment of a PV Facility for the purpose of reducing total carbon emissions and diversifying electricity supply. In the event of the PV facility being developed, they will contribute to the national electricity supply and increase the security of supply to consumers. In addition, the implementation of the proposed PV facility will contribute an economic stimulus to the local economy through the construction process and long term employment in site management, operation and maintenance of the facility. Therefore should the proposed facility be awarded a preferred bidder status, they will have the potential to be registered as SIP 8 projects.

2.2.1.3 Renewable Energy Development Zones (REDZ)

The DEA has been mandated to undertake a Strategic Environmental Assessment (SEA) process. The wind and solar photovoltaic SEAs are being undertaken in order to identify geographical areas most suitable for the rollout of wind and solar photovoltaic energy projects and the supporting electricity grid network. The DEA

and CSIR have released a map with focus areas best suited for the roll-out of wind and solar photovoltaic energy projects in South Africa. The aim of the assessment is to designate renewable energy development zones (REDZs) within which such development will be incentivised and streamlined. The proposed Woodhouse Solar 2 PV Facility falls within one of the identified geographical areas / focus area most suitable for the rollout of the development of solar energy projects (known as REDZ zone 6) within the North West Province, as shown in **Figure 2.3**.

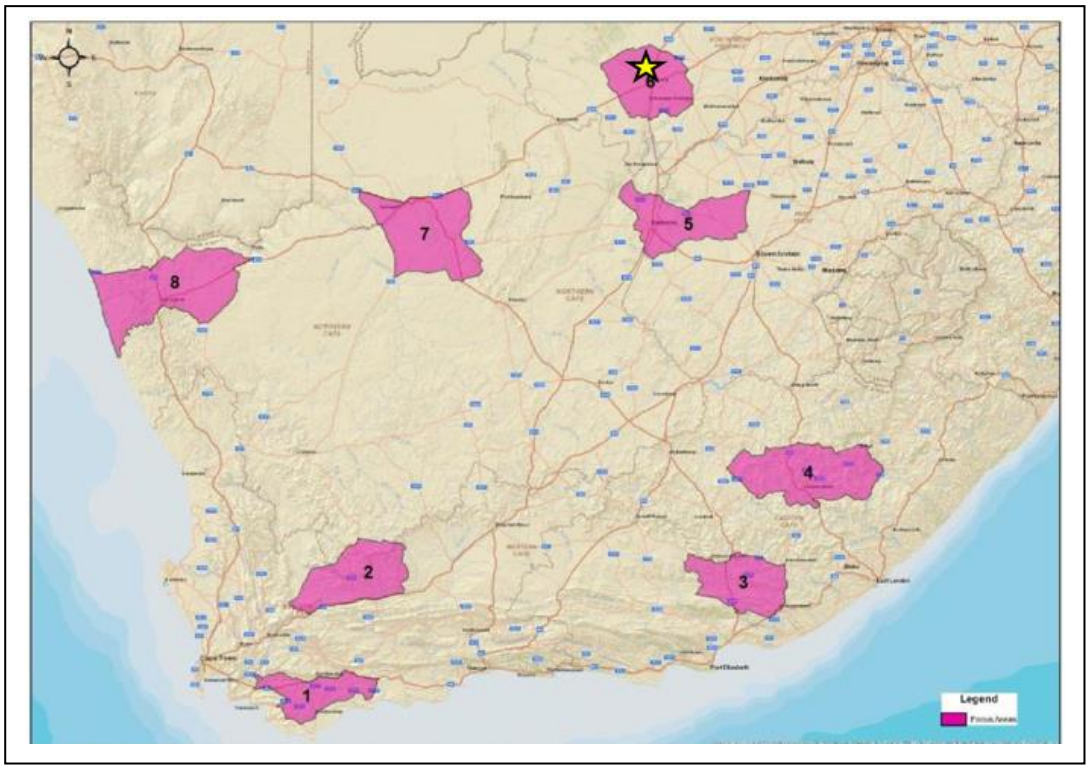

Figure 2.3: Renewable Energy Development Zones (REDZ) (CSIR 2014), the Woodhouse Solar 2 PV Facility (shown by the yellow star) falls within REDZ 6.

2.2.1.4 North West Provincial Growth and Development Strategy (PGDS) (2004-2014)

Goals and objectives of the North West Provincial Growth Development Strategy are to fight poverty and unemployment, improve the low level of expertise and skills which are classified as both immediate and long term goals and require primary goals for sustained growth and economic development. The proposed facility will contribute to employment creation and skills development which is in line with the goals and objectives of the North West PGDS.

The North West Provincial Growth Development Strategy aims at building a sustainable economy to eradicate poverty and improve social development. The

proposed facility will contribute to growth and development of the local area by expanding the economic base and creating employment opportunities.

2.2.1.5 North West Province Spatial Development Framework (SDF) - North West Environmental Management Series 7 (2008)

The North West Provincial Government (NWPG) has recently adopted a ten-year growth and development strategy for the province known as North West 2014. In order to fight poverty, unemployment and low levels of skills and expertise, this strategy has two goals. The *Economic Goal* which requires an average economic growth rate of 6.6% per annum and the *Poverty Eradication Goal* to wipe out the basic needs backlog which annually will require investment estimated at R854 million. The key pillars for growth and economic development are:

» Agriculture and rural development
» Mining and energy
» Manufacturing
» Trade and finance
» Tourism
» Construction and infrastructure
» Small Medium and Micro Enterprise
» Training and Skills Development

The strategy lists a number of transversal objectives of which one is "Ensuring sustainable development through resource and environmental management". The Provincial Spatial Development Framework and Environmental Management Plan (PSDF–EMP) is one of the fundamental implementation instruments of North West 2014 and provides the spatial dimension for this strategy. The key emphasis is on economic growth and poverty eradication. This version mainly provides statements of objectives, key development issues, development concepts/ principles, and the spatial development rationale. The Spatial Development Framework (SDF) addresses the need for spatial planning, socio-economic development, infrastructure and conservation of natural resources. Key socio-economic issues which would require strategic planning provision include: employment (including youth and women); poverty eradication; attracting investment; economic growth; HIV / AIDS and other diseases; food security; physical infrastructure (including availability of industrial land); illiteracy; tourism development; population growth, urbanization and migration. Natural resource issues include inadequate water resources for future development; bush encroachment and alien invasive species; land and soil degradation; and overgrazing. With regard to spatial planning, the legacies of Apartheid-era policy is identified as a key issue and residents of the North West are consequently extremely underdeveloped.

The development of the proposed facility will contribute to economic growth and development, which will in turn help eradicate poverty through job creation and skills development in the region which will be in line with the North West SDF.

2.2.1.6 Dr Ruth Segomotsi Mompati District Municipality Integrated Development Plan (IDP) (2015/2016)

The mission of the district is, "to ensure optimal utilization of available resources through effective, efficient, sustainable integrated planning and corporate governance."

The existing level of development and challenges in Dr Ruth Segomotsi Mompati District Municipality can be summarized as follows:

- Dr Ruth Segomotsi Mompati District Municipality is endowed with minerals but this sector remains a small contributor to GDP of the province;
- Population is largely African with low education, low incomes, high unemployment and with minimal access to water and sanitation;
- The large African population is largely young with a small percentage of adults who are economically active;
- Functional literacy does not favour Africans. There is a great challenge in the provision of education to empower Africans;
- Heavy dependency on public administration as employer. There is a critical need to develop the private sector in agriculture and mining involvement. The development of the Small Medium Micro Enterprise (SMME) sector both in the formal and informal sectors is critical.
- Current access to water and sanitation services is a concern.

The above calls for associated action to improve delivery of the needed services for socio and economic development in the Dr Ruth Segomotsi Mompati District Municipality.

The Key Performance Areas (KPA) of the district are as follows:

- *Service delivery and infrastructure development:* The objective is to eradicate backlogs in order to improve access to services and ensure proper operations and maintenance.
- *Public participation and good governance (governance structures):* The objective is to promote a culture of participatory and good governance.
- *Institutional development and transformation:* The objective is to improve organizational cohesion and effectiveness.
- *Financial viability:* The strategic objective is to improve overall financial management in the municipalities by developing and implementing appropriate financial management policies, procedures and systems.

- » *Local economic development:* The strategic objective is to create an environment that promotes the development of the local economy and facilitate job creation.
- » *Community services & development:* All citizens have a right to an environment that is not detrimental to human health, and it imposes a duty on the State to promulgate legislation and to implement policies aimed at ensuring that this right is upheld.

The strategic objective of the North West Department of Rural, Environment and Agricultural Development (READ) is to facilitate and promote local economic development in the district through existing and shared partnerships. The district is an agricultural hub within the province and as a result, special attention is given to promoting agricultural initiatives and ensuring value chain benefits from the sector. While it is acknowledged that agriculture is one of the main sectors contributing effectively to the province's GDP, the district needs to ensure equitable focus on other sectors of the economy.

The following were identified as key strategic intervention areas to be prioritized from 2014 -2017:

- » Promotion of Local Economic Development (Agriculture, Agri-Business, Land and Rural Development)
- » Service Delivery (Infrastructure Development and Transportation)

Attraction of major investments to the district remains a challenge because of the poor infrastructure conditions, more specifically roads, water networks or reticulation, communication, electricity and transport networks. The critical importance of commitment to transforming the economy of the district therefore remains emphasized. This will ensure that job opportunities are increased for the unemployed masses (mainly the youth) of the Dr Ruth Segomotsi Mompati District Municipality.

The IDP aims at promoting local economic growth and social development in order to provide a better life for the communities. The proposed facility will provide employment opportunities and contribute in assisting the district municipality in achieving local economic development and building a sustainable economy through introducing a relatively new sector into the local economy.

2.2.1.7 Naledi Local Municipality (NLM) Integrated Development Plan (IDP) (2015-2016)

One of the primary objectives of the IDP process for the NLM was to create a new vision for the Naledi Local Municipality's future local economic development based on its unique strengths and its capacity to leverage existing assets to generate revenue.

Based on the needs analysed in the IDP processes and the Naledi Spatial Development Framework (SDF, 2013), the following key strategic interventions are proposed by the Naledi Local Municipality:

- *Strategic Intervention A:* Regional development hub
- *Strategic Intervention B:* CBD Revitalisation
- *Strategic Intervention C:* Development of the cattle industry
- *Strategic Intervention D:* Growth of the game farming, hunting and eco-tourism industries
- *Strategic Intervention E:* Maximise revenue opportunities
- *Strategic Intervention F:* Uninterrupted basic service delivery
- *Strategic Intervention G:* Attract major renewable energy solar projects

The proposed facility falls in line with the Strategic Intervention G (attract major renewable energy projects into the area). The development will contribute to employment creation and economic growth, which in turn will have a positive multiplier effect on the local area. The IDP 2015/2016 supports the investment of renewable energy developments in the Naledi Local Municipality.

2.3 Receptiveness of the site to development of a PV Facility

Genesis Woodhouse Solar 2 (Pty) Ltd considers the site, the Remaining Extent of the Farm Woodhouse 729 (2263ha), to be highly preferred for the development of a solar energy facility and its associated infrastructure. The reasons include:

- Extent of site: Availability of level land of sufficient area can be a restraining factor, as a 100MW PV facility requires 300 ha of land space. The larger farm portion owned by a single landowner is approximately 2265 ha in extent, which is sufficient for the installation of the facility (300ha) allowing for avoidance of site sensitivities. The development footprint of the facility would comprise less than 15% of the total extent of the farm portion.
- Power transmission considerations: Three options for grid connection exist, i.e. i) Direct connection to the authorised Eskom Bophirima substation to be constructed in the northern portion of the site, ii) A direct connection to the existing Mookodi 400/132kV substation located to the west of the site, or iii) a connection to the existing Woodhouse 88/22KV Substation located on the boundary of the site in the north. A new 132KV overhead power line will be constructed for the facility which will be the connection between the on-site substation and the preferred grid connection point (to be informed by this EIA process and Eskom requirements).
- Site access: Access to the site is possible through the use of the regional road (R34) which traverses the northern portion of the site. Alternatively, access

can be gained via the national route (N18) situated to the west of the site, or a secondary main road traversing the western portion of the site.

» Loss of current land use: There is no cultivated agricultural land within the farm portion which could be impacted upon by the proposed PV facility. However, grazing activities are taking place within the site which would be affected. The facility will not have a major impact on the availability of grazing space as there would be sufficient space left for grazing to continue on the remaining portions of the property during the operation of the facility.

» Climatic conditions: Climatic conditions determine the economic viability of a solar energy facility as it is directly dependent on the annual direct solar irradiation values for a particular area. The climate of the Vryburg area has the following characteristics: i) rainfall occurs mainly in summer and autumn with very dry winters ii) the mean annual rainfall is about 477 mm with January being the wettest month averaging at about 89 mm and July being the driest with an average of only 4 mm, iii) the average annual temperature in Vryburg is 17.9 °C with January being the warmest (Ave. 24.8 °C) and July being the coldest (Ave 9.3 °C), and iv) frost is frequent to very frequent in winter (mean frost days: 40). The North West Province receives a high average daily direct normal and global horizontal irradiation (2120-2240 kWh/m^2/annum – refer to **Figure 2.2**)) which indicates that the regional location is appropriate for the solar energy facility. Factors contributing to the location of the PV facility include the relatively high number of daylight hours and the low number of rainy days experienced in this region.

» Topographic conditions: The site conditions are optimal for a development of this nature, with the site being of a suitable gradient for the development of a PV facility. The region within which the site is located can be described as a flat plateau. The area is consistent with the landtype and classifies the landscape as a Class A2 with an average slope of between 0% and 2%.

» Geographic location: The project site falls within the identified geographical areas / focus area most suitable for the rollout of the development of solar energy projects (i.e. Vryburg solar priority area or REDZ 6)[2].

» Availability of land: The development of the PV facility requires sufficient space to be constructed and operated on. The landowner of the Remaining Extent of the Farm Woodhouse 729 is willing to allow the development of the PV facility to take place on his property and will allow the developer to lease the portions for the solar facility.

The above criteria are discussed in more detail below.

[2] Note that the REDZ have been identified through a detailed research and consultation process but are still to be gazetted.

Solar Irradiation

The economic viability of a solar facility is directly dependent on the annual direct solar irradiation values. The North West Province (specifically near the town of Vryburg) receives a high average of daily direct irradiation in South Africa (refer to **Figure 2.2**). Global Horizontal Irradiation (GHI) for the province varies between 2060 and 2240 kWh/m^2/annum. The GHI for the proposed Woodhouse Solar 2 is in the region of approximately 2120-2180 kWh/m^2/annum.

Topography

The region within which the study area is located can be described as a flat plateau. The average slope of the area is between 0% and 2%. The site is situated at elevations between 1 197 m and 1 230 m above sea level with an average slope of less than 1.5% and a maximum slope of 5.8%. The largest portion and central part of the site is situated on a relative flat plateau with gradual slopes towards lower lying areas to the north, south and the north-west. The north and south facing slopes are relative gradual (average northern slope: 2.1% and average southern slope: 3.4%), although the north facing slope contain areas (just below the plateau edge) which is more steep (Max slope: 5.8 %). A level development area is desirable for the construction of the facility.

Access to the Grid

Ease of access into the Eskom electricity grid is vital to the viability of a solar PV facility. Projects which are in close proximity to a connection point and/or demand centre are considered favourable, and reduce the losses associated with power transmission. In addition, Eskom's '2040 Transmission Network Study' has drawn on various scenarios to determine the grid's development requirements, as well as to identify critical power corridors for future strategic development (refer to **Figure 2.4**). The national power corridors have been refined and consolidated into five transmission power corridors of 100 km in width, which are being used by the Department of Environmental Affairs for a strategic environmental assessment (SEA) which will seek to identify environmentally acceptable routes over which long-term environmental impact assessment (EIA) approvals can be secured. The Woodhouse Solar 2 PV facility site is located in close proximity to the Northern corridor (refer to **Figure 2.4**), making the location a suitable option for the development of the PV facility in regards to grid connection points and the availability of infrastructure.

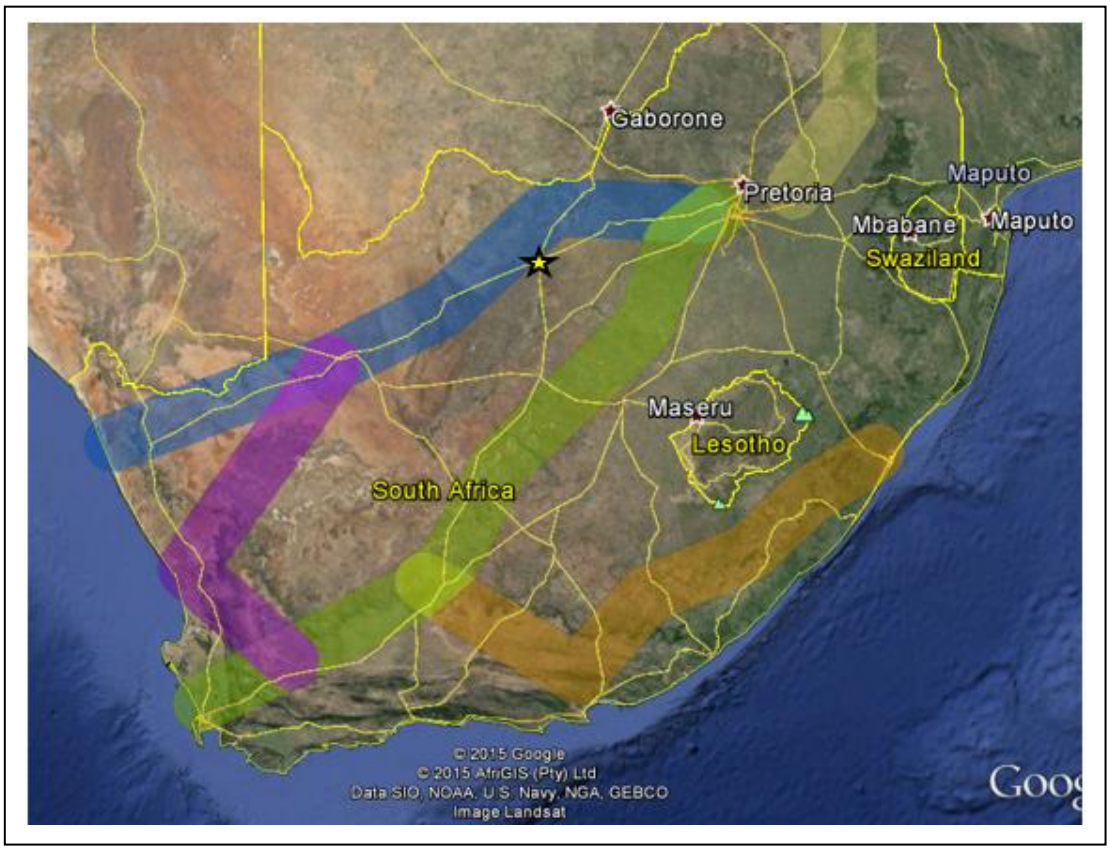

Figure 2.4: The Eskom Transmissions Network of South Africa, the proposed Woodhouse Solar 2 position is shown by the yellow star on the map.

Proximity to Towns with a Need for Socio-Economic Upliftment

The North West Province and areas within the Dr Ruth Segomotsi Mompati District Municipality and the Naledi Local Municipality, like most of South Africa, is marred by unemployment, inequalities and poverty. To this extent the Woodhouse Solar 2 PV facility is situated in an area that is surrounded by towns including the towns of Vryburg, Dleareyvill, Stella and Schweizer-Reneke and consequently, local labour would be easy to source, which fits in well with the REIPPP Programme's economic development criteria for socio-economic upliftment. Currently, a large proportion of local labour within the Naledi Local Municipality is used in the hunting and agricultural industries. Other important job creating sectors are finance and insurance (8%), public administration (8%), health and social (5.8%) and transport (5%). The development of the proposed facility will create a new avenue for economic and skills development within the Dr Ruth Segomotsi Mompati District Municipality and the Naledi Local Municipality.

Proximity to Access Road for Transportation of Material and Components

The site for the proposed development is situated in close proximity to the following access points: i) the national road (N18) is located 3-4km to the west of the site, ii) the regional road (R34) traverses the northern portion of the site and

iii) a secondary main road traverses the western portion of the site. As material and components would need to be transported to the site during the construction phase of the proposed facility, accessibility was a key factor in determining the viability of the development, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on project economics and therefore the ability to submit a competitive bid under the DoE's REIPPP programme.

2.4 Alternatives Considered in the Scoping Phase

In accordance with the requirements outlined in Appendix 2 of the EIA Regulations 2014, the consideration of alternatives including site and technology alternatives and the "do-nothing" alternative should be undertaken. The follow sections address this requirement.

2.4.1 Site Alternatives

The proposed site for the development of the PV Facility (Woodhouse Solar 2) is located on the Remaining Extent of the Farm Woodhouse 729 and consists of an overall extent of 2263ha. The facility will have a development footprint of ~300ha in extent. It is anticipated that the facility and its associated infrastructure (i.e. on-site substation and internal roads, etc.) can be appropriately positioned within the broader site to avoid areas of environmental sensitivity. Therefore, the extent of the site allows for the identification of layout design and site-specific alternatives.

No site alternatives are proposed for the development of the facility as the placement of solar PV facility is strongly dependent on several factors including climatic conditions (solar radiation levels), topography, the location of the site; the potential grid connection, the extent of the site, the availability of land for the proposed project to be developed on and the need and desirability for the project.

Genesis-Eco Energy Developments (Pty) Ltd implemented a site finding study in order to find potential sites that met both technical and environmental guidelines for the development of a PV facility. Using GIS data, Genesis identified the Vryburg Renewable Energy Development Zone (REDZ 6) and the newly upgraded Mookodi substation as a preferred area for a solar facility development. Individual land parcels were identified with neighbouring properties to the west of the Remaining Extent of Farm Woodhouse 729 excluded as a result of environmental constraints. Therefore the Remaining Extent of the Farm Woodhouse 729 was selected as a preferred site for the development.

Based on the findings as described in Sections 2.1 and 2.2 above, Genesis Woodhouse Solar 2 (Pty) Ltd considers the proposed site to be highly favourable

and the most suitable location for the development of the Woodhouse Solar 2 PV Facility due to the following characteristics:

» Climatic conditions
» Land use compatibility
» Land availability
» Extent of site
» Grid connection considerations
» Topography
» Site access

The site is located within an area which has been identified as a node for the development of renewable energy projects (including wind and solar photovoltaic developments). These areas are known as REDZ zones and have been identified as preferred areas suitable for renewable energy developments of this nature. The identification of these areas also consider the impact (mainly focussing on the benefits) that the development will have on the local surrounding communities. The location of the proposed Woodhouse solar 2 PV Facility falls within a REDZ zone 6 (the Vryburg REDZ) and will contribute to the creation of the Renewable Energy Development Zones in the country, as well as benefiting the local surrounding communities. Thus, the proposed location for the PV facility is considered as suitable for development.

2.4.2 Layout and Design Alternatives

A broader site of approximately 2263ha is being considered, within which the development footprint for the facility of approximately 300ha in extent would be appropriately located. The site can adequately accommodate the facility with a contracted capacity of up to 100MW. It is anticipated that the facility and its associated infrastructure (i.e. on-site substation and internal roads, etc.) can be appropriately positioned within the larger site to avoid areas of environmental sensitivity. The total development footprint of the facility would comprise less than 15% of the total extent of the farm portion. Therefore, the extent of the site allows for the identification of layout design and site-specific alternatives.

The Scoping Phase aims to identify potentially environmentally sensitive areas within the site which should be avoided by the development of the proposed facility as far as possible. These areas will need to be considered in greater detail during the EIA Phase through site-specific specialist studies. The information from these studies will be used to inform layout alternatives for the proposed facility and inform recommendations regarding a preferred alternative.

Specific design alternatives will include *inter alia* the layout and mounting of the PV panels, and alternative routes for the power line corridors and access roads.

The aim of this planning process is to avoid environmentally sensitive areas as far as possible and inform the final design of the facility.

Technology Alternatives

Few technology options are available for the development of PV facilities, and the use of those that are considered are usually differentiated by weather and temperature conditions that prevail within the study area, so that optimality is obtained by the final site selection. Solar energy is considered to be the most suitable renewable energy technology for this site, based on the location, ambient conditions and energy resource availability. Solar PV was determined as the most suitable option for the proposed site as large volumes of water are not required for power generation purposes compared to concentrated solar power technology (CSP). PV is also preferred when compared to CSP technology because of the lower visual profile. Two solar energy technology alternatives are being considered for the development of the proposed facility and include:

» Fixed mounted PV systems (static/fixed-tilt panels);
» Tracking PV systems (with solar panels that rotate around a defined axis to follow the sun's movement).

The primary differences between technologies available which affect the potential for environmental impacts relate to the extent of the facility, or land-take (disturbance or loss of habitat), as well as the height of the facility (visual impacts). The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance. The impacts associated with the operation and decommissioning of the facility will be the same irrespective of the technology chosen.

Grid connection Alternatives

The grid connection for the facility will be finalised based on input from Eskom and the environmental assessment. However, three alternatives are being considered at this point of the assessment process:

» A direct connection to the authorised Eskom Bophirima Substation located in the northern portion of the Remaining Extent of the Farm Woodhouse 729; or alternatively
» A direct connection to the existing Mookodi Substation located approximately 7.4km to the west of the site.
» A direct connection to the existing Woodhouse 88/22KV Substation located on the boundary of the site in the north.

The power line routes to be constructed for the distribution of the generated solar power to the national electricity grid will be situated either within the Remaining Extent of the Farm Woodhouse 729 or outside of the property depending on the

final grid connection point(s) identified for the facility. If either the existing Woodhouse Substation or the authorised Bophirima Substation is identified as the grid connection point for the facility the power line routes would most likely be located within the Remaining Extent of the Farm Woodhouse 729. If the Mookodi Substation, located to the west of the site, is identified as the grid connection point for the facility then the power line routes will fall outside of the site. The alternative power line routes for the facility will be assessed in detail within the EIA phase of the projects.

Access Road(s) Alternatives

Access to the site is possible through the use of the regional road (R34) which traverses the northern portion of the site. Alternatively access can be gained via the national route (N18) situated to the west or a secondary main road traversing the western portion of the site. These existing roads are being considered as potential access points to the facility access roads for the PV facility.

The final design for the access roads (internal and external) will be finalised during the EIA phase in accordance with the final layouts of the PV facility. At the current stage of the assessment process, alternatives for the facility access roads connecting to the above mentioned existing roads have not yet been considered in detail by the developer as the location of the PV facility within the site has not been established.

2.4.3 The 'Do-Nothing' Alternative

The 'do-nothing' alternative is the option of not constructing the proposed Woodhouse Solar 2 PV Facility. Should this alternative be selected, there would be no environmental impacts on the site due to the construction and operation activities of the solar PV facility not occurring. However, the benefits of the renewable energy facility, including job creation, local procurement, economic growth and the diversification of the national electricity grid will not be realised. The generation of electricity from renewable energy resources can also offer a range of socio-economic and environmental benefits for South Africa. This alternative will be assessed in detail within the EIA Phase of the process.

2.5 Technology considered for the Solar Photovoltaic (PV) Facility and the Generation of Electricity

Solar energy facilities, such as those using PV panels, use the energy from the sun to generate electricity through a process known as the **Photovoltaic Effect**. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity.

A photovoltaic (PV) cell is made of silicone that acts as a semi-conductor used to produce the photovoltaic effect. Individual PV cells are linked and placed behind a protective glass sheet to form a PV panel. The PV cell is positively charged on one side and negatively charged on the other side with electrical conductors attached to either side to form a circuit. This circuit then captures the released electrons in the form of an electric current (direct current). An inverter must be used to change the direct current (DC) to alternating current (AC). The electricity is then distributed through a power line for use.

The PV panels can either comprise a fixed/static support structure set at an angle (fixed-tilt) as to receive the maximum amount of solar irradiation, or a single or double axis support structure which can be either fixed or tracking. The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar irradiation characteristics.

Figure 2.5: Photovoltaic panel array (with permission from Genesis Eco-Energy)

The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance.

The Photovoltaic Effect is achieved through the use of the following components:

Photovoltaic Cells

A PV cell is made of silicone that acts as a semiconductor used to produce the photovoltaic effect. A single cell is sufficient to power a small device such as an emergency telephone. However, to produce up to 100MW of power, the proposed facility will require numerous cells arranged in multiples/arrays which will be placed behind a protective glass sheet and fixed to a support structure. Each PV

cell is positively charged on one side and negatively charged on the other side, with electrical conductors attached to either side to form a circuit. This circuit captures the released electrons in the form of an electric current (direct current).

The Inverter

An inverter is used to convert the electricity which is produced as direct current (DC) into alternating current (AC) for the purpose of a grid connection. In order to connect a large solar facility to the national grid, numerous inverters will be arranged in several arrays to collect, and convert the produced power.

The Support Structure

The PV panels will be installed on a support structure either set at an angle (fixed-tilt PV system) or a tracking system as to receive the maximum amount of solar irradiation. If the PV facility will be of a fixed nature, then the angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar radiation characteristics.

2.5.1 Description of the Associated Infrastructure

The proposed Woodhouse Solar 2 PV Facility is proposed to include several arrays of photovoltaic (PV) solar panels with a generating capacity of up to 100MW. A summary of the details and dimensions of the planned infrastructure associated with the facility is provided in **Table 2.1**.

Table 2.1: Details or dimensions of typical structures required for the PV Facility

Infrastructure	Dimensions/ Details
Technology	Static or tracking photovoltaic, with panel height not exceeding 5m
Project development footprint	300ha
On-site substation	150x150m
Power line	Servitude width – 32m Length – to be confirmed Height of towers – 28-30m
Access road	Access to the proposed site has not yet been finalised but may be via a number of existing routes as described within this report Internal access roads – 5m wide
Other services required	Waste removal – waste removal will be undertaken by the municipality Sewage removal – sewage will be stored on-site in a septic tank which will be emptied by the municipality. Electricity supply - electricity will be sourced to the facility via the power line traversing the northern

	boundary of the site, unless there is a more suitable distribution powerline that can be used elsewhere. This power line is known as the Delareyville Munic/Vryburg 1 88kV Feeder.

2.6 Proposed Activities during the Project Development Stages

In order to construct the solar energy facility and its associated infrastructure, a series of activities will need to be undertaken during the design, pre-construction, construction, operation, and decommissioning phases which are discussed in more detail below.

2.6.1 Design and Pre-Construction Phase

Conduct Surveys

Prior to initiating construction, a number of surveys will be required including, but not limited to:

» Geotechnical survey - the geology and topography of the development footprint will be surveyed. The geotechnical study will focus on topographical constraints, foundation conditions, potential for excavations, and the availability of natural construction materials. The geotechnical examination will include surface and subsurface exploration, soil sampling and laboratory analysis.
» Site survey - will be done for the finalisation of the design layout of the solar arrays, and the other associated infrastructure. The micro-siting footprint will consider any environmental sensitivity identified during the EIA Phase investigations and will need to be confirmed in line with the Environmental Authorisation issued for the facility.

2.6.2 Construction Phase

Establishment of an Access Road to the Site

Access is possible through the use of the regional road (R34) which traverses the northern portion of the site, alternatively access can be gained via the national route (N18) situated to the west or a secondary main road traversing the western portion of the site. Within the facility footprint itself, access will be required from new/existing roads for construction purposes (and limited access for maintenance during operation). The final layout will be determined following the identification of site related sensitivities.

Undertake Site Preparation

Site preparation activities will include clearance of vegetation. These activities will require the stripping of topsoil which will need to be stockpiled, backfilled and/or spread on site.

Transport of Components and Equipment to Site

The national, regional, secondary and proposed internal access roads will be used to transport all components and equipment required during the construction phase of the facility. Some of the components (i.e. substation transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989)[3] by virtue of the dimensional limitations. Typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the mounting of the PV support structures, construction of the substation and site preparation.

Establishment of Laydown Areas on Site

Laydown and storage areas will be required for the typical construction equipment. Once the required equipment has been transported to site, a dedicated equipment construction camp and laydown areas will need to be established adjacent to the workshop area. The equipment construction camp serves to confine activities and storage of equipment to one designated area to limit the potential ecological impacts associated with this phase of the projects. The laydown areas will be used for the assembly of the PV panels and the general placement/storage of construction equipment.

Erect PV Cells and Construct Substation and Invertors

The construction phase involves installation of the solar PV panels and the entire necessary structural and electrical infrastructure to make the PV facility operational. In addition, preparation of the soil and improvement of the access roads would continue for most of the construction phase. For array installation, typically vertical support posts are driven into the ground. Depending on the results of the geotechnical report a different foundation method, such as screw pile, helical pile, micropile or drilled post/pile could be used. The posts will hold the support structures (tables) on which PV modules would be mounted. Brackets attach the PV modules to the tables. Trenches are dug for the underground AC and DC cabling and the foundations of the inverter enclosures and transformers are prepared. While cables are being laid and combiner boxes are being installed, the PV tables are erected. Wire harnesses connect the PV modules to the electrical collection systems. Underground cables and overhead circuits connect the Power Conversion Stations (PCS) to the on-site AC electrical infrastructure and ultimately the project's substation.

[3] A permit will be required for the transportation of these abnormal loads on public roads.

The construction of substations will require a survey of the site, site clearing and levelling and construction of access road/s (where required), construction of a level terrace and foundations, assembly, erection, installation and connection of equipment, and rehabilitation of any disturbed areas and protection of erosion sensitive areas.

Establishment of Ancillary Infrastructure

Ancillary infrastructure will include a power line for connection to the Eskom national grid, workshop, storage and laydown areas, gatehouse and security complex, as well as a temporary contractor's equipment camp.

The establishment of the buildings will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction. Laydown areas for building materials and equipment associated with these buildings will also be required.

Water Usage Associated with the Solar Energy Facility

The PV project will require the usage of water during both the construction and operation phases. Water will be required during construction for dust suppression, as well as potable water on the site for the construction crew. During the operation phase, water will be required to clean the PV panels. Water required for the 100MW PV facility is approximately 15,200m^3 for the construction phase over 12-18 months, and approximately 5050m^3 of water per year for the operation phase (over the 20 year lifetime of the project) for the cleaning of panels. Possible water sources for the facility include the boreholes located within the Remaining Extent of Farm Woodhouse 729 or alternatively municipal water.

The preferred source of water will be determined through consultation with I&APs and authorities.

Construction of power lines

A power line is constructed by surveying the power line route, construction of foundations for the towers, installation of the towers, stringing of conductors and finally the rehabilitation of disturbed areas and protection of erosion sensitive areas.

Undertake Site Rehabilitation

Once construction is completed and once all construction equipment is removed, the site must be rehabilitated where practical and reasonable. On full commissioning of the facility, any access points to the site which are not required during the operational phase must be closed and rehabilitated.

2.6.3 Operational Phase

The proposed PV facility is expected to be operational for a minimum of 20 years. The facility will operate continuously, 7 days a week, during daylight hours. While the facility will be largely self-sufficient upon completion of construction, monitoring and periodic maintenance activities will be required. Key elements of the Operation and Maintenance plan include monitoring and reporting the performance of the facility, conducting preventative and corrective maintenance, receiving visitors, and maintaining security. The operational phase will create 9-15 full-time employment positions. No large scale energy storage mechanisms for the facility which would allow for continued generation at night or on cloudy days are proposed.

2.6.4 Decommissioning Phase

Depending on the continued economic viability of the solar energy facility following the initial 25 year operational period, the facility will either be decommissioned or the operational phase will be extended. If it is deemed financially viable to extend the operational phase, existing components would either continue to operate or be dissembled and replaced with new, more efficient technology/infrastructure available at that time. However, if the decision is made to decommission the facility, the following activities will form part of the project scope.

Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required decommissioning equipment.

Disassembly and Removal of Existing Components

When the facility is ultimately decommissioned, the equipment to be removed will depend on the proposed land use for the site at that time. At this time, all above ground facilities that are not intended for future use at the site will be removed.

Underground equipment (e.g. foundation, wiring) will be removed, and the surface restored to the original contours. Much of the above ground wire, steel, and PV panels of which the system is comprised are recyclable materials and would be recycled to the extent feasible. The components of the facility would be deconstructed and recycled or disposed of in accordance with regulatory requirements. The sites will be rehabilitated and can be returned to agricultural or other beneficial land-use.

Future plans for the site and infrastructure after decommissioning

The plant capacity would have degraded by ±15% over 20 years. The facility will potentially have the opportunity to generate power for a Merchant Market operation (i.e. the client would sell power on bid basis to the market). Another option for the site after decommissioning is the return of the site back to the landowner and its previous agricultural use.

APPROACH TO UNDERTAKING THE SCOPING PHASE CHAPTER 3

An Environmental Impact Assessment (EIA) process refers to that process (in line with the EIA Regulations) which involves the identification of and assessment of direct, indirect, and cumulative environmental impacts associated with a proposed project or activity. The EIA process comprises two main phases: i.e. **Scoping Phase** and **EIA Phase**. The EIA process culminates in the submission of an EIA Report (including an Environmental Management Programme (EMPr)) to the competent authority for decision-making. The EIA process is illustrated below:

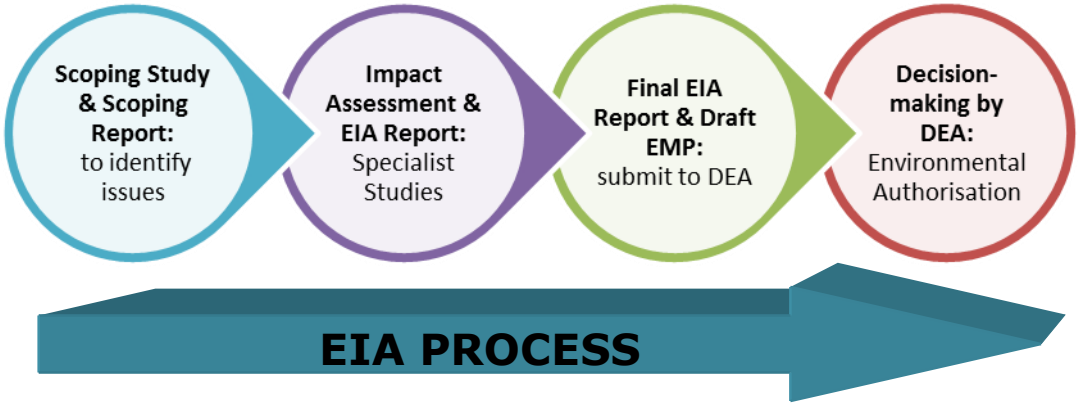

Figure 3.1: The Phases of an Environmental Impact Assessment (EIA) Process

Genesis Woodhouse Solar 2 (Pty) Ltd proposes the construction of the Woodhouse Solar 2 PV Facility as well as associated infrastructure on the Remaining Extent of the Farm Woodhouse 729 situated approximately 10 km south east of Vryburg in the North West Province. The Scoping Phase for the proposed Woodhouse Solar 2 PV Facility is being undertaken in accordance with the sections 24 (5) of the National Environmental Management Act (No 107 of 1998). In terms of the EIA Regulations (2014) of GN R982, GN R983, GN R984 and GN R985, a Scoping and EIA study is required to be undertaken for the proposed facility. In accordance with these Regulations, this Scoping process aims at identifying potential issues associated with the proposed facility, and defining the extent of studies required within the EIA phase. This was achieved through an evaluation of the facility involving desk-top specialist studies, as well as a consultation process with the Interested and Affected Parties (I&APs), including the decision making authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant organs of state departments, ward councillors and other key stakeholders. This chapter serves to outline the process which was followed during the Scoping Phase of the EIA process.

3.1. Legal Requirements as per the EIA Regulations, 2014

This chapter of the scoping report includes the following information required in term of Appendix 2: Content of the Scoping Report of the EIA Regulations, 2014:

Requirement	Relevant Section
(d) a description of the scope of the proposed activity, including (i) all listed and specified activities triggered and (ii) a description of the activities to be undertaken, including associated structures and infrastructure	All listed activities that are triggered through the development of the PV facility and a description of the activities to be undertaken are included in Table 3.1 within section 3.2 of this chapter.
(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	Legislation, policies, plans, guidelines, municipal development planning frameworks and instruments associated and considered for the development of the PV facility is included within Table 3.4 and section 3.6 of this chapter and section 2.3 of chapter 2 of this report.
(h)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs	The public participation process that has been undertaken (including the identification of stakeholders, the registration of interested and affected parties, the distribution of notifications and publishing of adverts, consultation and involvement of the public and the identification and recording of issues and concerns) for the scoping phase of the PV facility is detailed within section 3.4.2 of this chapter and Appendix C of this report.
(h)(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	No issues or concerns have been raised regarding the project to date. All issues and concerns raised by interested and affected parties will be included within the Comments and Responses Report of Appendix C of the final scoping report.

3.2. Relevant Listed Activities

In terms of the EIA Regulations, 2014 (GN R983, GN R984 and GN R985), the following listed activities are triggered by the proposed facility:

Table 3.1: Listed activities triggered by the proposed Woodhouse Solar 2 PV Facility

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
GN 983, 08 December 2014	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 ***The facility will require the construction of an on-site substation and a 132KV overhead distribution power line outside an urban area.***
GN 983, 08 December 2014	12	The development of (xii) infrastructure or structures with a physical footprint of 100 square metres 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 facility and/or associated infrastructure will be located either within or 32m from a watercourse (wetland depressions and small wetland flats).***
GN 983, 08 December 2014	19	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from- i.) a watercourse ***The construction of the facility will require the excavation, removal or moving of soil from a watercourse.***
GN 983, 08 December 2014	28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
		after 01 April 1998 and where such development: i.) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare ***Total area of land zoned as agriculture to be developed for the facility is larger than 1 hectare.***
GN 984, 08 December 2014	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; ***The total electricity output for the facility will be 100MW.***
GN 984, 08 December 2014	15	The clearance of an area of 20 hectares or more of indigenous vegetation ***The clearance of more than 20 hectares of indigenous vegetation will be undertaken during construction of the facility.***
GN 985, 08 December 2014	4	The development of a road wider than 4 meters with a reserve less than 13,5 meters (e) in North West (i) outside urban areas, in: (ee) Critical biodiversity areas (Terrestrial Type 1 and 2) as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The development of access roads wider than 4 meters are required for the facility. The site is located within critical biodiversity areas identified in the North West Province bioregional plans.***
GN 985, 08 December 2014	12	The clearance of an area of 300 square meters or more of indigenous vegetation (a) in North West (ii) within critical biodiversity areas identified in bioregional plans. ***The clearance of more than 300 m^2 will be required for the construction of the facility. The site is located within critical biodiversity areas identified in the North***

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
		West Province bioregional plans.
GN 985, 08 December 2014	14	The development of (xii) infrastructure or structures with a physical footprint of 10 square meters or more where such development occurs (a) within a watercourse or (b) within 32 meters of a watercourse measured from the edge of a watercourse (e) in North west (i) Outside urban areas, in: (ee) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The facility and/or associated infrastructure will be located either within or 32m from a watercourse (wetland depressions and small wetland flats). The site is located within an area that has been identified as a Critical Biodiversity Area by the North West Province bioregional plans.***

On the basis of the above listed activities, a Scoping and an EIA Process is required to be undertaken for the proposed facility[4]. This process is to be undertaken in two phases as follows:

» The Scoping Phase includes the identification of potential issues associated with the proposed facility through a desktop study and consultation with I&APs through a public participation process. The entire farm portion is considered within this process at a desk-top level. Through this study, areas of sensitivity within the broader site are identified and delineated in order to identify any environmental fatal flaws, and sensitive or no go areas. Following a 30-day review period of the Scoping report, this phase culminates in the submission of a Final Scoping Report and Plan of Study for EIA to the DEA.
» The EIA Phase involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase includes detailed specialist investigations and a public participation process. The detailed studies consider the proposed development footprint, the placement of which is informed by the outcomes of the scoping study. Following a 30-day review period of the EIA report, this phase culminates in the submission of a Final EIA Report and an

[4] An application for Environmental Authorisation is being submitted for the development of the facility to the National Department of Environmental Affairs.

Environmental Management Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to DEA for decision-making.

3.3. Objectives of the Scoping Phase

This Scoping report documents the evaluation of the potential environmental impacts of the proposed solar energy facility and forms part of the EIA process. The Scoping Phase was conducted in accordance with the requirements of the EIA Regulations in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

This Scoping Phase aims to:

» Identify, describe and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed facility (including design, construction, operation and decommissioning) within the site through a desk-top review of existing baseline data and desk-top specialist studies.
» Identify potentially sensitive environmental features and areas within the broader site in order to inform the preliminary design process of the facility.
» Define the scope of studies to be undertaken within the EIA process.
» Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as regarding the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase of the process.

The following objectives of the scoping process, through the undertaking of a consultative process and with the assistance of specialist input, have been met.
The identification of relevant policies and legislation regarding the activities to be undertaken have been identified and considered within this scoping report. Activities to be undertaken for the development of the PV facility have been identified and motivated in terms of the need and desirability for the activities to take place. Impacts associated with the undertaking of the identified activities and technologies have been identified and has resulted in the identification of suitable and preferable location and technology alternatives associated with the development of the PV facility. The preferred site (the Remaining Extent of Woodhouse 729) for the development of the PV facility has been identified by the applicant through a site selection process. Preferred areas for the development, which are areas associated with a low environmental sensitivity, for the PV facility have been identified within the site through a consultative and specialist informed site identification process which includes an impact assessment process (on a desktop level and limited field work), locations of the preferred areas through the consideration of various aspects have been identified. Key issues associated with the PV facility to be addressed within the assessment phase for further detailed

study and ground-truthing has been identified and listed within this scoping report. The level of assessment, expertise and the extent of further consultation to be undertaken, with the aim of determining the extent of associated impacts of the activities through the life cycle of the PV facility, have been identified and included within this Scoping report.

3.4. Overview of the Scoping Phase

The Scoping Phase has been undertaken in accordance with the EIA Regulations published in Government Gazette No 38282 in December 2014, in terms of NEMA. Key tasks undertaken within the scoping phase included:

» Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
» Submission of the completed application form for authorisation to the competent authority (DEA) in terms of Regulations 5 and 16 of Government Notice R982 of 2014.
» Undertaking a public participation process throughout the Scoping process in accordance with Chapter 6 of Government Notice R982 of 2014 in order to identify issues and concerns associated with the proposed project.
» Undertaking of independent specialist studies in accordance with Appendix 6 of Government Notice R982 of 2014.
» Preparation of a Scoping Report and Plan of Study for EIA in accordance with the requirements of Appendix 2 of Government Notice No R982 of 2014.
» Preparation of a Comments and Response Report detailing key issues raised by I&APs as part of the Scoping phase.

The tasks are discussed in detail below.

3.4.1. Authority Consultation and Application for Authorisation in terms of GNR982 of 2014

In terms of the Energy Response Plan, the DEA is the competent authority for all energy related projects. As the facility is located within the North West Province, the North West Department of Rural, Environment and Agricultural Development (READ) is the commenting authority for the development of the facility. Consultation with these authorities has been undertaken throughout the Scoping process. This consultation included the following:

» Submission of the application for authorisation to DEA;
» Submission of the Scoping Report for review by I&APs, the Organs of State and the competent authority.

A record of all authority correspondence i.e. National, Provincial and Local authorities undertaken prior to and within the Scoping Phase is included in **Appendix C**.

3.4.2. Public Participation Process

Public participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations under NEMA, specifically Regulation 41of the EIA Regulations (GN R982 of December 2014).

The sharing of information forms the basis of the public participation process and offers the opportunity to Interested and Affected Parties (I&APs) to become actively involved in the EIA Process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

During the Scoping Phase

- » identify issues of concern and suggestions for enhanced benefits;
- » verify that their issues have been recorded;
- » assist in identifying reasonable alternatives, where required; and
- » contribute relevant local information and knowledge to the environmental assessment.

During the EIA Phase

- » contribute relevant local information and knowledge to the environmental assessment;
- » verify that their issues have been considered in the environmental investigations; and
- » comment on the findings of the environmental assessments.

During the decision-making phase:

- » be advised of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The public participation process therefore aims to ensure that:

» Information that contains all the relevant facts in respect of the application is made available to I&APs for review.
» Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the proposed facility.
» Adequate review periods are provided for I&APs to comment on the findings of the Scoping and EIA Reports.

In order to ensure effective participation, the public participation process includes the following:

» Distribution of project related information in the form of notification letters and a background information document at the outset of the project.

» Identification of potential I&APs including:
    - the competent authority (National Department of Environmental Affairs),
    - State departments that administer a law relating to matters affecting the environment relevant to an application for an environmental authorisation;
    - all organs of state which have jurisdiction in respect of the activity to which the application for environmental authorisation relates;
    - owners, person in control of and occupiers of the site where the activity is to be undertaken or to any alternative site where the activity is to be undertaken;
    - owners, person in control of, and occupiers of land adjacent to the site where the activity is to be undertaken or to any alternative site where the activity is to be undertaken;
    - the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
    - the municipality which has jurisdiction in the area; and
    - any other I&AP as required by the competent authority.
» Placement of site notices at the affected and alternative properties.
» Placement of advertisements in local newspapers.
» Compilation of an I&AP database which is updated throughout the Scoping and EIA process.
» On-going consultation with all registered I&APs regarding the progress in the EIA process through stakeholder consultation via notification letters, telephone calls and consultation meetings.
» Release of the Scoping and EIA reports for 30-day review periods.
» Holding meetings with I&APs to further facilitate the public participation process.

The following sections detail the tasks which were undertaken as part of the public participation process.

i. Stakeholder identification

In terms of the EIA Regulations, 2014, affected and surrounding landowners are identified and registered on the project database. Other stakeholders are required to formally register as stakeholders or interested and affected parties (I&APs) for the EIA process. The first step in the public participation process is to initiate the identification of potential I&APs. I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the study area and a registration process involving completion of a

registration and comment sheet. An initial list of stakeholders identified and registered is listed in **Table 3.2** below:

Table 3.2: List of Stakeholders identified during the Scoping Phase

Organs of State
National Government Departments
Department of Agriculture, Forestry and Fisheries (DAFF)
Department of Communications
Department of Energy (DoE)
Department of Mineral Resources (DMR)
Department of Public Works (DPW)
Department of Rural Development and Land Reform (DRDLR)
Department of Water and Sanitation (DWS)
Department of Science and Technology (DST)
Government Bodies and State Owned Companies
Eskom SOC Limited
National Energy Regulator of South Africa (NERSA)
Sentech
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
Square Kilometre Array: Southern Africa
Telkom SA Ltd
Provincial Government Departments
North West Provincial Department of Rural, Environment and Agricultural Development
North West Provincial Heritage Resources Agency
North West Provincial Department of Community Safety & Transport Management
Local Government Departments
Naledi Local Municipality
Dr Ruth Segomotsi Mompati District Municipality
Conservation Authorities
BirdLife South Africa
Wildlife and Environment Society of South Africa (WESSA)
Endangered Wildlife Trust (EWT)
Landowners
Affected landowners and tenants
Neighbouring landowners and tenants

ii. Register of Interested and Affected Parties

As per Regulation 42 of the EIA Regulations, 2014 all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix**

C for a listing of recorded parties). The register of I&APs contains the names, contact details and addresses of:

- » all persons who requested to be registered on the database in writing
- » all organs of state which hold jurisdiction in respect of the activity to which the application relates
- » all persons who submitted written comments or attended meetings during the public participation process

While I&APs have been encouraged to register their interest in the EIA process from the onset, the identification and registration of I&APs will be on-going for the duration of the EIA process. The register of I&APs will be updated throughout the EIA process, and will act as a record of the parties involved in the public participation process.

iii. Adverts and Notifications

In order to notify and inform the public of the proposed EIA process being undertaken for the facility and invite members of the public to register as I&APs for this process, an advertisement was placed in the Overvaal newspaper which is read in the broader area surrounding the site. The advert provides information on the following (in terms of Regulation 41):

» the details of the project and applicant and
» the availability of the Scoping Report for review.

Site notices (in English and Afrikaans) have been placed at visible points along the boundary of the site (Remaining Extent of the Farm Woodhouse 729), in accordance with the requirements of the EIA Regulations. Further notices will be placed at the Vryburg Public Library and the local and district municipal offices. In addition to the advertisements and site notices, key stakeholders and registered I&APs have been notified in writing of the commencement of the EIA process and the availability of the Scoping Report for review. Copies of all the advertisements, site notices and written notifications are included within **Appendix C**.

iv. Public Involvement and Consultation

In order to provide information regarding the proposed PV facility and the EIA process, a background information document (BID) has been compiled (refer to **Appendix C**). The BID has been distributed to identified stakeholders and I&APs, and additional copies will be made available at public venues within the surrounding areas of the study area. The BID is also available electronically on the Savannah Environmental website.

Through consultation with key stakeholders and I&APs, issues for inclusion within the issues-based scoping study have been identified and confirmed. In order to accommodate the varying needs of stakeholders and I&APs within the communities surrounding of the study area, as well as capture their views, issues and concerns regarding the facility, various opportunities have been and will continue to be provided in order for I&APs to note their issues. I&APs are being consulted through the following means:

» **Focus group meetings** (pre-arranged and stakeholders invited to attend)
» **One-on-one consultation meetings** (for example with directly affected or surrounding landowners)
» **Telephonic** consultation sessions
» Written, faxed or e-mail **correspondence**

v. Identification and Recording of Issues and Concerns

No comments have been received on the project to date. A Comments and Response Report will be compiled to include all comments received through the public participation process. The Comments and Response Report will be included in the Final Scoping Report within **Appendix C**.

3.5. Review of the Scoping Report

The Scoping Report will be made available for review from **13 November 2015 – 14 December 2015** at the following locations:

» Vryburg Public Library
» www.savannahSA.com

3.5.1. Evaluation of Issues Identified through the Scoping Process

Issues (both direct and indirect environmental impacts) associated with the proposed facility identified within the scoping process have been evaluated through desk-top studies. In identifying and evaluating potential impacts, Savannah Environmental has been assisted by the following specialist consultants as outlined in **Table 3.3** below.

Table 3.3: Specialist consultants appointed to evaluate the potential impacts associated with the Woodhouse Solar 2 PV Facility.

Specialist	Area of Expertise	Refer Appendix
Gerhard Botha (Savannah Environmental)	Ecology	Appendix D
Jaco van der Walt (Heritage Contracts and Archaeological Consulting CC (HCAC))	Heritage and Archaeology	Appendix E
Elize Butler (Bloemfontein National Museum)	Palaeontology	Appendix F
Jaco Jansen (Savannah Environmental)	Soils and Agricultural Potential	Appendix G
Jon Marshall (Afzelia Environmental Consultants)	Visual	Appendix H
Candice Hunter (Savannah Environmental)	Social	Appendix I

In order to evaluate issues and assign an order of priority, it was necessary to identify the characteristics of each potential issue/impact:

» *the nature,* which includes a description of what causes the effect, what will be affected and how it will be affected
» *the extent,* wherein it is indicated whether the impact will be local (limited to the immediate area or site of development),regional or national.

The evaluation of the issues resulted in a description of the nature, significance, consequence, extent, duration and probability of the identified issues, as well as recommendations regarding further studies required within the EIA phase.

3.5.2. Finalisation of the Scoping Report

The final stage in the Scoping Phase will entail the capturing of comments from stakeholders and I&APs on the Scoping Report in order to finalise and submit the Scoping Report to the DEA for consideration. It is the final Scoping Report upon which the decision-making environmental Authorities decide to accept or reject the undertaking of the EIA Phase of the process.

3.6. Regulatory and Legal Context

The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for energy generation projects of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. As solar energy development is a multi-sectoral issue (encompassing economic, spatial, biophysical, and cultural dimensions) various statutory bodies are likely to be involved in the approval process for the PV facility and the related statutory environmental assessment process.

3.6.1. Regulatory Hierarchy

At **National Level**, the main regulatory agencies are:

» *Department of Energy (DoE):* This Department is responsible for policy relating to all energy forms, including renewable energy, and is responsible for forming and approving the IRP (Integrated Resource Plan for Electricity).
» *National Energy Regulator of South Africa (NERSA):* This body is responsible for regulating all aspects of the electricity sector, and will ultimately issue licenses for solar energy developments to generate electricity.
» *Department of Environmental Affairs (DEA):* This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations. The DEA is the competent authority for the facility, and charged with granting the relevant environmental authorisation.
» *The South African Heritage Resources Agency (SAHRA):* SAHRA is a statutory organisation established under the National Heritage Resources Act, No 25 of 1999, as the national administrative body responsible for the protection of South Africa's cultural heritage.
» *National Department of Agriculture, Forestry, and Fisheries (DAFF):* This Department is responsible for activities pertaining to subdivision and rezoning of agricultural land. The forestry section is responsible for the protection of tree species under the National Forests Act (Act No 84 of 1998).
» *South African National Roads Agency (SANRAL):* This Agency is responsible for the regulation and maintenance of all national routes.
» *Department of Water and Sanitation:* This Department is responsible for water resource protection, water use licensing and permits.
» *Department of Mineral Resources (DMR):* Approval from the DMR may be required to use land surface contrary to the objects of the Act in terms of Section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002): In terms of the Act approval from the Minister of Mineral Resources is required to ensure that the proposed activities do not sterilise a mineral resource that might occur on site.

At the **Provincial Level**, the main regulatory agencies are:

» *Provincial Government of the North West – North West Department of Rural, Environmental and Agricultural Development (READ):* This Department is the commenting authority for the project as well as being responsible for issuing of any biodiversity and conservation-related permits which may be required.
» *North West Department of Community Safety and Transport Management*: This department provides effective co-ordination of crime prevention initiatives, provincial police oversight, traffic management and road safety towards a more secure environment.

» *North West Provincial Heritage Resources Agency (NWPHRA)*: This department identifies, conserves and manage heritage resources throughout the North West Province.

At the **Local Level,** the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the North West Province, both the local and district municipalities play a role. The local municipality is the Naledi Local Municipality which forms part of the greater Dr Ruth Segomotsi Mompati District Municipality.

3.6.2 Legislation and Guidelines that have informed the preparation of this Scoping Report

The following legislation and guidelines have informed the scope and content of this Scoping Report:

» National Environmental Management Act (Act No. 107 of 1998)
» EIA Regulations, published under Chapter 5 of NEMA (GNR R982 in Government Gazette No 38282 of December 2014)
» Naledi Local Municipality Integrated Development Plan (IDP) (2015-2016)
» Dr Ruth Segomotsi Mompati District Municipality Integrated Development Plan (IDP) (2015/2016)
» International guidelines – the Equator Principles and the International Finance Corporation and World Bank Guidelines.

Several other Acts, standards or guidelines have also informed the project process and the scope of issues assessed in this scoping report. A listing of relevant legislation is provided in **Table 3.4**, where the level of applicability of the legislation or policy to the activity/project is detailed.

Table 3.4: Relevant legislative permitting requirements applicable to the proposed Woodhouse Solar 2 PV Facility.

Legislation	Applicable Requirements
	National Legislation
National Environmental Management Act (Act No 107 of 1998)	The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations. In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. In terms of GN R982, R983, R984 and R985 of December 2014, a Scoping and EIA Process is required to be undertaken for the proposed PV facility.
National Environmental Management Act (Act No 107 of 1998)	In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of the facility to ensure that any pollution or degradation of the environment associated with the development of the facility is avoided, stopped or minimised. In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.
Environment Conservation Act (Act No 73 of 1989)	National Noise Control Regulations (GN R154 dated 10 January 1992)
National Water Act (Act No 36 of 1998)	Water uses under S21 of the Act must be licensed, unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation (and then registration of the water use is required). Consumptive water uses may include the taking of water from a water resource and storage - Sections 21a and b. Non-consumptive water uses may include impeding or diverting of flow in a water

Legislation	Applicable Requirements
	course - Section 21c; and altering of bed, banks or characteristics of a watercourse - Section 21i.
Minerals and Petroleum Resources Development Act (Act No 28 of 2002)	A mining permit or mining right may be required where a mineral in question is to be mined in accordance with the provisions of the Act. S53 Department of Mineral Resources: Approval from the Department of Mineral Resources (DMR) may be required to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002): In terms of the Act approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that might occur on site.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	» Measures in respect of dust control (S32) and National Dust Control Regulations of March 2014. » Measures to control noise (S34) - no regulations promulgated yet.
National Heritage Resources Act (Act No 25 of 1999)	» Stipulates assessment criteria and categories of heritage resources according to their significance (S7). » Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35). » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36). » Lists activities which require developers any person who intends to undertake such an activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development (S38). » Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44).
National Environmental Management: Biodiversity Act (Act No	» Provides for the MEC/Minister to identify any process or activity in such a listed

Legislation	Applicable Requirements
10 of 2004)	ecosystem as a threatening process (S53) » A list of threatened and protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations). » Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 37596, GN 324), 29 April 2014). » This Act also regulates alien and invader species.
Conservation of Agricultural Resources Act (Act No 43 of 1983)	» Prohibition of the spreading of weeds (S5) » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) & restrictions in terms of where these species may occur. » Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048).
National Forests Act (Act No. 84 of 1998)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'.
National Veld and Forest Fire Act (Act 101 of 1998)	In terms of S13 the landowner must ensure that the firebreak is wide and long

Legislation	Applicable Requirements
	enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.
Hazardous Substances Act (Act No 15 of 1973)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product; and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list.

Legislation	Applicable Requirements
	» Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of this Act (GN 921), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in any other way rendered unfit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented.
Subdivision of Agricultural Land Act (Act No 70 of 1970)	Details land subdivision requirements and procedures. Applies for subdivision of all agricultural land in the Province.
National Road Traffic Act (Act No 93 of 1996)	» The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. » Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. » The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to

Legislation	Applicable Requirements
	speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.
Provincial Legislation	
Transvaal Nature Conservation Ordinance (No. 12 of 1983)	The Nature Conservation Ordinance accompanied by all amendments is regarded by the North West Department of Rural, Environment and Agricultural Development as the legal binding, provincial documents, providing regulations, guidelines and procedures with the aim of protecting game and fish, the conservation of flora and fauna and the destruction of problematic species. In its entirety, with special reference to: » Schedule 2: Protected Game » Schedule 3: Specially Protected Game » Schedule 4: Protected Wild Animals » Schedule 5: Wild Animals » Schedule 7: Invertebrates » Schedule 11: Protected Plants » Schedule 12: Specially Protected Plants
Bophuthatswana Nature Conservation Act (Act 3 of 1973)	The Nature Conservation Ordinance accompanied by all amendments is regarded by the North West Department of Rural, Environment and Agricultural Development as the legal binding, provincial documents, providing regulations, guidelines and procedures with the aim of protecting game and fish, the conservation of flora and fauna and the destruction of problematic species. In its entirety, with special reference to: » Schedule 1: Protected Game » Schedule 1A: Specially Protected Game

Legislation	Applicable Requirements
	» Schedule 2: Ordinary Game » Schedule 3: Wild Animals In Respect Of Which The Provision Of Section 3 (a) (ii) Apply » Schedule 4: Wild Animals To Which The Provisions Of Section 4 (1) (b) Do Not Apply » Schedule 7: Protected Plants » Schedule 7: Specially Protected Plants

DESCRIPTION OF THE RECEIVING ENVIRONMENT CHAPTER 4

This section of the Scoping Report provides a description of the environment that may be affected by the Woodhouse Solar 2 PV Facility. This information is provided in order to assist the reader in understanding the receiving environment within which the proposed facility is situated. Features of the biophysical, social and economic environment that could directly or indirectly be affected by, or could affect, the proposed development have been described. This information has been sourced from existing information available for the area, and aims to provide the context within which this EIA is being conducted. As the layout and/or ancillary infrastructure associated with the construction of the Woodhouse Solar 2 PV Facility could be located anywhere within the Remaining Extent of the Farm Woodhouse 729, the full extent of the site is described below. A comprehensive description of each aspect of the affected environment is included within the specialist scoping reports contained within the **Appendices D-I**.

4.1. Legal Requirements as per the EIA Regulations, 2014

This chapter of the scoping report includes the following information required by Appendix 2: Content of the Scoping Report of the EIA Regulations, 2014:

Requirement	Relevant Section
(h)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The environmental attributes associated with the development of the PV facility is included as a whole within this chapter. The environmental attributes that are assessed within this chapter includes the following:
	• The regional setting referring to the location of the site. This is included in section 4.2.
	• The climatic conditions associated with the Vryburg area, as well as the site. This is included in section 4.3.
	• The biophysical characteristics of the area including topography, soil types, agricultural potential and ecological profile. This is included within section 4.4.
	• The visual quality of the area, as well as the effect of the development of the PV facility on the visual characteristics. This is included in section 4.5.
	• Available access and transportation routes in the region of the study area and surrounding the site. This is

Requirement	Relevant Section
	included in section 4.6.
	• The social characteristics, including the socio-economic profiles of the regional context and local context. This is included in section 4.7
	• Heritage features that occur in the region, including archaeological and palaeontological resources. This is included in section 4.8.

4.2 Regional Setting: Location of the Study Area

The North West Province is situated in the north of South Africa. The province shares the boundaries with the Free State, Limpopo and Gauteng Provinces, and is the gateway to Botswana. It covers an area of ~104 882km². Much of the province consists of flat areas of scattered trees and grassland. The Vaal River flows along the southern border of the province. Mahikeng (previously Mafikeng) is the capital of the province. The biggest cities in the province are Mmabatho, Potchefstroom and Klerksdorp. Other main towns within the province include Brits, Rustenburg, and Lichtenburg. The North West Province is divided into four district municipalities which include: Bojanala District Municipality, Ngaka Modiri Molema District Municipality, Dr Ruth Segomotsi District Municipality and Dr Kenneth Kaunda District Municipality, which are further subdivided into 19 local municipalities.

The site for the proposed Woodhouse Solar 2 PV facility is located approximately 10km south-east of Vryburg on the Remaining Extent of the Farm Woodhouse 729 (refer to **Figure 4.1**). The site falls under the jurisdiction of the Naledi Local Municipality (NLM) and within the greater Dr Ruth Segomotsi Mompati District Municipality (DRSMDM) in the North West Province.

The associated land for the development of the facility is owned by a private landowner, and a lease-agreement with Genesis Woodhouse Solar 2 (Pty) Ltd will be undertaken for the life of the facility. The site is located close to the head of a shallow valley that breaks through a range of low hills which extends roughly in a south west to north eastern direction towards Gauteng, dividing the West Griqualand in the north from the Karoo in the south. A small portion of the site has been used for cultivation activities. The farm portion is traversed by the R34 and a secondary main road, with the N18 also in close proximity to the site. This enables relatively easy access to the site.

The location of the site also falls within a Renewable Energy Development Zone (REDZ 6). These zones have been identified as areas earmarked for the development of renewable energy facilities. The entire town of Vryburg and its surrounding areas are included within this zone, which is considered suitable for the development of solar energy facilities. Assessments have been undertaken by the CSIR to determine what the landscape sensitivity is within the REDZ. **Figure 4.2** below provides an illustration of the landscape sensitivity within the Vryburg REDZ 6. The site falls almost completely within an area classified as a low landscape sensitivity. Thus the proposed site can be considered as preferred and suitable for the development of PV facility.

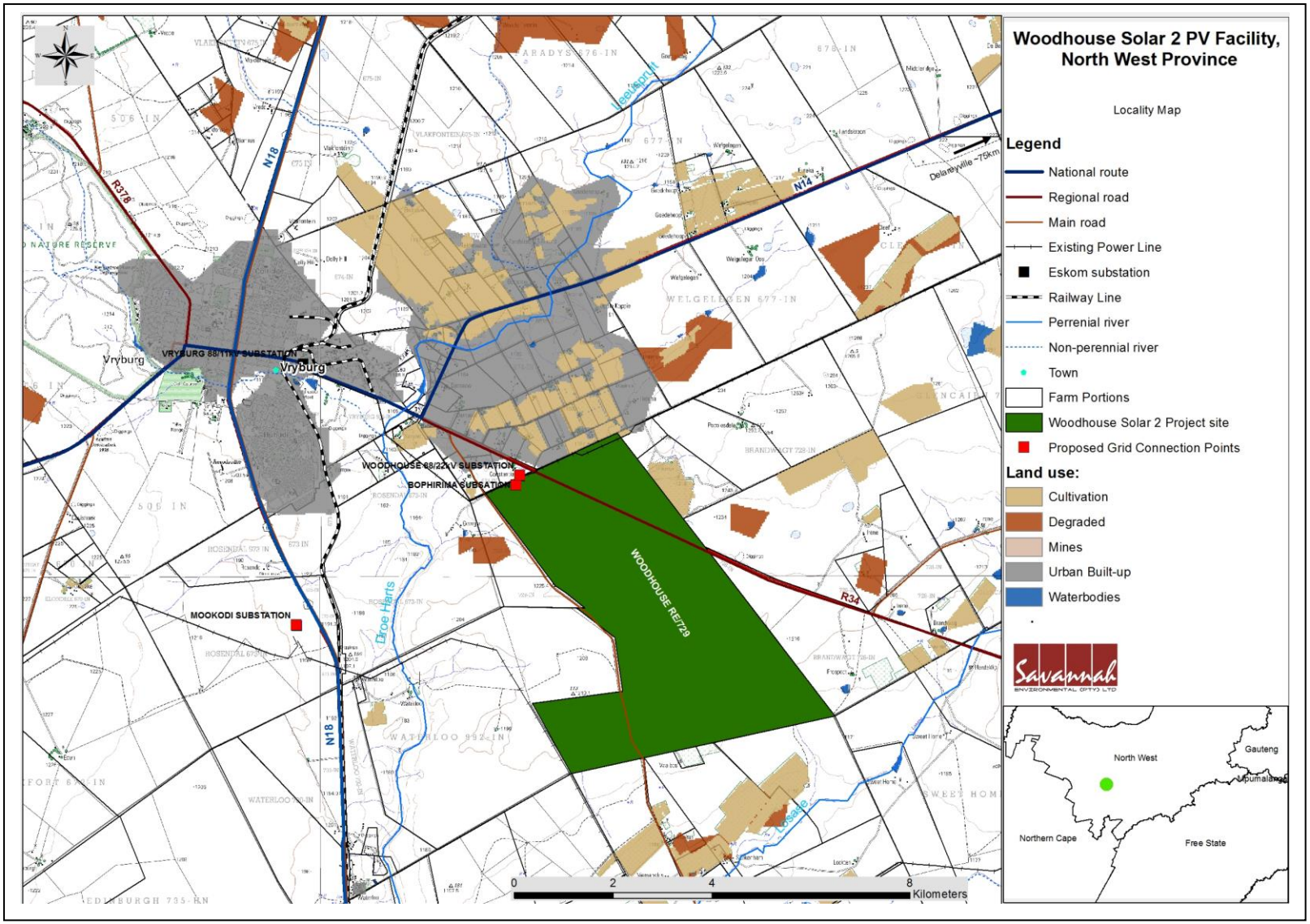

Figure 4.1: Regional context of the Woodhouse Solar 2 PV Facility site.

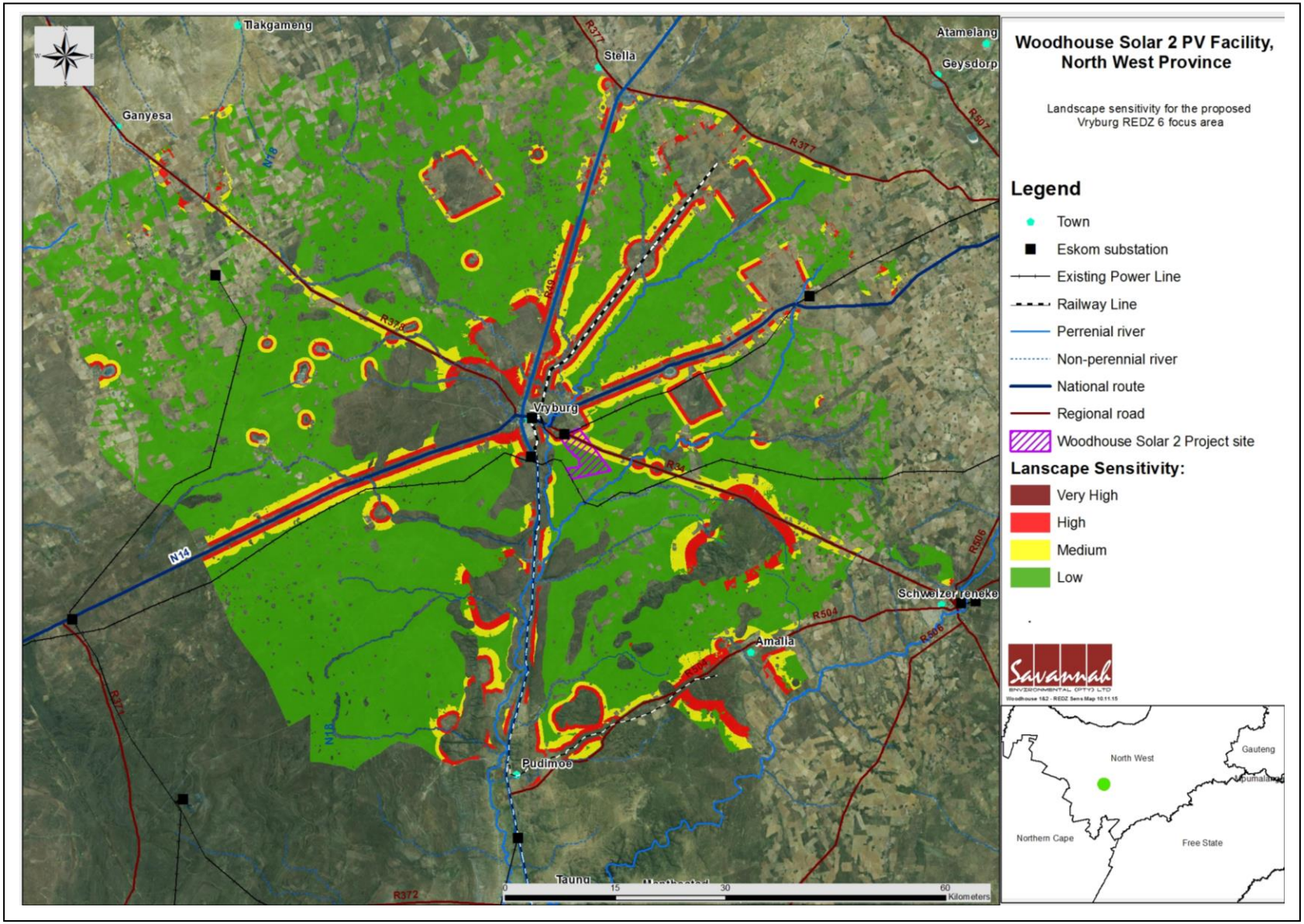

Figure 4.2: An illustration of landscape sensitivity of the Woodhouse Solar 2 PV Facility site.

4.3 Climatic Conditions

The climate of Vryburg has the following characteristics:
i) rainfall occurs mainly in summer and autumn with very dry winters; ii) the mean annual rainfall is about 477 mm with January being the wettest month averaging at about 89 mm and July being the driest with an average of only 4 mm; iii) the average annual temperature in Vryburg is 17.9 °C with January being the warmest (Ave. 24.8 °C) and July being the coldest (Ave 9.3 °C); and iv) frost is frequent to very frequent in winter (mean frost days: 40). The North West Province receives a high average daily direct normal and global horizontal irradiation (2120-2240 kWh/m2/annum) which indicates that the regional location is appropriate for the solar energy facility. Factors contributing to the location of the PV facility includes the relatively high number of daylight hours and the low number of rainy days experienced in this region.

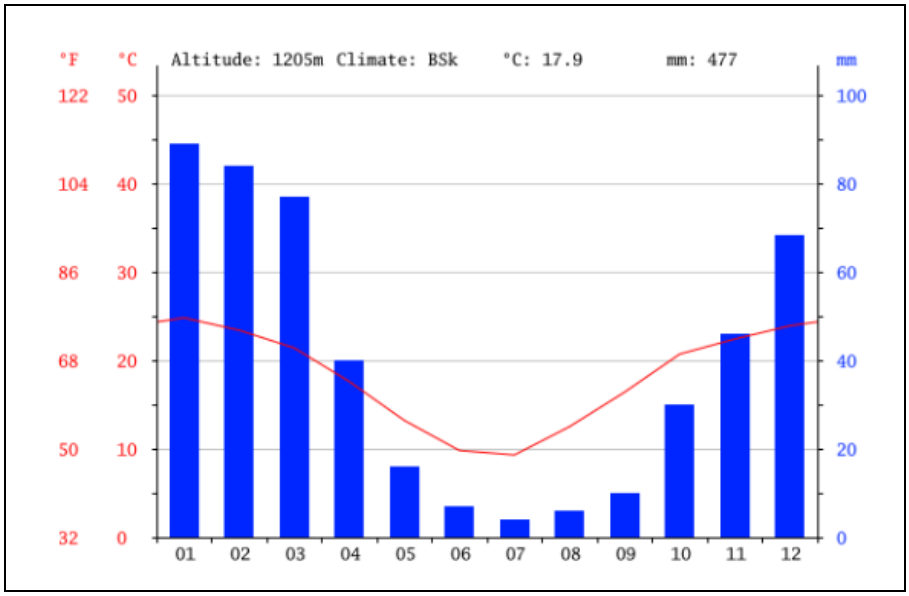

Figure 4.3: Climate graph for the town of Vryburg, North West Province.

4.4 Biophysical Characteristics of the Study Area

4.4.1 Topography

The region within which the study area is located can be described as a flat plateau. The average slope of the area is between 0% and 2%. The site is situated at elevations of between 1 197m and 1 230m above sea level with an average slope of less than 1.5% and a maximum slope of 5.8%. The largest portion and central part of the site is situated on a relative flat plateau with gradual slopes towards lower lying areas to the north, south and the north-west of the site. The north and south facing slopes are relatively gradual (average northern slope: 2.1% and average southern slope: 3.4%), although the north-facing slopes contain areas (just below the plateau edge) which are more steep

(Max slope: 5.8 %). A level development area is desirable for the construction of the facility.

4.4.2. Soil types

The underlying geology of the study area is dominated by andesite and basalt lavas of the Ventersdorp Supergroup. Quartzite of the Vryburg formation and Dwyka tillite occur sporadically in places. Dolerite, diabase and Calcrete may also be spread across the proposed site.

The most relevant soil properties of the site are described below (refer to **Figure 4.4**):

» **Land type Ae** covers a large area of the proposed site. Soils of this land type are red and yellow well-drained sandy soils with a high base status found directly on semi-shallow underlying rock. Rock-soil complexes cover a large percentage of the area. An orthic A horizon is mostly found directly on top of hard rock, or on a red apedal B and seldom on a yellow-brown apedal B. The B horizon may contain fragments of the eroded mother material. High clay content B horizons are also present and occupy ~ 10% of the area. Soils of this type form part of the Shortlands soil form.
» **Land type Ag** is rocky with almost 20% rock outcrops present. Shallow Mispah and Glenrosa soil forms are abundantly found. Some red and yellow well-drained sandy soil with high base status may occur in places.
» There are only two other land types in the surrounding area, namely Ea12 and Fc4. These soils are very similar to the previously mentioned land types.
» The general soil pattern is classified as LP1 which is described as soils with limited pedological development, usually shallow on hard or weathering rock, with or without intermittent diverse soils and CM which are red soils with a high base status. Lime is generally absent in the landscape but the geology does produce alkaline soils (Fey, 2010).
» Soil classes provided by Fey, 2010, indicate that lithosols are very abundant and hard rock outcrops are also present. Lithosols are shallow soils on hard or weathering rock (Fey, 2010). They may receive water runoff from associated rock and are not generally deep because of their association with depth limiting rock layers. Soil horizons associated with the lithic group are lithocutanic B and hard rock, which occur in Glenrosa, Mispah and Cartef soil forms.
» There are also cumilic soils present which are complementary to the lithosols but are found in lower areas of the landscape where deposition is ongoing (Fey, 2010). Soil horizons associated with the cumulic group are neocutanic or neocarbonate B, regic sand, deep E or stratified alluvium, which occur in Tukulu, Oakleaf, Montagu, Augrabies, Namib, Vilafontes, Kinkelbos, Fernwood and Dundee soil forms.

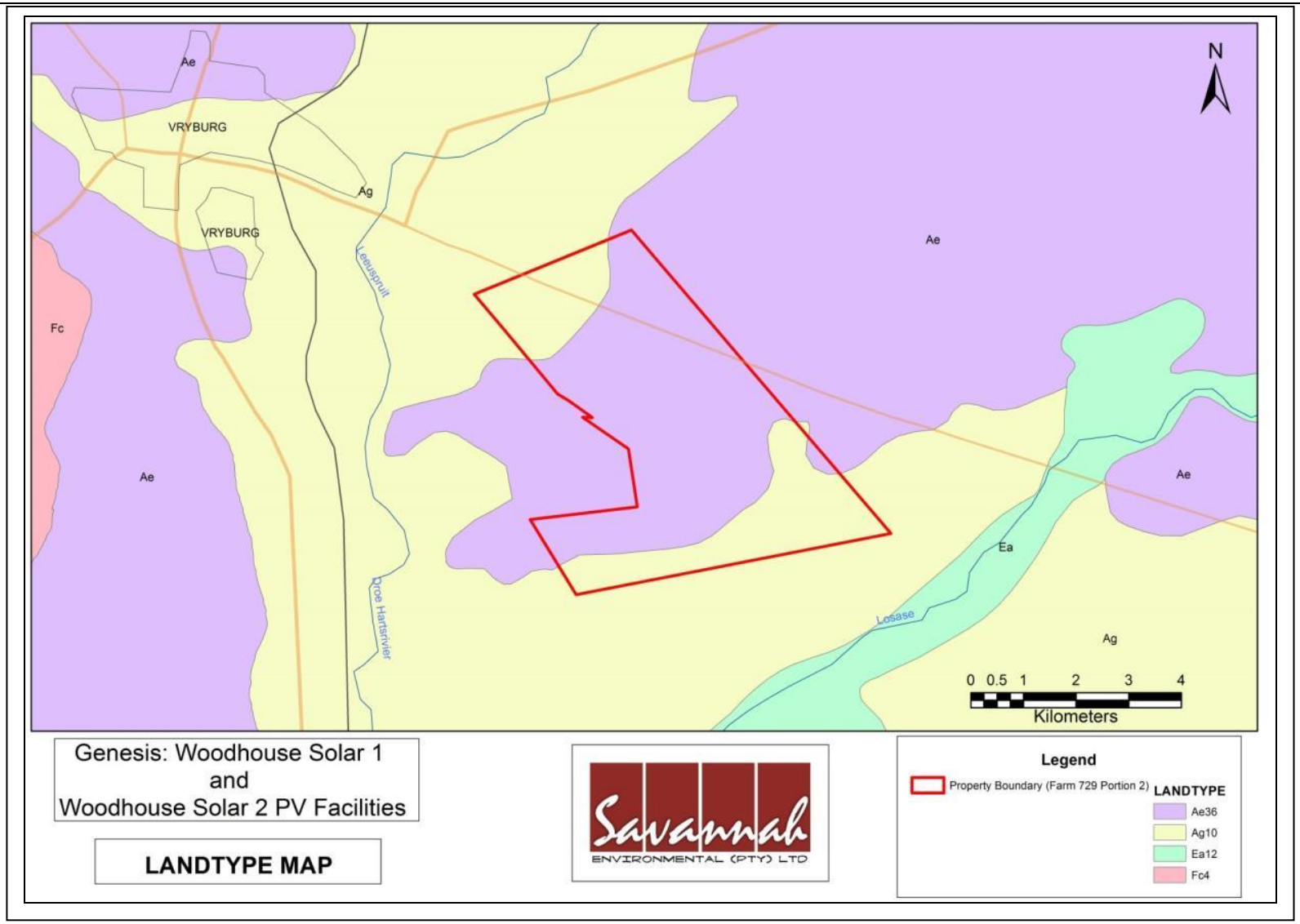

Figure 4.4: Landtype properties of the Woodhouse Solar 2 PV Facility site.

4.4.3. Agricultural Potential

The entire site is classified as Land Class V, which is associated with little or no erosion hazard but has other limitations which are impractical to remove that limit its use mainly to grazing and habitat for wildlife. These limitations restrict the type of plants that can be grown and prevent normal tillage of cultivated crops. The landscape is nearly flat. Some areas are stony, while others have climatic limitations, or have some combination of these limitations.

The climatic conditions of the site are associated with a moisture availability of class 4 which equates to moderate to severe limitations accompanied by low and unreliable rainfall. Temperature and rainfall variations are high and restrict regular crop production. Various factors have constraints that prohibit crop production and lead to insignificant agricultural activities except that of grazing. The agricultural potential of the site can thus be described as low.

4.4.4. Ecological Profile

Vegetation

The site is situated in the Savanna biome and Eastern Kalahari Bushveld Bioregion. The vegetation in and surrounding the site is the Ghaap Plateau Vaalbosveld. The distribution of the vegetation type is spread across the Northern Cape and North West Province, from about Campbell in the south east of Danielskuil through Reivilo to around Vryburg in the north. This vegetation type has been described by Mucina and Rutherford (2006) as a flat plateau with well-developed shrub layer with *Tarchonanthus camphoratus* and *Acacia karroo*. The open tree layer has *Olea europaea subsp. africana*, A*. tortilis, Ziziphus mucronata* and *Searsia lanceae*. *Olea* is more important in the southern parts of the unit, while *A. tortilis*, *A. hebeclada* and *A. mellifera* are more important in the north and part of the west of the unit. Much of the south-central part of this unit has remarkably low cover of *Acacia* species for an arid savanna and is dominated by the non-thorny *T. camphoratus*, *R. lanceae* and *O. europaea subsp. africana*.

A total of 369 indigenous species have been recorded in the Vryburg region according to the SANBI database. It is highly unlikely that all of these species will occur within the study area and project site. Alien invasive species (33) have also been recorded within the relevant quarter degree grids.

Listed and protected plant species

The vegetation types of South Africa have been categorized according to their conservation status which is, in turn, assessed according to the degree of transformation and rates of conservation. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. The level at which an ecosystem becomes Critically Endangered differs from one ecosystem to another and varies from 16% to 36% (Driver et al. 2005). The conservation status of the Ghaap Plateau Vaalbosveld which occurs within the site is illustrated within the table below (**Table 4.1**).

Table 4.1: Conservation status of the vegetation type occurring in and around the site

Vegetation Type	Target (%)	Conserved (%)	Transformed (%)	Conservation Status	
				Driver *et al*., 2005; Mucina & Rutherford, 2006	National Ecosystem List (NEM:BA)
Ghaap Plateau Vaalbosveld	16%	0	1%	Least Threatened	Not Listed

According to Mucina and Rutherford (2006) the vegetation type is not protected within any formal conservation areas, and only 1% of this unit has been transformed. The conservation status of this unit is classified as Least Threatened and is not listed under the National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environment Management: Biodiversity Act (Act No. 10 of 2004).

A species list was obtained from the Plants of Southern Africa database (POSA) for the relevant degree grids. The species on this list were evaluated to determine the likelihood of any of them occurring within the study area. Of the species that are considered to occur within the geographical area under consideration, there were 19 species which are regarded as conservation worthy. Three species recorded in the degree grids are listed on the Red List plant species. According to the South African Red List Categories, one is listed as Rare (*Gnaphalium nesonii*), one Vulnerable (*Rennera stellata*) and one Near Threatened (*Lithops lesliei*). *Boscia albitrunca* is the only tree species protected according to the National Forest Act (NFA) that may potentially occur within the site. The remaining 15 species are protected within the Transvaal Nature Conservation Ordinance (TNCO) and Bophuthatswana Nature Conservation Act (BNCA).

Conservation Planning

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services. These form the key output of a systematic conservation assessment and are the biodiversity sectors inputs into multi-sectoral planning and decision making tools. The use of CBAs within the North West Province follows the definition laid out in the guideline for publishing bioregional plans (Anon, 2008). The purpose of the CBA is to indicate spatially the location of critical or important areas for biodiversity in the landscape. The CBA, through the underlying land management objectives that define the CBA, prescribes the desired ecological state in which the province would like to keep this biodiversity. Therefore, the desired ecological state or land management objective determines which land-use activities are compatible with each CBA category based on the perceived impact of each activity on biodiversity pattern and process.

The site consists of areas of Aquatic as well as Terrestrial Critical Biodiversity Areas.

Regarding the Terrestrial Critical Biodiversity Areas, almost half of the site is covered by some sort of CBA. The largest portion of the CBA consists of Important Ecological Corridors (T2 CBA). Three hill features have been classified as T2 CBA (Hills). The south-western corner of the study site is classified as a T2 CBA (features) according to its association with carbonate rocks and because of its importance as a potential groundwater recharge zone. The only T1 CBA found within the site is located in a small section of the north-western corner and is due to the areas ecological function as a critical linkage and corridor zone (refer to **Figure 4.5**). This area has however been impacted by overgrazing, past disturbance and infrastructure development which has reduced its sensitivity.

As for the Aquatic Critical Biodiversity Areas, these CBAs cover a much more extensive portion of the site, with more than half of the area falling within some kind of CBA. The largest portion of CBA falls within the A2 CBA due to its location within a sub-Quaternary catchment (Droë Harts) as identified by the CSIR national assessment. The wetland body located within the centre of the site is regarded as an A1 CBA wetland feature and the buffer area around the wetland as an A1 ESA (Ecological Support Area) area. The smaller wetland bodies occurring in and around the site are regarded as A2 CBA wetland features and their buffer areas as A2 ESA. A2 ESA (Dolomite) is consistent with T2 CBA and covers the south-western corner of the site (refer to **Figure 4.6**).

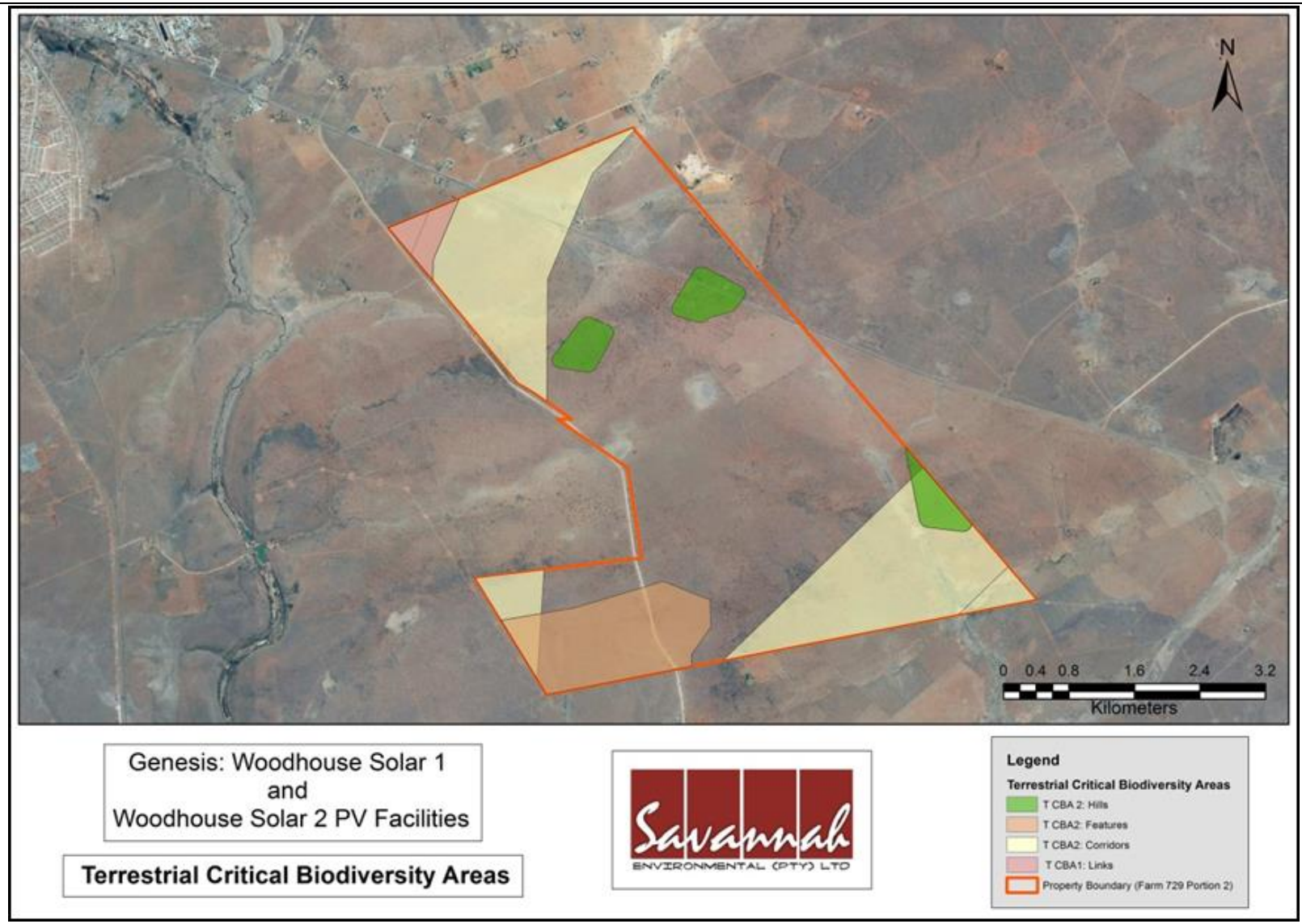

Figure 4.5: Terrestrial Critical Biodiversity Areas map of the proposed site.

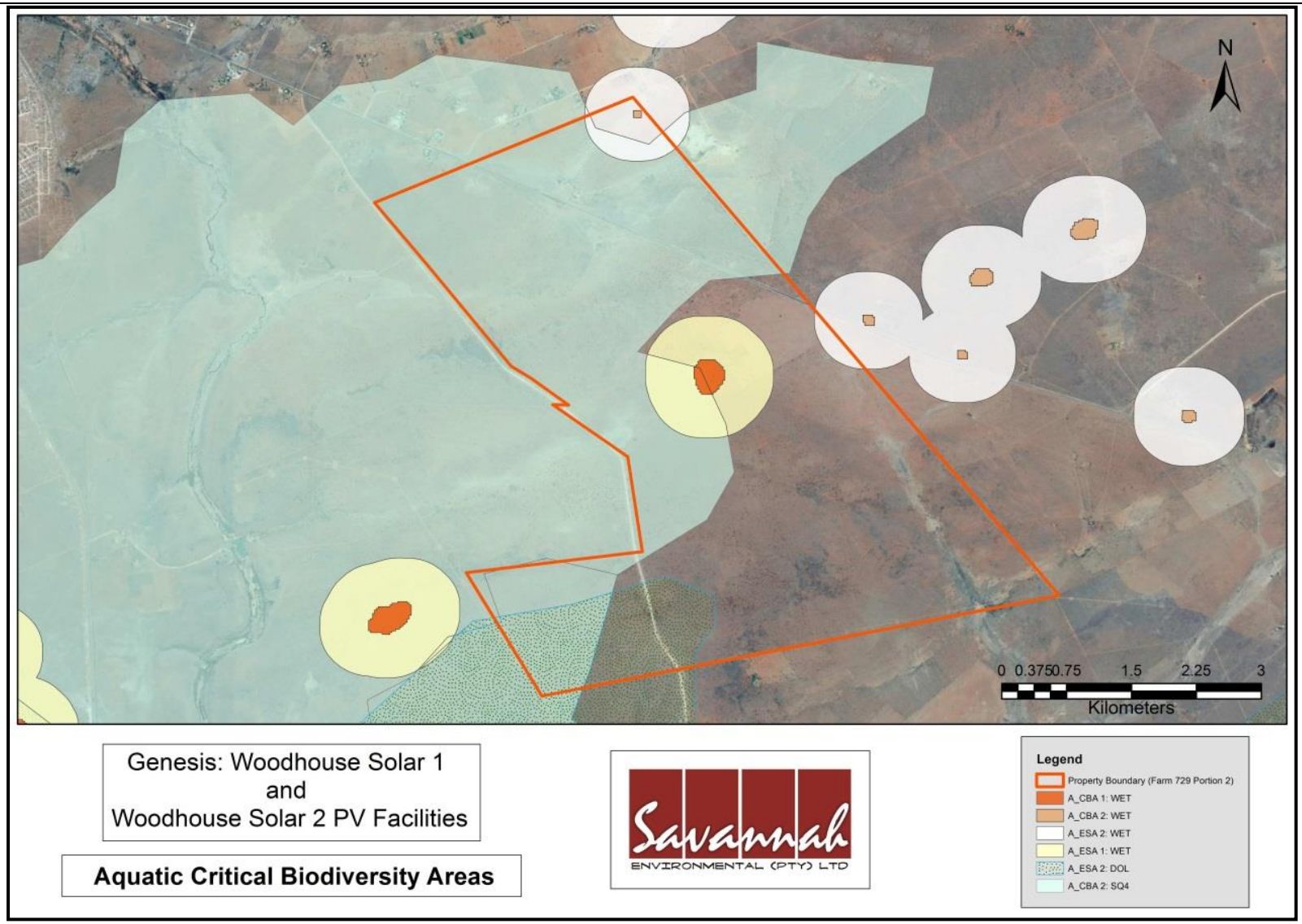

Figure 4.6: Aquatic Critical Biodiversity Areas map of the proposed site and surrounding environment.

To provide a better understanding of the state of the environmental sensitive areas, specifically relating to Critical Biodiversity Areas which occur within the study area, a Scoping phase inspection of the site was conducted. This inspection was aimed at determining the status, condition and capabilities of these areas to fulfil their irrespective ecological functions and to determine whether the development of the PV facility will have a potential detrimental impact on these areas and their functions. It should however be noted that the inspection was not undertaken within the growing season of the area and thus limitations in regards to the results need to be considered. A more formal and thorough inspection of the site will be undertaken within the EIA phase to determine if the impacts identified within the scoping phase are significant and what the true extent will be.

The following observations regarding the CBAs within the study area were made during the site inspection.

Terrestrial 1 CBA (Critical linkage and core corridor zone)

This Semi-natural Kalahari Bushveld can be described as a low laying plains shrub veld, with a dense, short woody layer dominated by Trachonanthus camphoratus and Grewia flava. The majority of the north-western section of the farm portion is extremely dry and moderately overgrazed. A few trampled cattle paths and bare patches of exposed soil are present as a result of the combination of grazing and the draught conditions experienced within the area. The dominance of Eragrostis rigidior is an indication of past disturbance and overgrazing. Other disturbances within the area include the existing overhead power lines, service and farm gravel roads, boarder fences and the Woodhouse Substation (refer to **Figure 4.7**). The function of this area as a CBA is to provide a critical linkage and form a core corridor area between the upper dry Kalahari Bushveld and the lower lying Droë Hartsrivier Valley. When taking into account the small size of the T1 CBA located within the proposed footprint area, the fractured nature of this area and the number of barriers isolating this section from the rest of the T1 CBA, including numerous fences, the provincial gravel road (to Amalia) and the numerous smaller farm tracks and service roads traversing the area, the capabilities of this small portion of T1 CBA to contribute as an important linkage and corridor is considered to be extremely limited. Furthermore the loss of this small section of semi-natural T1 CBA as a result of development is expected to have an insignificant effect on the limit of acceptable change within this T1 CBA unit as well as a on the potential loss of irreplaceable biodiversity patterns. Thus it is recommended that this area is excluded from the T1 CBA and rather be incorporated within the T2 CBA (Corridor).

Figure 4.7: An illustration of the landscape falling within the T1 CBA (Linkage & Corridor Zone). Due to the drought and moderate levels of overgrazing the grass and herbaceous layer is sparsely and relatively poorly represented. Other disturbances include power lines, service and farm roads, the Woodhouse Substation and the Provincial gravel road.

Terrestrial 2 CBA (Corridor Zones) as well as Aquatic 2 CBA (SQ4 or important Sub-Quaternary Catchment Areas)

The majority of the T2 CBA areas within the farm portion are associated with corridor zones linking the lower lying valleys (Droë Harts- and Losase Rivers) with the higher lying dry Kalahari bushveld. These areas also fall within A2 CBAs (SQ4) Most of the T2/A2 CBA within the farm portion falls within a landscape similar to that described for the T1 CBA, namely a semi-natural dry Kalahari Bushveld, moderately disturbed, mainly due to overgrazing. Furthermore, the landscape is highly fractured by access roads, fencing and the larger provincial gravel road as well as the R34 Road (refer to **Figure 4.8**). Having said this, the area still provides habitat for numerous smaller mammals as well as reptile species. According to the description of a T2 Corridor Zone within the North West Province Biodiversity Conservation Assessment Technical Report, these corridor/sub-Quaternary catchment networks should focus on all biodiversity patterns and ecological processes. Taking this into account together with the field observations and the nature of the proposed development, the most significant impacts are expected to be during the construction phase. However with careful planning and the necessary mitigation measures in place, the affected footprint area can be restored and rehabilitated to an extent where ecological function and biodiversity is restored and maintained albeit in a slightly altered state. Thus although the area was confirmed as T2/A2 CBAs it can be concluded that the proposed development will not result in a severe alteration of the functionality of the area.

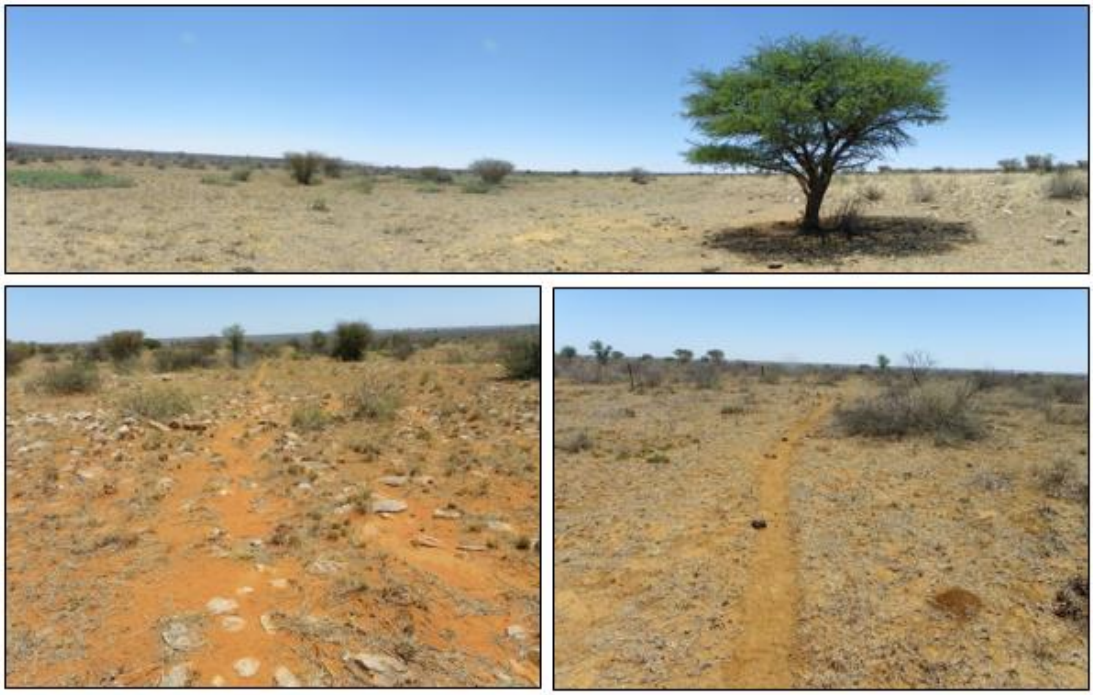

Figure 4.8: Vegetation and landscape characteristics within the T2 CBA (Corridor) and A2 CBA (SQ4). Again as in the case of the T1 CBA (Linkage and Critical Corridor Zone) the area is moderately disturbed due to overgrazing.

Terrestrial 2 CBA (Hills)

The ridges and hilly areas located mainly within the central portion of the study area differ in plant structure and species composition from the surrounding lower lying areas (refer to **Figure 4.9**). The vegetation of these habitats can be described as semi-natural to natural Kalahari Thornveld dominated by a more open taller woody layer consisting out of a few Acacia species (*A. mellifera* subsp. *detinens*, *A. tortilis, A. erioloba, A. karroo* and *A. robusta*) and broad-leaved shrubs such as T. camphoratus, G. flava and a few stouted growth forms of *Boscia albitrunca*. Due to the change in landscape morphology, species composition and habitat structure, these areas contribute to biodiversity and subsequently these areas can be confirmed as T2 CBA areas.

Figure 4.9: The ridges and hilly landscape is characterized by a number of Acacia species as well other species restricted to these rocky areas. Thus these habitat types contribute to the overall habitat and species diversity of, not only the proposed farm portion but also of the greater surroundings.

Terrestrial 2 CBA (Features) as well as Aquatic 2 CBA (Dolomite)

The south eastern corner of the property has been categorized as a CBA2 area due to the presence of dolomites and their association with important aquifers. This low lying plans shrub veld is in a relative natural condition with only slight indications of overgrazing in certain areas (refer to **Figure 4.10**). The proposed activities associated with the development will have little impact on the integrity the CBA areas as potential disturbance and pollution of the important features (presence of dolomites and associated aquifers) can be regarded as low to insignificant.

Figure4.10: Landscape and vegetation of T2/A2 CBA (Feature/Dolomite). Note that the area is less overgrazed with a better covering of grass.

Aquatic 1 CBA (Wetlands) as well as Aquatic 1&2 ESAs (Wetland Buffer Areas)

The relatively large pan (depression) wetland classified as an A1 CBA has been confirmed during the scoping phase site inspection (refer to **Figure 4.11**). This non-perennial depression wetland contributes not only to habitat and species diversity but also provide vital ecological functions such as;

» Accumulation and filtering of runoff before water seeps into ground water.
» Possible seasonal surface water during periods of high rainfall (although this is very unpredictable).
» Seasonal availability of associated biota (most notably invertebrates) that serves as important food sources for especially reptiles and birds.
» Possible habitat for Giant Bullfrog (Pyxicephalus adspersus), a threatened species.
» Seasonal grazing during periods of higher moisture.
» Below-ground storage and channelling of water.

In order to maintain their integrity and ecological functions, sufficient buffer areas around these wetland bodies should be maintained in natural or semi-natural condition. Currently the state of these allocated buffer areas (A1/A2 ESAs) can be confirmed as semi-natural and are vital for the maintenance of the depression wetlands themselves.

Figure 4.11: Wetland depression/Pan classified as A1 CBA (wetland) as well as the fringing vegetation classified as A2 ESA (Wetland Buffer). These wetlands play an important role in biodiversity, hydrological as well geohydrological functioning of the landscape. Most of these pans are non-perennial, containing surface water only after sufficient precipitation and normally only for a short period of time.

Geohydrology

The following conclusions can be made regarding the groundwater resource potential within the Naledi Local Municipality. Based on similarities in the hydrological properties the area can be broadly subdivided into three potential aquifer types.

» *Basement Aquifers*: Consisting of Kraaipan, Ventersdorp volcanics and Archaean intrusive rocks. These aquifer types extend over a very large area, but are concealed by a veneer of Tertialry-to-Quaternary terrestrial sedimentary rocks.
» *Inter-granular aquifers*: Comprise of alluvial gravel and clastic sedimentary rocks of the Ventersdorp and Kalahari Group. The alluvial gravel aquifers often occur along major rivers that are located southeast of Stella and south of Vryburg towns.
» *Karst aquifers*: These aquifers are associated with the Malmani Subgroup of the Transvaal basin and consist out of limestone, dolomite and calcareous sedimentary rocks that largely cover the area south of Vryburg town.

The southern part of the Naledi Local Municipality is characterised overall by good groundwater potential. The most significant zone covers approximately 14% of the municipality, is located within carbonate rocks to the south of the municipality and includes a very small section of the study site. These areas also play an important role as recharge zones.

Faunal Communities

Mammals
Although the potential diversity of mammals within the proposed study area is high with as many as 55 terrestrial mammals and 9 bat species present, there are several factors which will reduce the actual number of species present. This includes the proximity to the town of Vryburg and vehicle movements along the roads.

Listed mammals which may be present within the study area include the White-tailed Mouse *Mystromys albicaudatus* (Endangered), Brown Hyaena *Hyaena brunnea* (Near Threatened), Black-footed Cat *Felis nigripes* (Vulnerable), Honey badger *Mellivora capensis* (IUCN LC, SA RDB EN), South African hedgehog *Atelerix frontalis* (SA RDB NT) and Ground Pangolin *Smutsia temminckii* (VU).

Reptiles and Amphibians
Of the 27 reptilian species that have been recorded with the 2624 and 2724 degree grids, eight species have been recorded within the quarter degree grids (2624DD, 2724BB). None of which are listed as Red Data species.

Fifteen amphibian species have been recorded within the degree grids and of these 15 species eight species were recorded for the quarter degree grids (QDG) within which the site is located. One near threatened species (*Pyxicephalus adspersus*, Giant Bull Frog)

have been recorded for the degree grid. Although this species was not recorded for the QDG, it is still likely for this species to occur within the site as potential suitable habitat (pans and drainage lines) is available.

Avifauna

According to the SABAP2 database 167 species have been recorded from the quarter degree grids 2624DD and 2724BB. From the list, 8 IUCN-listed species are known from the area, of which three are likely to utilize or pass through the site at least on an occasional basis. Wetland bodies, drainage lines, dams and possible bush clumps can be regarded as potential important habitats.

4.5 Visual Quality

Landscape character is defined as "a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another". Landscape Character is a composite of a number of influencing factors including:

- Landform and drainage
- Nature and density of development
- Land use
- Vegetation patterns

Landform and Drainage

The site is located close to the head of a shallow valley that breaks through a range of low hills which extends roughly in a south west to north eastern direction towards Gauteng, dividing the West Griqualand in the north from the Karoo in the south. The head of the valley is a watershed between catchments. The watercourse that flows south through the valley, known as the Harts River, is a tributary of the Vaal River. A number of non-perennial streams flow through the side valleys into this watercourse.

The topography can be described as gently undulating with the head of the valley being approximately 60m above the valley floor. Minor ridgelines that extend into the valley in the vicinity of the site are approximately 20 – 30m above the valley floor. The proposed site straddles two low ridgelines close to the head of the valley on the eastern side of the main watercourse.

Given the relatively low nature of the proposed facility (up to 5m in height), minor ridges within and in close proximity to the site could play a major role in either helping to screen or make the development of the PV facility obvious in the landscape.

Nature and Density of Development

The general development pattern within the surrounding areas includes:

1. The urban area of Vryburg.

This is a dense urban area which, typically of many small towns, is set out on a grid pattern with roads traversing north/south and east/west. The two closest areas of the town to the proposed site include:

» A light industrial area that extends along the N14 / R34 to the north west.
» The residential township of Huhudi that extends along the N18 to the west north west.

2. An area of smallholdings directly to the east of Vryburg.

From reference to online aerial photographs, it is evident that this area is comprised of smallholdings. In terms of visual implications, the openness of this settlement area could mean that it is more exposed to views of the proposed facility than the main urban area.

3. The rural area surrounding Vryburg.

The majority of this area is used for cattle grazing. The area is well known for cattle rearing and is referred to as the Texas of South Africa having some of the largest cattle herds in the world. Within the agricultural area there are numerous farmsteads that are comprised of farm houses, agricultural buildings and farm worker's accommodation.

In addition to general uses there are a number of service uses that also have an influence on localised landscape character including:

» Adjacent roads.
» A railway line traverses parallel to the western boundary of the site.
» Existing electrical infrastructure including overhead power lines that are situated close to the southern boundary of the site.

These elements all have the effect of eroding the natural character of the area.

Vegetation Patterns

As a result of grazing activities taking place within the area the natural vegetation is under pressure. It is evident that the general pattern of small trees and shrubs in the grassland extends over much of the area surrounding Vryburg. Whilst the density of taller shrubs and small trees is relatively sparse, in a flat landscape and over distance, these are likely to combine to provide significant screening of low elements such as the proposed PV arrays.

Ornamental trees and shrubs are generally located within gardens in the urban area of Vryburg and surround farmsteads in the rural area. These have the following visual effects:

» It makes the location of farmsteads obvious in the landscape.
» It helps to screen views of the surrounding landscape from both farmsteads and from within the urban area.

4.6 Access and Transport Routes in the Region

Access to the site is possible through the use of the regional road (R34) which traverses the northern portion of the site. Alternatively access can be gained via the national route (N18) situated to the west, or a secondary main road traversing the western portion of the site.

4.7 Social Characteristics of the Site and Surrounding Areas

The purpose of the section is to provide an overview of the current socio-economic situation within the proposed study area. This section will provide a strategic understanding of the socio-economic profile of the North West Province, DRMSDM and NLM, in order to develop a better understanding of the socio-economic performance as a background to the development of the facility. Overall, this section will provide a brief overview of the study area; from a regional context, local context (which includes the baseline description of the local social environment), site context and surrounding land use context (which includes the land use character of the immediate area of influence).

4.7.1. Regional Context

1. North West Province

Most of the economic activity of the North West Province is concentrated in the southern region of the North West Province between Potchefstroom and Klerksdorp, as well as Rustenburg and the eastern region. The North West Province is predominantly a rural province with the main economic activities being mining and agriculture. Mining of diamond, marble and gold bring in substantial wealth.

The province is a world leader in platinum production. Mining is the major contributor to the North West economy and represents almost a quarter of South Africa's mining industry as a whole. The province produces a quarter of South Africa's gold, as well as granite, marble, fluorspar and diamonds (NAFCOC, 2014). The North West Province is well known for cattle farming, while the areas around Rustenburg and Brits are fertile where mixed-crop farming land occurs. Maize and sunflowers are the most important crops, and the province is a major producer of white maize in the country (South Africa Info, 2014). The province has a number of major tourist attractions, including the internationally famous Sun City, the Pilanesberg National Park, the Madikwe Game Reserve and the Rustenburg Nature Reserve.

2. Dr Ruth Segomotsi Mompati District Municipality (DRSMDM)

Dr Ruth Segomotsi Mompati District Municipality is one of the four districts of the North West Province. The district municipality covers the following local municipalities: Naledi, Greater Taung, Kagisano-Molopo, Mamusa and Lekwa-Teemane. The seat of the district

is the town of Vryburg. The DRSMDM has a population of ~439 637 people which is 13.2% of the population of the North West Province. The majority of the population within the DRSMDM speak Setswana (Census, 2011). The DRSMSM is South Africa's largest beef producing district, with Hereford cattle being the most popular. Maize and peanuts are important crops produced in the district (Local Government Handbook, 2012).

The settlement pattern in the DRSMDM is fragmentary with small, low-intensity urban areas scattered throughout and surrounded by vast rural areas. The more urban areas, or towns, comprise of higher density settlements with mainly a residential character, except for the only regional urban center or node, being Vryburg, which has a mix of land uses, varying from residential, retail, institutional to manufacturing and industrial. The major towns are surrounded by very low-density, scattered rural settlements, villages and vast rural areas. The DRSMDM area is described to be the rural hinterland of the North West Province (DRSMDM IDP 2015/2016). The main towns in the district include: Amalia, Bloemhof, Christiana, Piet Plessis, Pomfret, Pudimoe, Reivilo, Schweizer-Reneke, Stella, Taung and Vryburg. The primary economic sectors within the district are as follows: community services (33.1%), agriculture (17.1%), finance (16.2%), trade (12.7%), transport (9%), manufacturing (4%), mining (3.2%), and construction (3.2%).

4.7.2. Local Context

Naledi Local Municipality (NLM)

The Naledi Local Municipality is situated in the Dr Ruth Segomotsi Mompati District Municipality in the North West Province. The NLM covers an area of approximately ~7 264 km² and is divided into nine wards. This land mass is makes up 15% of the total area of the DRSMDM. The NLM is separated into the following main places, namely; the town of Vryburg, Huhudi Township, Colridge Township, Stella, Devondale and Dithakwaneng village. The two primary towns in the area include Vryburg and Stella.

Agriculture and hunting are the strongest contributors to the municipality's economy, jointly responsible for 21% of employment. Other important job creating sectors are finance and insurance (8%), public administration (8%), health and social (5.8%) and transport (5%). This makes the municipality the main employer within the district and most significant contributor to the GDP. According to the NLM IDP 2015/2016, the NLM is an agriculture-based municipality and falls within the Extensive Agricultural Development Zone. The NLM has a strong beef breeding industry and most of the income is derived from the agricultural sector. The NLM is identified as a Priority Two Investment Area in terms of the Provincial Spatial Development Framework serving as the:

» Hub for regional growth needs
» Main trading centre in the district
» Main district administrative centre

The NLM is located on the intersection of the Western Frontier and N14 Transport Corridor. Good national road and rail infrastructure is present within the area increasing the ease of accessibility. However the N18 road between Vryburg and Stella is often congested with trucks. However, the NLM faces challenges with the lack of upgrading and maintenance of infrastructure. Industries are hesitant to locate in the NLM due to the inefficient and haphazard supply of basic services such as water and electricity.

The greatest social problems in the NLM are illiteracy, poverty and lack of basic service infrastructure. The NLM has been experiencing a declining economy. The income distribution is distorted in the NLM to the disadvantage of the less economically secured people, who also represents the majority of the municipal area. Poor households are a result of a lack of wage income, either due to unemployment or low-paying jobs. Access to basic services such as electricity, toilets and piped water is also closely correlated with poverty.

Baseline Characteristics of the Naledi Local Municipality

General baseline characteristics and challenges of the NLM are as follows (Census, 2011 & NLM IDP 2015/2016):

- The municipality has a population of ~66 781 which is 14.4% of the total population of the DRSMDM.
- Of the ~66 781 population, about 49.83% are female and 50.17% are male.
- In the NLM there are approximately ~18 572 households, with an average household size of ~3.4 persons per household. Of the ~18 572 households in NLM approximately 82% live in formal dwellings.
- More than 74% of the population comprise the Black African ethnic group.
- The most spoken language in the NLM is Setswana (68.8% of the population).
- The Economically Active Population (EAP) (individuals that are aged 15-64 that are either employed or actively seeking employment) accounts for 64% of the entire population.
- The population aged 0–14 years comprise 31% of the population and those aged 65 years and above accounts for 5% of the entire municipal population.
- The dependency ratio (amount of individuals that are below the age of 15 and over the age of 64, who are dependent on the EAP) in the NLM comprises 36% of the population.
- There are low levels of literacy amongst the members of the community. The level of education influences growth and economic productivity of a region. In the NLM 16.6% of the population have no schooling, 22% have completed matric and only 9.1% of the population have received higher education. This means that majority of the population have a low-skill level and would need employment in low-skill sectors.
- The municipality's unemployment rate stands at 26.4% (2011).
- Households that have either no income or low income that fall within the poverty level (R0- R38 200 per annum) accounts for 66.9%. A middle-income is classified as earning between R38 201 - R307 600 per annum. Approximately 28.2% of the households earn a middle income and 4.9% of households earn a high income that is classified as earning R307 601 or more per annum. A high percentage of household income falls within the poverty level. The high poverty level has social consequences such as not being able to pay for basic needs and services.
- Approximately 63.9% of the population have access to electricity. For all the population that have access to electricity; 77% use it for lighting, 50.7% use it for heating and 64.5% for cooking.
- Approximately 69% of households within the municipality have access to a flush toilet. Approximately 11.8% of the population are using a pit toilet and 4.5% of households use the bucket toilet system.
- 69.7% of the municipal households have their refuse disposal removed by the municipality, whereas only 20.5% use their own refuse dump.

- 97% of households have access to piped (tap) water. From this percentage, 40.9% have access inside their dwelling units, 37% inside their yards, 14% access tap water on a community stand that is a distance of less than 200m from their yards and 3% travel between 200m and 500m to access tap water.
- The NLM has a declining economy despite being the most diverse economy in the district.
- The NLM does not have a detailed settlement plan for rural villages. There are also limited business and Small Medium Micro Enterprise development infrastructure within the rural villages. The NLM also lacks a proper Land Use Management System.
- The NLM lacks rental housing units which discourages skilled and professional people from coming into the area.
- The NLM has an underdeveloped tourism sector and no local tourism strategy.
- Availability and affordability of land/business space in Vryburg is a constraint especially for emerging entrepreneurs and business initiatives.

4.8 Heritage features of the region

4.8.1. Heritage and archaeology

The wider geographical area is known to contain archaeological sites dating to the Middle and Later Stone Age. Previous discoveries in the area indicated that pans, drainage channels and ridges are sensitive from a heritage perspective (Van der Walt 2013, Van Schalkwyk 2008 and 2012). The area was also inhabited from the 1800's onwards and the possibility exists that structures/features older than 60 years might occur in the area. No records of known graves within the site have been previously recorded, but graves can be expected anywhere on the landscape.

4.8.2. Palaeontology (Fossils)

The site for the development of the proposed PV facility is underlain by Ghaap Group (Schmidtdrif Subgroup and Vryburg Formation), and the Dwyka Group of the Karoo Supergroup. The geologically older Vryburg Formation (2.6 billion year-old) consists of fluvial and shallow marine quartzites, mudrocks and conglomerates, while the Dwyka Group [317 Million years (Ma)] consists of Permo-carboniferous glacial sediments. Small outcrops on the north-western and south-eastern borders consist of Permo-Carboniferous glacial rocks of the Dwyka Group (Karoo Supergroup). Although trace fossils and plants could be present in the Dwyka the likelihood of significant fossil heritage in the Vryburg area is considered to be low. The central area of the site consists of the Vryburg Formation, while a small outcrop of the Schmidtsdrif Subgroup is present in the south western margin. Stromatolite assemblages are recorded within the Schmidtdrif Subgroup and Vryburg Formation. The Boomplaas Formation stromatolites represent some of the oldest examples of these microbial fossils in South Africa. Detailed descriptions of these fossils has yet to be documented while their stratigraphic and geographical distributions are poorly understood.

SCOPING OF ISSUES ASSOCIATED WITH THE WOODHOUSE SOLAR 2 PV FACILITY CHAPTER 5

This chapter serves to describe and evaluate the identified potential environmental impacts associated with the construction and operation of the Woodhouse Solar 2 PV Facility. As the layout and/or ancillary infrastructure associated with the construction of the Woodhouse Solar 2 PV Facility could be located anywhere within the Remaining Extent of the Farm Woodhouse 729, the full extent of the farm has been considered in this assessment for the development. This has been undertaken with the aim of determining the feasibility of undertaking the development within the study area, and identifying areas which will be assessed further and confirmed in the EIA phase.

The potential impacts of the proposed Woodhouse Solar 2 PV Facility (i.e. construction, operation and decommissioning phases) are identified, described and evaluated in this chapter in accordance with the requirements of the EIA Regulations. In accordance with the objectives of the scoping study (as defined in Chapter 3 of this report), this has been informed by a review of existing baseline information, desk-top investigations and limited field work.

The majority of the environmental impacts are expected to occur during the construction phase with a development of this nature. Environmental issues associated with construction and decommissioning activities of the PV facility are similar and include, among others:

» Impacts on Ecology, including fauna and flora within and around the site;
» Impacts on soil and agricultural potential of the development footprint;
» Impacts on heritage resources, including archaeological and palaeontological resources, within the development footprint;
» Impacts on the social aspects of the affected communities within and around the study area;
» a loss of habitat .

Environmental issues specific to the operation of the PV Facility could include, among others:

» Impacts on wetland located within the site and the alternation of runoff patterns.
» Alteration of vegetation species composition within the footprint of the facility.
» Visual impacts (changes in the perception of the landscape characteristics)

Table 5.1 and **Table 5.2** provide a summary of the findings of the scoping study undertaken for the construction and operation phases of the proposed PV facility respectively. Impacts associated with the decommissioning phase are expected to be

similar to those associated with construction and are therefore not repeated. Impacts of the proposed facility are described and evaluated, and recommendations are made regarding further studies required within the EIA phase of the process. **Table 5.4** provides a summary of the potential for cumulative impacts associated with the development of the proposed PV facility.

5.1 Legal Requirements as per the EIA Regulations, 2014

This chapter of the scoping report includes the following information required by Appendix 2: Content of the Scoping Report of the EIA Regulations, 2014 (GNR982):

Requirement	Relevant Section
(h)(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 (aa) can be reversed (bb) may cause irreplaceable loss of resources and (cc) can be avoided, managed or mitigated.	The impacts and risks identified for both the construction and operation phases are included within the Tables 5.1-5.3.
(h)(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	The methodology used for the assessment of potential impact and risks is detailed in Section 5.2.
(h)(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	The impacts and risks identified for both the construction and operation phases is included within the Tables 5.1-5.4.
(h)(viii) the possible mitigation measures that could be applied and level of residual risk	Possible mitigation measures and the level of residual risk associated with the impacts is included within the Tables 5.1-5.4.

5.2 Methodology for Impact and Risk Assessment during the Scoping Phase

The following methodology was used to describe and evaluate the main issues and potential risks and impacts associated with the proposed facility during the scoping phase:

» The identification of potential sensitive environments and receptors that may be impacted on by the proposed facility and the types of impacts (i.e. direct, indirect and cumulative[5]) that are most likely to occur. This was achieved through a review of existing baseline information, desk-top investigations and limited field work to define sensitivities.
» Description of the nature, significance, consequence, extent, duration and probability of potential impacts, as well as the degree to which these impacts are reversible, may cause irreplaceable loss of resources and can be avoided, managed or mitigated during the construction and operation phases.
» The identification of potential risks to the development and the environment, and identification of 'No-Go' areas within the broader site, where applicable.
» The compilation of a summary of the potential impacts that will be considered further in the EIA Phase through specialist assessments.

5.3 Assumptions made during the Evaluation of Potential Impacts

While evaluating potential impacts associated with the development of the facility, it was assumed that the development footprint (~300ha) of the facility (the area that will be affected during the operation phase) will include the footprints of the solar components (i.e. PV panels), on-site substation and associated infrastructure (i.e. internal access roads). However, during the construction phase, the entire extent of the developable area required for the proposed facility could suffer some level of disturbance. This is referred to as the construction footprint.

[5] A cumulative impact refers to the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities (Environmental Impact Assessment Regulations, 2014).

Table 5.1: Evaluation of potential impacts associated with the construction and decommissioning of the Woodhouse Solar PV Facility

Impacts on Ecology (Flora, Fauna, Water Resources and Ecosystems)

The impacts as a result of the construction and decommissioning of the PV facility are mainly associated with the disturbance of vegetation and the supporting substrate. Other impacts expected to occur will be associated with bird species or small mammals and invertebrates. The following impacts are identified as the major impacts that are likely to be associated with the development of the proposed PV facility and which will be assessed further during the EIA phase. An overall ecological desktop sensitivity map is included a **Figure 5.1**.

Impacts on vegetation and protected plant species

The most likely and significant impact during construction will be on the vegetation within the development footprint. The proposed development may lead to direct loss of vegetation. Consequences of the impact occurring may include:

» general loss of habitat for sensitive species;
» loss in variation within sensitive habitat due to loss of portions thereof;
» general reduction in biodiversity;
» increased fragmentation (depending on location of impact);
» disturbance to processes maintaining biodiversity and ecosystem goods and services; and
» loss of ecosystem goods and services

Several protected and red data species occur within the Quarter Degree Grid Squares (2624DD and 2724BB) encompassing the study site and there is a potential for these species as well as species protected within the relevant provincial and national legislations (NFA, TNCO and BNCA). Such species are especially vulnerable to infrastructure development due to the fact that they cannot move out of the path of the construction activities, but are also affected by overall loss of habitat. Threatened species (red data species) include those listed as critically endangered, endangered or vulnerable. For any other species a loss of individuals or localized populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened plant species, loss of a population or individuals could lead to a direct change in the conservation status of the species, possible extinction. This may arise if the proposed infrastructure is located where it will impact on such individual or populations.

Consequences may include:

» fragmentation of populations of affected species;
» reduction in area of occupancy of affected species; and
» loss of genetic variation within affected species

These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species' overall survival chances.

The impacts can be largely mitigated through avoidance of potential sensitive areas and listed species, by allowing a minimum clearance of vegetation (restricted to the absolute necessary areas) etc.

Direct Faunal impacts

Faunal species will primarily be affected by the overall loss of habitat. Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species and species confined and dependant on specified habitats would not be able to avoid the construction activities and might be killed. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present. This impact is highly likely to occur during the construction-phase and would also potential occur with resident fauna within the facility after construction.

Threatened species (red data species) include those listed as critically endangered, endangered or vulnerable. For any other species a loss of individuals or localized populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened animal species, loss of a population or individuals could lead to a direct change in the conservation status of the species, possible extinction. This may arise if the proposed infrastructure is located where it will impact on such individual or populations.

Consequences may include:

» fragmentation of populations of affected species;
» reduction in area of occupancy of affected species; and
» loss of genetic variation within affected species

These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species' overall survival chances. Disturbance of faunal species can be maintained to a minimum and low significance by implanting effective mitigation measures.

Impacts on wetlands and watercourses

Construction may lead to some direct or indirect loss of or damage to wetlands and drainage lines. This will lead to localised loss of wetland habitat and may lead to downstream impacts that affect a greater extent of wetlands or impact on wetland function and biodiversity. Where these habitats are already stressed due to degradation and transformation, the loss may lead to increased vulnerability (susceptibility to future damage) of the habitat. Physical alteration to wetlands can have an impact on the functioning of those wetlands. Consequences may include:

» increased loss of soil;
» loss of or disturbance to indigenous wetland vegetation;
» loss of sensitive wetland habitats;

» loss or disturbance to individuals of rare, endangered, endemic and/or protected species that occur in wetlands;
» fragmentation of sensitive habitats;
» impairment of wetland function;
» change in channel morphology in downstream wetlands, potentially leading to further loss of wetland vegetation; and
» reduction in water quality in wetlands downstream.

By implementing mitigation measures, including the exclusion of wetlands, drainage lines and ephemeral streams, along with determined buffer areas, from the proposed development footprint area, these habitat types can retain their character and functionality. Where watercourses cannot be avoided (e.g. by access road crossings), carefully considered mitigation measures, such as culvert design, size and placement as well as measures to control water flow (especially flash floods) and erosion (e.g. gabion structures, bank revegetation and rehabilitation etc.), should be in place. Furthermore the necessary licencing and/or application should be obtained from the relevant authorities.

Avifaunal Impacts

Probably the most important and significant potential impacts of the proposed development to avifauna will be the loss and destruction of habitat as well as mortality due to collision and electrocution of certain bird species with the proposed power line. This can be a particular problem, if the power line lies within the movement or migration pathway of the birds. As many of the vulnerable species are long-lived slow-breeding species, collisions with power lines can be a major source of mortality for such species and may threaten the viability of local or regional populations.

Electrocution and collision with the proposed power line can be mitigated by implementing Eskom's' standard guidelines, including the insulating of electrical components and fitting bird flight diverters were deemed necessary.

Soil erosion and associated degradation of ecosystems

Soil erosion is a frequent risk associated with any development on account of the vegetation clearing and disturbance associated with the construction phase, and may continue occurring throughout the operational phase. The central section of the property boundary earmarked for the proposed development is relatively flat and erosion within this section is likely to be less significant than in comparison with the more undulating areas occurring along the southern, eastern and northern portions of the property. Service roads and panels will generate an increase in runoff during intense rainfall events and may exaggerate the effects of erosion. These eroded materials may enter the nearby streams and rivers and may potentially impact these systems through siltation and change in chemistry and turbidity of the water.

With effective mitigation measures in place including regular monitoring the occurrence, spread and potential cumulative effects of erosion may be limited to an absolute minimum.

Alien Plant Invasions

Major factors contributing to invasion by alien invader plants includes habitat disturbance and associated destruction of indigenous vegetation. Consequences of this may include:

» further loss and displacement of indigenous vegetation;
» change in vegetation structure leading to change in various habitat characteristics;
» change in plant species composition;
» change in soil chemistry properties;
» loss of sensitive habitats;
» loss or disturbance to individuals of rare, endangered, endemic and/or protected species;
» fragmentation of sensitive habitats;
» change in flammability of vegetation, depending on alien species;
» hydrological impacts due to increased transpiration and runoff; and
» impairment of wetland function.

Although the potential severity of this impact may be high, it can be easily mitigated through regular alien control.

Impacts on Critical Biodiversity Areas and Broad-Scale Ecological Processes

Large portions of the broader property are located within Critical Biodiversity Areas. Apart from a direct impact on biodiversity the presence of the facility would potentially impact the ecological functioning of the CBAs. These areas have been briefly surveyed and it has been observed that they mainly provide connectivity corridors rather than specific ecological functions, thereby reducing their sensitivity to some extent. Impact on these Critical Biodiversity Areas can be maintained to an absolute minimum or even avoided by selecting areas outside the CBAs or restricting the development to disturbed and transformed areas within the CBAs. By furthermore implementing effective mitigation measures (to be determined during EIA phase following detailed field work), the functionality of these areas and connectivity between these areas may be maintained.

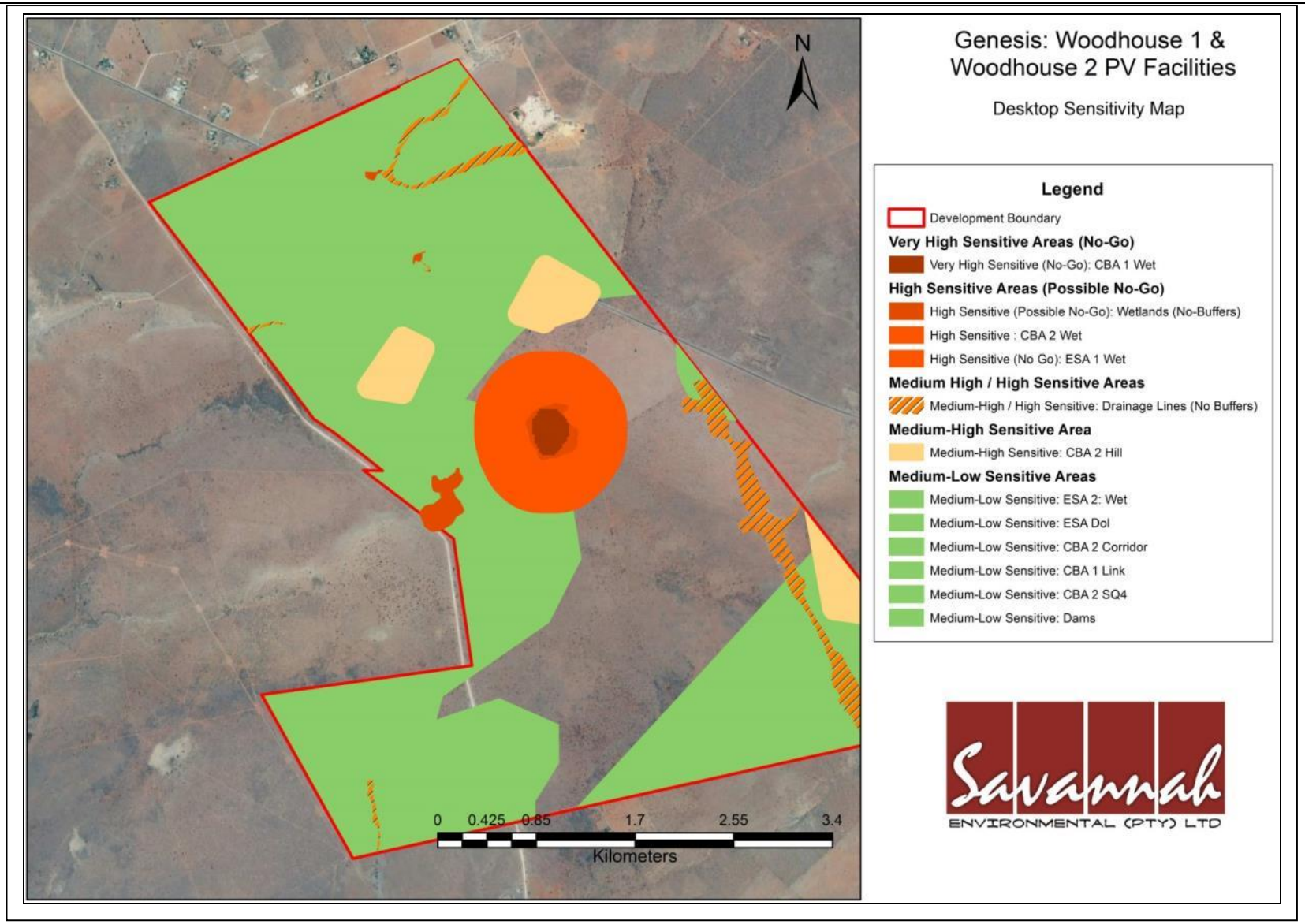

Figure 5.1: Ecological sensitivity map of the Woodhouse Solar 2 site.

The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- **Low** – Areas have been transformed to the point where no natural habitat remains.
- **Medium**-**Low** – Areas have been disturbed and degraded, specifically the disturbance of indigenous natural vegetation
- **Medium-High** - Areas are natural vegetation in which there are one or two features that make them of biodiversity value, but not to the extent that they would be classified into one of the other two higher categories.
- **High** – Areas are of high biodiversity value, but do not necessarily contain features that would put them into the VERY HIGH class. The class also includes any areas that are not specifically identified as having high conservation status but, have high local species richness, unique species composition, low resilience or provide very important inclusion into this class, if there were no other factors that would put them into the highest class.
- **Very High** – Areas are vital for the survival of species or ecosystems. They are either known sites for threatened species or are ecosystems that have been identified as being remaining areas of vegetation of critical conservation importance. CBA1 areas would qualify for inclusion into this class, depending on their condition as confirmed through field investigations.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Disturbance to and loss of indigenous natural vegetation	Construction of infrastructure will lead to direct loss of vegetation, causing a localised or more extensive reduction in the overall extent of vegetation. Consequences of the clearing and loss of indigenous natural vegetation occurring may include: » Increased vulnerability of remaining vegetation to future disturbance, including extreme climatic events; » General loss of habitat for sensitive fauna and flora species; » Loss in variation within sensitive habitats due to loss of portions of it; » General reduction in biodiversity; » Increased fragmentation (depending on the location of the impact) and associated reduced viability of species populations; » Alteration of the habitat suitable for plant populations by altering surface structure. This will change species composition and associated species interactions. » Disturbance to processes maintaining biodiversity and ecosystem goods and services; and	Local	The only no-go areas identified up to date due to important and/or irreplaceable vegetation vital for effective ecological functioning are the A1 CBA depression wetland as well as the A1 ESA wetland buffer area. Other possible no-go areas must be verified during a detailed investigation as part of the EIA phase.

	» Loss of ecosystem goods and services.		
Disturbance or loss of threatened / protected plants	Several red-data plant species could potentially occur in the study area. Flora is affected by overall loss or alteration of habitat and due to its limited ability to extend or change its distribution range. In the case of threatened plant species, a loss of a population or individuals could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations. Consequences of this may include: » Fragmentation and decline of populations of affected species; » Reduction in area of occupancy of affected species; » Loss of genetic variation within affected species; » Alteration of the habitat suitable for plant associations by altering surface structure. This will change species composition and associated species interactions and species ability to persist; » Future extinction debt of particular species of flora and fauna. These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chance of survival of the species.	Local	Several red-data species potentially occur within the study area. The issue requires further investigation in the EIA phase in order to confirm the presence of any red data species within the development footprint.
Loss of protected trees	According to the National Forests Act, no person may cut, disturb, damage or destroy any listed protected tree species. The loss of protected trees may have wider consequences than losing individuals of species of conservation concern: » The loss of mature, large trees can lead to a permanent loss of these trees and their ecosystem function from the environment, as trees grow slowly and recruitment events in the study area may be limited. » Some of the protected trees, if present, may be a food source for	Site	At this stage, it is expected that the presence of protected trees will be low, with only *Boscia albitrunca* potentially occurring with the study area. Their presence and density within the development footprint needs to be confirmed during the EIA field study.

	various fauna species in the area.		
Loss of habitat for fauna species of conservation concern	Fauna species of conservation concern are indirectly affected primarily by loss of or alteration of habitat and associated resources. Animals are mobile and, in most cases, can move away from a potential threat, unless they are bound to a specific habitat that is also spatially limited and will be negatively impacted by a development. Nevertheless, the proposed development will reduce the extent of habitat available to fauna. For any species, a loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened animal species, loss of a suitable habitat, population, or individuals could lead to a direct change in the conservation status of the species. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations or the habitat that they depend on. Consequences may include: » Loss of populations of affected species; » Reduction in area of occupancy of affected species; » Loss of genetic variation within affected species; » Future extinction debt of a particular species. There are a number of red data species that have been recorded for the wider area within which the study area is located. Their presence and the necessity to keep their habitats intact in the study area need to be confirmed during a detailed field survey.	Local	The only no-go area identified up to date due to possible habitat for fauna species of conservation concern (Threatened Giantbullfrog) is the A1 CBA depression wetland. Other possible no-go areas must be verified during a detailed investigation as part of the EIA phase.
Disturbance to migration routes and associated impacts to faunal species populations	Site preparation and construction activities may interfere with current migration routes of fauna species. This may lead to: » Reduced ability of species to move between breeding and foraging grounds, reducing breeding success rates;	Site and surroundings	The only no-go area identified up to date due to important fauna populations of conservation concern (Threatened Giant Bullfrog) is the A1 CBA depression wetland.

	» Increased mortality rates due to fatal collisions with infrastructure; » Reduced genetic variation due to reduced interaction amongst individuals or populations as a result of fragmentation effects caused by the proposed development.		Other possible no-go areas must be verified during a detailed investigation as part of the EIA phase.
Impacts on wetlands	NFEPA and CBA Maps along with available Google imagery show that a number of wetlands and drainage lines may be present within the study area. Beyond the study area the Droë Harts and Losase Rivers are present, which could be influenced by the proposed development if mitigation measures are not adequately implemented. Furthermore this area is characterized by valuable aquifers and groundwater resources which also could be influenced by the proposed development if mitigation measures are not adequately implemented. » The nature of the site preparation and construction activities for the proposed development will change surface characteristics, rainfall interception patterns and runoff characteristics of the area; » This may affect the geohydrology, susceptibility to erosion and potential erosion rates of the landscape, which may lead to a significant alteration to or loss of habitat for fauna and flora species, especially those that depend on riparian and wetland habitats; » A decline in ecosystem functionality of smaller wetlands and riparian areas of smaller drainage lines will impact lower-lying larger wetlands, whilst also reducing the ability of the environment to buffer effects of extreme climatic events.	Local and regional	The only no-go areas identified up to date are the A1 CBA depression wetland as well as the A1 ESA wetland buffer area. The desktop delineated wetlands (excluding the A1 CBA wetland) have been preliminary classified as High Sensitive Areas whilst the drainage lines are classified as Medium – High to High Sensitive Areas. Their status as potential No-Go areas along with their buffer zones should be determined following a detailed investigation as part of the EIA phase. The A1 CBA wetland located in the centre of the study area has been preliminary classified as a Very-High Sensitive area and its Ecological Support Area (1A ESA) as a High Sensitive Area. As mentioned these areas are regarded as No-Go areas.
Impact on Critical Biodiversity Areas	Development within the CBAs may negatively impact biodiversity and the ecological functioning of the CBA.	Local and Regional	The only no-go areas identified up to date are the A1 CBA depression wetland as well as the A1 ESA

			wetland buffer area. Due to the size of the CBA falling within the farm portion, the semi-natural as well as fractured and isolated state of the current area, the area should rather be incorporated within the T2 CBA (Corridor Zones) located within the study area and can be regarded as a Medium-Low Sensitive Areas. The A1 CBA wetland located in the middle of the study area has been classified as a Very-High Sensitive area and its Ecological Support Area (1A ESA) as a High Sensitive Area. These areas is regarded as No-Go Areas The T2 CBA & A2 ESA areas located in the south-western corner of the study is regarded as a Low-Sensitivity. This is due to the fact that the proposed development will unlikely impact on these dolomite features.
Establishment and spread of declared weeds and alien invader plants.	Major factors contributing to invasion by alien invader plants include excessive disturbance to vegetation, creating a window of opportunity for the establishment of alien invasive species. In addition, regenerative material of alien invasive species may be introduced to the site by machinery traversing through areas with	Local and Regional	None identified at this stage, but the potential for alien invasive species present in or around the study area is regarded as high.

	such plants or materials that may contain regenerative materials of such species. Consequences of the establishment and spread of invasive plants include: » Loss of indigenous vegetation; » Change in vegetation structure leading to change in or loss of various habitat characteristics; » Change in plant species composition; » Altered and reduced food resources for fauna; » Change in soil chemical properties; » Loss or disturbance to individuals of rare, endangered, endemic and/or protected species; » Fragmentation of sensitive habitats; » Change in flammability of vegetation, depending on alien species; » Hydrological impacts due to increased transpiration and runoff; » Increased production and associated dispersal potential of alien invasive plants, especially to lower-lying wetland areas, and » Impairment of wetland function.		A high number of alien invasive species has been recorded in the wider area according to the SANBI database. The extent to which the site contains alien plants will be determined in the EIA phase.

Summary of the nature, significance, consequence, extent, duration and probability of the impacts

» Most of the above mentioned impacts are probable, although the extent, duration, and magnitude of these impacts can be minimised to levels where these impacts can be regarded as low significance through implementation of appropriate mitigation measures. By exclusion of certain sensitive areas (e.g. CBAs of high sensitivity, wetlands, drainage lines and other sensitive habitats) from the development footprint area, the probability of the above-mentioned impacts occurring within these habitats can be avoided.

» The duration of the project is expected to be long-term and subsequently most of the impacts are also expected to be long-term. However, some impacts are expected to be short-term and confined to the construction phase. For example the disturbance of some animal species will be confined to the construction phase and as human movement on the site and in the area decreases some species may return to the site. Furthermore, impacts such as erosion and invasion of alien invasive species can be retained to a medium to short duration with the implementation of effective mitigation measures, including regular monitoring throughout the lifespan of the proposed development.

» Although most impacts associated with the proposed development are expected to be local, affecting mainly the immediate environment, the potential does exist for some impacts to be exacerbated and even spread outside the development footprint area if left unattended, eventually posing a

potential threat to important environmental processes and functionality. Impacts in this regard include invasion by invasive alien species, soil erosion, significant disturbance and alteration of important wetland habitats and watercourses.

- Probably the most significant impacts that the proposed development will have are the impacts on Critical Biodiversity Areas and Broad-Scale Ecological Processes. The development is located within a Critical Biodiversity Area and the presence of the facility would potentially impact the ecological functioning of the CBA.

Gaps in knowledge & recommendations for further study

- The initial desk-top investigation and limited field survey of the study area indicates that a few protected and red-data species as well as sensitive habitats potentially occur within the site. The presence of these within the development area will need to be confirmed through detailed field investigations in the EIA Phase. Provided that the final layout has been designed in accordance to findings of a field investigation, the likelihood that the development will compromise the survival of any species of conservation concern is expected to be limited.
- Plant species of conservation concern will only be identifiable during the growing season, thus any field survey of vegetation should only commence from November and be completed by April.
- Although previous collection records from the Vryburg area exist, the study area itself may not have been previously surveyed and there may be additional species that have not yet been captured in the existing species databases for the area. A detailed ecological survey and sensitivity assessment will be undertaken during the EIA phase according to the methods outlined in Section 4 of Appendix D (Ecological Scoping Study) and within Chapter 7.

Impacts on Soil, Land use and Agricultural Potential

The construction phase of the proposed solar energy facility will inevitably have some potential impacts on the soil, land-use and agricultural potential of the area. The entire site is classified as Land Class V, which is associated with little or no erosion hazard but has other limitations which are impractical to remove that limit its use mainly to grazing and habitat for wildlife. These limitations restrict the kind of plants that can be grown and prevent normal tillage of cultivated crops. The soils are moderately susceptible to wind erosion and are classified under category 3b and 3d where loamy sands are dominant and present. Soils on the site have mostly above 10% dominant clay in the top soils and are not very susceptible to water erosion because of the higher clay contents and the gradual nature of the geography. The following impacts are identified as those likely to be associated with the development of the proposed PV facility.

- Loss of Agricultural Grazing Land
- Soil erosion
- Loss of Topsoil

» Soil contamination

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of agricultural land use	The loss of agricultural grazing land due to the direct impact by the infrastructure's footprint during the lifetime of the project.	Local	None
Soil erosion	A change in the natural condition of the site and removal of vegetation will potentially lead to increased risk of soil erosion. It is considered unlikely that this impact will occur due to the low susceptibility to erosion.	Local	None
Loss of topsoil	Poor topsoil management may lead to the loss of nutrient rich topsoil.	Local	None
Soil contamination	Soil contamination due to accidental spills of fuel and hydraulic fluid when drilling into soil etc. and soil compaction by heavy vehicle movement, excavation operations, soil removal and restoration may occur during the construction phase.	Regional	None

Summary of the nature, significance, consequence, extent, duration and probability of the impacts

The overall impacts of the proposed facility on agriculture and soil conditions will be of low significance, mainly because of the climatic conditions and the low agricultural and grazing potential of the site and low susceptibility to soil erosion of the soils. The possibility to house substantial commercial farming practices (agriculture or grazing) on the property is not realistic, because of the dominant climatic conditions and prevailing soil conditions. Irregular rainfall, along with other soil-related factors, lead to low agricultural potential. The soil and rock type properties tend to be very homogenous in the area and the whole site can be better utilised for power generation than any other practise. This is not regarded as viable commercial farming site and would be suited to house the PV facility.

Gaps in knowledge & recommendations for further study

» As a result of the low significance of impacts, no further studies are required to be undertaken

Impacts on Heritage Resources (Archaeology and Palaeontology)

Archaeology

The wider geographical area is known to contain archaeological sites dating to the Middle and Later Stone Age. Previous work in the area indicated that pans, drainage channels and ridges are sensitive from a heritage perspective (Van der Walt 2013, Van Schalkwyk 2008 and 2012). The area was also inhabited from the 1800's onwards and structures/ features older than 60 years might occur in the area. Databases consulted have no records of known graves in the site but graves can be expected anywhere on the landscape.

The heritage scoping study revealed that the following heritage sites, features and objects that can be expected within the study area. The construction and operation of the proposed project could directly impact on graves, archaeological sites and historical sites.

Archaeological finds

There is a medium - high likelihood of finding Middle Stone Age and Late Stone Age stone artefacts scattered within the site. There is a higher possibility of finding Stone Age sites close to water sources like the drainage channels and pans that occur within the site.

Historical finds

Historical finds include middens, structural remains (beacons, kraals etc.) and cultural landscape. The desktop study highlighted that the farm was surveyed by the Chief Surveyor General in 1893. The title deed at that time belonged to Robert Croshie and the farm was possibly inhabited from this time and farming infrastructure older than 60 years can be expected in the site.

Burials and Cemeteries

Graves and informal cemeteries can be expected anywhere on the landscape.

Palaeontology

The development site is underlain by Ghaap Group (Schmidtdrif Subgroup and Vryburg Formation), and the Dwyka Group of the Karoo Supergroup. The geologically older Vryburg Formation (2.6 billion year-old) consists of fluvial and shallow marine quartzites, mudrocks and conglomerates, while the Dwyka Group [317 Million years (Ma)] consists of Permo-carboniferous glacial sediments. Small outcrops on the north-western and south-eastern borders consist of Permo-Carboniferous glacial rocks of the Dwyka Group (Karoo Supergroup). Although trace fossils and plants could be present in the Dwyka the likelihood of significant fossil heritage in the Vryburg area is considered to be low. The central area of the development area consists of the Vryburg Formation, while a small outcrop of the Schmidtsdrif Subgroup is present in the south western margin of the development area. There is a possibility that concentrations of small to large stromatolites will be recorded in the site. The probability of significant impacts on palaeontological heritage during the

construction phase is high.			
Issue	**Nature of Impact**	**Extent of Impact**	**No Go Areas**
Disturbance and destruction of archaeological sites and graves.	Construction and operational activities could cause irreversible damage or destroy heritage resources and depletion of the archaeological record of the Vryburg area.	Local	None currently identified
Loss of Palaeontological Heritage: stromatolites (laminated microbial mounds)	Construction of the PV facility will permanently modify the existing topography and may disturb damage, destroy or permanently seal-in fossils at or below the ground surface resulting in it being no longer available for scientific research or cultural heritage. Any fossils occurring in the site are potentially scientifically and culturally significant and any negative impact on them would be of high significance.	Local	No no-go areas have not been identified at this stage although palaeontological sensitive areas are present namely the Boomplaas and Vryburg Formations. Microbial stromatolites in the upper Vryburg Formation has been described although detailed occurrences of the Vryburg stromatolite has as not been recorded in the literature. The stromatolites of the Boomplaas Formation is important as they represent some of the oldest examples of these fossils in South Africa.
Summary of the nature, significance, consequence, extent, duration and probability of the impact **<u>Archaeology</u>** Significance of sites, mitigation and significance of possible impact can only be determined after the field work has been conducted, but based on previous work in the area Stone Age sites of Medium to Medium high significance can be expected. Loss of these archaeological sites could potentially occur within			

the development footprint and would result in the irreversible loss of resources. Impacts can however be effectively avoided through the implementation of appropriate mitigation and management measures.

Palaeontology

» A significant negative impact on fossil materials and thus palaeontological heritage will be limited to the construction phase when new excavations into fresh potentially fossiliferous bedrock take place. The extent of the area of potential impact is thus restricted to the project site and therefore categorised as local.
» The expected duration of the impact is assessed as potentially permanent to long-term. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent and irreversible.
» Should the project progress without due care to the possibility of fossils being present at the proposed development site within the Vryburg Formation the resultant damage, destruction or inadvertent relocation of any affected fossils will be permanent and irreversible. Thus, any fossils occurring within the study area are potentially scientifically and culturally significant and any negative impact on them would be of high significance.

Gaps in knowledge & recommendations for further study:

» In order to comply with the National Heritage Resources Act (Act 25 of 1999) a Phase 1 Archaeological Impact Assessment must be undertaken. During this study sites of archaeological, historical or places of cultural interest must be located, identified, recorded, photographed and described. During this study the levels of significance of recorded heritage resources must be determined and mitigation proposed should any significant sites be impacted upon, ensuring that all the requirements of SAHRA are met.
» It is recommended that a phase 2 palaeontological impact assessment must be conducted to assess the effect of the proposed PV facility on the palaeontological heritage.
» The study area has not been subjected to a cultural resource study and it is assumed that information obtained for the wider region is applicable to the study area. To address these gaps it is recommended that a field study should be conducted to confirm the presence of heritage resources after which mitigation will be recommended.
» It is recommended that as part of the public consultation process the presence of graves, archaeological and historical sites should be determined.
» Microbial stromatolites in the upper Vryburg Formation has been described although detailed descriptions of the Vryburg stromatolite occurrences has as not been located in the literature.
»

Social Impacts

The construction of the PV facility will have both positive and negative impacts on the socio-economic environment of the surrounding areas:

The potential positive impacts which could arise as a result of the construction activities include the following:

» Socio-economic benefits could accrue through job creation (primarily lower skilled levels) during the construction phase. The local community could thus benefit in this regard.
» It is anticipated that more skilled positions could be filled by individuals from South Africa.
» Should employment be linked to training and capacity building it would further the positives in this regard.
» At this stage it is not anticipated that local procurement would be achievable for the technology requirements associated with a project of this nature. Local procurement would be more focused on the procurement of general construction materials, goods and services.

The potential negative impacts which could arise as a result of the construction activities include the following:

» A large number of construction vehicles utilising the R34 and N18 and internal access roads for a period of 12-18 months during the construction phase for the PV facility could add to the negative impact on the roads. Construction vehicles utilising these roads over the construction period with heavy construction vehicles could increase the wear and tear on the roads utilised, regional roads and internal access roads; also crossing over the roads to access the site could increase the risk of accidents.
» An influx of workers and jobseekers to an area (whether locals are employed or outsiders are employed) could increase the safety risks in the local area and have an impact on the local social dynamics. Should locals be employed it could minimise the perceived and actual risk in this regard.
» An influx of an outside workforce could put pressure on municipal services, as indicated from the baseline description of the local area. Therefore introducing an external workforce to the local area will put pressure on local services and local community. This would, however, also depend on the exact size of the workforce.
» There may be impacts for road users of the main access road whereby an increase in traffic and heavy vehicles could have a negative impact on regular daily living and movement patterns.
» During the construction phase adjacent landowners could be negatively affected by the dust, noise and negative aesthetics created as a result of the construction activities.

Positive impacts

Issue	Nature of Impact	Extent of Impact	No Go Areas
Direct employment opportunities and skills development	The creation of employment opportunities and skills development opportunities during the construction phase for the country and local economy	Local-regional	None

Economic multiplier effects	Significance of the impact from the economic multiplier effects from the use of local goods and services	Local-regional	None
Negative impacts			
Safety and security impacts	Temporary increase in safety and security concerns associated with the influx of people in the study area during the construction phase	Local	None at this stage
Impacts on daily living and movement patterns	Temporary increase in traffic disruptions impacting local communities movement patterns and increased safety risks for road users	Local	None
Pressure on economic and social infrastructure impacts from an in-migration of people	Added pressure on economic and social infrastructure during construction phase as a result of in-migration of people	Local-regional	None
Nuisance Impacts (noise & dust)	Nuisance impacts in terms of temporary increase in noise and dust, on site and on farm roads for access to the site	Local	None

Summary of the nature, significance, consequence, extent, duration and probability of the impact

Positive Impacts: The potential impacts are expected to be positive, probable, short term and have a low – medium significance. Employment opportunities and skills development will have a moderate intensity and economic effects will be of a low intensity. In terms of reversibility of the impact and irreplaceable loss of resources, this is not applicable to this type of impact. The potential positive impacts may be enhanced with possible enhancement measures which will be elaborated in the SIA EIA phase.

Negative impacts:

» *Safety and security impacts*: The potential impact is expected to be negative, improbable, short term, with a low intensity and have a low significance.
» *Impacts on daily living and movement patterns:* The potential impact is expected to be negative, probable, short term, with a moderate intensity and have a low-medium significance.
» *Pressure on economic and social infrastructure impacts from an in-migration of people*: The potential impact is expected to be negative, improbable, short term, with a low intensity and have a low significance.
» *Nuisance Impacts (noise & dust)*: The potential impact is expected to be negative, probable, short term, with a moderate intensity and have a low significance

The potential negative impacts can be reversed and there are no irreplaceable loss of resources associated with the potential impacts. The potential impacts may be mitigated with possible mitigation measures which will be elaborated in the SIA EIA phase.

Gaps in knowledge & recommendations for further study

- A site visit and consultations with key stakeholders and affected parties will need to take place in the EIA phase in order to determine the perceived safety and security risks associated with the proposed development.
- Consultations with key stakeholders and affected parties will need to take place in the EIA phase in order to determine the impact on daily living and movement patterns.
- Consultations with key stakeholders (ward councillor and municipalities) will need to take place in the EIA phase.
- A site visit and consultations with key stakeholders (impacted and adjacent landowners) will need to take place in the EIA phase in order to determine the extent of nuisance impact.

Table 5.2: Evaluation of potential impacts associated with the operation of the Woodhouse Solar 2 PV Facility

Impacts on Ecology (Flora, Fauna, Water Resources and Ecosystems)

Operation related activities which could impact on the fauna, flora and overall ecology of the site includes:

» Maintenance (trimming / removal) of surrounding vegetation as part of management of the facility.
» Presence of the overhead power line.
» Presence of impermeable surfaces associated with the substation and workshop area.

The following impacts are identified as the major potential impacts that are likely to be associated with the operation of the proposed PV facility and which will be assessed further during the EIA phase.

» Disturbance, loss or alteration of the species composition (vegetation)
» Altered runoff patterns due to rainfall interception by PV panels and compacted areas
» Disturbance to migration routes and associated impacts to species populations.
» Impacts on wetlands
» Establishment and spread of declared weeds and alien invader plants.
» Implementation of either a fixed or static PV system.

Issue	Nature of Impact	Extent of Impact	'No go' Areas
Disturbance, loss or alteration of the species composition (vegetation)	PV panels create large areas of altered surface characteristics, rainfall interception patterns, and intensive shade that will not be tolerated by most of the species present on site, as these have evolved with a high daily irradiance. Consequently, it can be expected that within the Solar Energy Facility footprint, species composition and topsoil characteristics will change significantly. No equivalent experiments have been undertaken in similar environments up to date, thus the nature and density of vegetation that may persist cannot be predicted at this stage. A sparser or less stable vegetation beneath the PV panels, together with the altered surface and runoff characteristics may lead to:	Local	No No-Go areas have been identified to date. This must be verified during a detailed investigation as part of the EIA phase

	» Increased vulnerability of remaining vegetation to future disturbance, including erosion; » General loss or significant alteration of habitats for sensitive species; » Loss in variation within sensitive habitats due to loss of portions of it; » General reduction in biodiversity; » Increased fragmentation (depending on location of impact); » Future extinction debt of a particular species; » Disturbance to processes maintaining biodiversity and ecosystem goods and services; and » Loss of ecosystem goods and services.		
Altered runoff patterns due to rainfall interception by PV panels and compacted areas	The PV panels create large surfaces of rainfall interception, where rainfall is collected and concentrated at the edges from where it then moves onto the ground in larger, concentrated quantities opposed to small drops being directly intercepted and raindrop impact dispersed by vegetation, then absorbed by the ground. This may lead to a localised increase in runoff during rainfall events, which may result in localised accelerated erosion. Likewise, access roads and areas where soils have been compacted during construction will have a low rainfall infiltration rate, hence creating more localised runoff from those surfaces. This runoff will thus have to be monitored and channelled where necessary to prevent erosion over larger areas.	Site	No No-Go areas have been identified to date. This must be verified during a detailed investigation as part of the EIA phase
Disturbance to migration routes and associated impacts to species populations.	All components of the proposed development may interfere with current migration routes of especially fauna species. This may lead to: » Reduced ability of species to move between breeding an foraging grounds, reducing breeding success rates; » Increased mortality rates due to fatal collisions with	Site and surroundings	No No-Go areas have been identified to date. This must be verified during a detailed investigation as part of the EIA phase

	infrastructure; » Reduced genetic variation due to reduced ability of especially smaller organisms to have individual interaction; » Future extinction debt of a particular species.		
Impacts on wetlands	NFEPA Maps and available Google imagery show that a number of wetlands and drainage lines may be present within the study area. Beyond the study area is the Droë Harts and Losase Rivers, which could be influenced by the proposed development if mitigation measures are not adequately implemented. Furthermore this area is characterized by valuable aquifers and groundwater resources which also could be influenced by the proposed development if mitigation measures are not adequately implemented. » Accidental spills, if not contained and mitigated immediately, may result in harmful/toxic substances ending up in wetlands or polluting ground water resources. Whilst damages to small isolated pans may remain localised, spillage into larger drainage lines may result in adverse effects along the lower lying Droë Harts and Losase Rivers and associated ecosystems; » The nature of the proposed development, especially the PV arrays and new hard surfaces, will change surface characteristics, rainfall interception patterns and hence runoff characteristics of the project area; » This may affect the geohydrology, susceptibility to erosion and potential erosion rates of the landscape, which may lead to a significant alteration to or loss of habitat for fauna and flora species that depend on riparian and wetland habitats; » Altered runoff patterns may influence infrequent filling of possible wetlands on site, which may eliminate localised populations of water-dwelling organisms such as the tadpole shrimp (*Triops* sp) that depend on occasional small areas of	Local to regional	No No-Go areas have been identified to date. The desktop delineated wetlands have been preliminarily classified as High Sensitive Areas whilst the drainage lines are classified as Medium – High to High Sensitive Areas. Their status as potential No-Go areas along with their buffer zones should be determined following a detailed investigation as part of the EIA phase. The A1 CBA wetland located in the middle of the study area has been preliminarily classified as a Very-High Sensitive area and its Ecological Support Area (1A ESA) as a High Sensitive Area. The condition of these CBAs and their status as potential No-Go areas should

	standing water to breed out and regenerate; » A decline in ecosystem functionality of smaller wetlands and riparian areas of smaller drainage lines will impact lower-lying larger wetland areas		be determined following a detailed investigation as part of the EIA phase.
Establishment and spread of declared weeds and alien invader plants.	The envisaged altered vegetation cover after construction and during the operation phase of the proposed development will create a window of opportunity for the establishment of alien invasive species. In addition, regenerative material of alien invasive species may be introduced to the site by machinery or persons traversing through areas with such plants or materials that may contain regenerative materials of such species. Consequences of the establishment and spread of invasive plants include: » Loss of indigenous vegetation or change in vegetation structure leading to an even more significant change in or loss of various habitat characteristics; » Loss of plant resources available to fauna; » Change in soil chemical properties; » Loss or fragmentation of sensitive or restricted habitats; » Loss or disturbance to individuals of rare, endangered, endemic and/or protected species; » Change in flammability of vegetation, depending on alien species; » Hydrological impacts due to increased transpiration and runoff; » Increased production and associated dispersal potential of alien invasive plants, especially to lower-lying wetland areas, and » Impairment of wetland function.	Local to regional	None identified at this stage, but the potential for alien invasive species present in or around the study area is regarded as high. A high number of alien invasive species has been recorded in the wider area according to the SANBI database. The extent to which the site contains alien plants will be determined in the EIA phase.
Implementation of a fixed PV system	The implementation of a fixed PV system will cause: » More continuous and intense shading leading to less stable and dense vegetation and a reduced buffering capacity of extreme	Local	No No-Go areas have been identified to date. This must be verified during a detailed

	weather events by vegetation. » More concentrated runoff as a result of a large continuous panel area. » Constant runoff edges potentially create more erosion, especially where vegetation is weakened » The height of the PV panels limit the permissible vegetation due to maintenance and fire risks.		investigation as part of the EIA phase
Implementation of a tracking PV system	The implementation of a tracking PV system will cause: » More variable and less intense overall shading » Small reduction of vegetation buffering capacity of extreme weather events. » Runoff more dissipated, moderate variation of runoff edges that are expected to create limited erosion where vegetation is weakened	Local	No No-Go areas have been identified to date. This must be verified during a detailed investigation as part of the EIA phase

Summary of the nature, significance, consequence, extent, duration and probability of the impacts

» Most of the above mentioned impacts are probable, although the extent, duration, and magnitude of these impacts can be minimised to levels where these impacts can be regarded as low significance through implementation of appropriate mitigation measures. By exclusion of certain sensitive areas (e.g. CBAs of high sensitivity, wetlands, drainage lines and other sensitive habitats) from the development footprint area, the probability of the above-mentioned impacts occurring within these habitats can be avoided.

» The duration of the project is expected to be long-term and subsequently most of the impacts are also expected to be long-term. Impacts such as erosion and invasion of alien invasive species can be retained to a medium to short duration with the implementation of effective mitigation measures, including regular monitoring throughout the lifespan of the proposed development.

» Although most impacts associated with the proposed development are expected to be local, affecting mainly the immediate environment, the potential does exist for some impacts to be exacerbated and even spread outside the development footprint area if left unattended, eventually posing a potential threat to important environmental processes and functionality. Impacts in this regard include invasion by invasive alien species, soil erosion, significant disturbance and alteration of important wetland habitats and watercourses.

  * Probably the most significant impacts that the proposed development will have are the impacts on Critical Biodiversity Areas and Broad-Scale Ecological Processes. The development is located within a Critical Biodiversity Area and the presence of the facility would potentially impact the ecological functioning of the CBA.

Gaps in knowledge & recommendations for further study

» The largest opportunity for mitigating any negative impacts exists during the design phase, if layouts adhere to the findings and recommendations of detailed field studies carried out during the EIA phase
» Limited knowledge does, however exist on the potential and ease with which vegetation can be re-established after construction given the variable rainfall regime of the region; which species would be able to persist in the altered environment on and around the proposed development; and what effect will this altered species composition and –density will have on ecosystem intactness and –functionality.
» Regular monitoring of a minimum set of environmental parameters throughout the operational phase, coupled with an adaptive environmental management program, will thus be essential to prevent any environmental degradation and any cumulative effects of the development beyond its periphery

Impacts on Soils, Land-Use and Agricultural Potential

During the operation of the solar energy facility, exposed areas / soil could be susceptible to wind/water erosion in the absence of soil erosion control measures, however the potential for erosion occurring within the site is considered to be low. The potential for soil contamination is considered to be marginal due to limited / no use of oils, diesel or fuels as maintenance PV panels require little in the way of maintenance (if pollen, dirt, dust, leaves, and other debris collect on the panels, it can be removed by spraying of water on the panels).

The area that will accommodate the project will exclude agricultural use – grazing activities - which will not be possible within the footprint of the facility. However, grazing can take place on the broader farm portion in the areas that are not utilised for the PV facility. With the low prevailing agricultural potential of the site, this impact would be of limited significance and would be local in extent.

Erosion is generally considered to be the most important direct negative impact on soil during the operation phase, due to the fact that the characteristics of the area has changed with the addition of flat surfaces (PV panels).

Issue	Issue	Extent	No go' Areas
Loss of agricultural land use	The loss of agricultural grazing land due to the direct impact by the infrastructure's footprint during the lifetime of the project.	Local	None
Soil erosion	A change in the natural condition of the site and removal of vegetation will potentially lead to increased risk of soil erosion. It is considered unlikely that this impact will occur	Local	None

	due to the low susceptibility to erosion.		

Summary of the nature, significance, consequence, extent, duration and probability of the impacts

The overall impacts of the proposed facility on agriculture and soil conditions will be of low significance, mainly because of the climatic conditions and the low agricultural and grazing potential of the site and low susceptibility to soil erosion of the soils. The possibility to house substantial commercial farming practices (agriculture or grazing) on the property is not realistic, because of the dominant climatic conditions and prevailing soil conditions. Irregular rainfall, along with other soil-related factors, lead to low agricultural potential. The soil and rock type properties tend to be very homogenous in the area and the whole site can be better utilised for power generation than any other practise. This is not regarded as viable commercial farming site and would be suited to house the facility.

Gaps in knowledge & recommendations for further study

» As a result of the low significance of impacts, no further studies are required to be undertaken

Visual Impacts

It is possible that landscape change due to the proposed PV facility could impact the character of an important landscape area. Importance can be derived from specific features that can relate to urban or rural settings. These might include key natural, historic or culturally significant elements. Importance might also relate to landscapes that are uncommon or under threat from development.

Likely areas of visual impact

Given the nature of the landscape in the area surrounding the study site, it is likely that any significant impacts will be limited to less than 2km distance from the proposed development. It is also considered unlikely that the proposed development will have any visual impacts at a distance greater than 5km.

Visual Receptors

Possible Receptors within the landscape due to use could be sensitive to landscape change. Possible receptors includes the:

» Semi-rural Landscape Character Area,
» Urban Landscape Character Areas and particularly the southern edges of Vryburg that overlook the site,
» Vryburg airport which is located approximately 5.5km to the west of the proposed sites, impacts particularly related to glare that could extend to flight paths
» Linear Receptors or routes through the area that include the N14, N18 and R34.
» Point Receptors that include isolated and small groups of farmsteads that are generally associated with and located within the Rural Landscape Character Areas.

Impact to be considered

The following impacts are identified as the potential impacts that are likely to be associated with the development of the proposed PV facility and which will be assessed further during the EIA phase.

» The proposed development could change the character of the surroundings of a natural area.
» The proposed development could be visible to an extensive area of small holdings
» The proposed development could change the character of the landscape as seen from the urban edge of Vryburg.
» The proposed projects are likely to be visible to a short length (approximately 3km) of the N14 only.
» The proposed projects are likely to be visible intermittently to approximately 5-6km of the R34
» The proposed projects are likely to be visible to approximately 9km of the N18.

» Farmsteads within 5km of the proposed site are less likely to be affected by the proposed projects than farmsteads at a greater distance. Glare from the proposed projects could cause nuisance on adjacent roads and for flightpaths associated with the Vryburg airport.			
Issue	**Nature of Impact**	**Extent of Impact**	**No go' Areas**
Industrialisation of a natural landscape	The affected landscape appears to be modified and is already impacted by various urban influences. As a result, the degree of change may be small. The general area appears to be a focus for future solar energy projects which could have a cumulative effect and transform the local landscape (as a result of the location of the site within a REDZ). There are no protected landscapes within the area.	Local	None defined at this stage.
Small holdings located in the surrounding areas	Negative impact on uses such as guest houses and upmarket residential uses particularly where property value is associated with outlook.	Local	None defined at this stage.
Industrialisation of views from the southern edge of Vryburg.	This could impact negatively on uses such as guest houses and residential uses particularly where property value is associated with outlook. This area is relatively open and views of the development may be possible from homes on the edge of the urban area.	Local	None defined at this stage.
Visibility of the facility to the N14, the N18 and the R34.	Negative impact on impressions of the area which is likely to impact most on tourism and recreational related traffic	Local	None defined at this stage.
Farmsteads located in the surrounding areas	This could impact negatively on uses such as guest houses and other tourism related activities. The ZTV (Zones of Theoretical Visibility) assessment indicates that farmsteads within 5km are unlikely to be significantly affected. Outside this range it is unlikely that there will be significant impact.	Local	None defined at this stage.
Nuisance impacts associated with glare including effects on flight paths and adjacent roads.	This is most likely to occur during early morning and late evening when the angle of incidence of light on PV units is acute resulting in more light being likely to be reflected.	Local	There is greater potential for glare to impact on the southern flight path from projects that are located to the north of the site than those

			located to the south of the site.

Summary of the nature, significance, consequence, extent, duration and probability of the impacts

The desk-top scoping assessment indicates that the development of the proposed PV facility could impact on the current landscape character and particularly the Natural Landscape Character of the area. This impact is likely to occur in areas exposed to the development area, and is expected to be limited within 2-5 km of the site. The significance of this impact will be confirmed in the EIA Phase of the process.

Gaps in knowledge & recommendations for further study:

» A site visit is required to confirm the
  * visual character of the area and the potential impacts;
  * likely sensitivity of smallholdings to visual impacts;
  * likely sensitivity of local roads to visual impacts;
  * likely sensitivity of farmsteads to visual impact.

» A detailed analysis is required to confirm the glare associated with the PV facility, location and nature of the PV arrays, the character and VAC of the landscape and the nature of sensitive receivers needs to be verified on site.

Social Impacts

The operation of the PV facility will have both positive and negative impacts on the socio-economic environment of the surrounding areas:

The potential positive impacts which could arise as a result of the operation phase include the following:

» During the operational phase employment opportunities would be created which could result in benefits to unemployed individuals within the local communities.

» Capacity building and skills development throughout the life of the facility could be to the benefit of the employees and could assist them in obtaining transferable skills.

» During the operational phase local procurement for general materials, goods and services (e.g. transport, catering and security) and other spin-off benefits could materialise.

» The presence of permanent security personnel at the facility could be beneficial to the overall security measures implemented in the area.
» The proposed project could assist in the generation of "green energy" which would lessen South Africa's dependency on coal-generated energy and the impact of such energy sources on the bio-physical environment. The project thereby providing clean, renewable energy supply.

The potential negative impacts which could arise as a result of the operation phase include the following:

» The permanent visual impact associated the solar energy facility (solar facility, power line, access roads, firebreaks, etc.) would alter the landscape. Perceptions with regards to the intensity of such an impact are expected to differ among landowners, stakeholders and other individuals. It is anticipated that each person would experience such an impact in a different way depending on their perception of the solar energy facility itself, the activities undertaken on the surrounding area, their interest in the project and their exposure to the project on a daily basis. However the landscape has already been altered due to commercial gold mining operations with the presence of shaft head infrastructure, mine dumps and transmission infrastructure associated with this activity. Therefore the aesthetics from the solar energy facility is expected to have a low intensity impact. The proposed facility is located in a rural area so the visual implications could have a further negative impact on the area's sense of place.
» Direct occupation of land by the PV facility has the effect of taking the impacted land out of agricultural production, through the occupation of the site by the footprint of the facility.

Positive impacts

Issue	Nature of Impact	Extent of Impact	No go' Areas
Direct employment opportunities and skills development	The creation of long term employment opportunities and skills development opportunities during the operation phase for the country and local economy	Local-regional	None
Economic multiplier effects	Significance of the impact from the economic multiplier effects from the use of local goods and services	Local-regional	None
Socio-Economic Development (SED), Enterprise Development (ED) and share ownership in the project company with local communities	Positive long-term impact from SED, ED and local share ownership in the project company	Local	None
Development of clean, renewable energy	Positive long-term impacts from the generation of renewable energy	Local-regional-national	None

infrastructure			
Negative impacts			
Visual impact and impacts on sense of place	Visual impacts and sense of place impacts associated with the operation phase of the project	Local	None
Impacts associated with the loss of agricultural land	Impacts associated with loss of farmland available for agricultural use due to occupation of land by the PV facility for 20-25 years	Local (Site)	None

Summary of the nature, significance, consequence, extent, duration and probability of the impacts

Positive Impacts:

» *Direct employment opportunities and skills development*: The potential impact is expected to be positive, probable, long term, with a minor intensity and have a low - medium significance. In terms of reversibility of the impact and irreplaceable loss of resources, this is not applicable to this type of impact.

» *Economic multiplier effects*: The potential impact is expected to be positive, probable, long term, with a minor intensity and have a low significance. In terms of reversibility of the impact and irreplaceable loss of resources, this is not applicable to this type of impact.

» *Socio-Economic Development (SED), Enterprise Development (ED) and share ownership in the project company with local communities*: The potential impact is expected to be positive, probable, long term, with a moderate intensity and have a medium significance. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact

» *Development of clean, renewable energy infrastructure*: The potential impact is expected to be positive, probable, long term, with a moderate intensity and have a medium significance. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact

The potential positive impacts may be enhanced with possible enhancement measures which will be elaborated on in the SIA EIA phase.

Negative Impacts:

» *Visual impact and impacts on sense of place*: The potential impact is expected to be negative, probable, long term, with a moderate intensity and have a low-medium significance. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact.

» *Impacts associated with the loss of agricultural land*: The potential impact is expected to be negative, probable, long term, with a low intensity and have a low-medium significance. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the

potential impact.

The potential negative impacts may be mitigated with possible mitigation measures which will be elaborated on in the SIA EIA phase.

Gaps in knowledge & recommendations for further study

» An additional in-depth community needs assessment (CNA) will need to be carried out at a later stage to make sure that the real needs of communities are addressed (in line with the local government) by development programmes in order to significantly contribute towards local economic growth, SED and ED
» A visual impact assessment will need to be undertaken to determine the exact visual impacts associated with the facility.

Table 5.3: Evaluation of potential impacts associated with the proposed grid connection of the Woodhouse Solar 2 PV Facility

Impacts of the power line

As the PV facility is proposed to generate solar power to be evacuated into the Eskom national electricity grid, a grid connection needs to be established between the facility and the national grid.

The grid connection for the project will be finalised based on the environmental assessment. Three grid connection options are being considered:

- Direct connection to the authorised Eskom Bophrima Substation proposed to be constructed in the northern portion of the Remaining Extent of the Farm Woodhouse 729
- Direct connection to the existing Mookodi400/132kv substation located to the west of the site
- Direct connection the existing Woodhouse 88/22KV Substation located on the boundary of the site in the north.

The power line utilised for the connection will be a 132KV line with a maximum height of 30m and will require a servitude width of 32m.

The power line route alternatives for the PV facility has not yet been identified at this stage of the project. The possible power line routes will only be identified after the completion of the scoping phase and will be assessed in detail within the EIA phase. As a result of limited information regarding the power line route alternatives only one impact associated with the construction of a power line has been identified, namely the impact of the power line on avifauna.

Issue	Nature of Impact	Extent of Impact	'No go' areas
Increase in mortalities of low-flying and perching birds	The construction of the overhead power line and exposed electrical infrastructure could increase mortality rates of avifauna by: » Collision of low-flying birds into overhead power lines » Electrocution of birds perching on exposed electrical components It should be possible to prevent such mortalities by ensuring adequate protection of all electrical	Local and surroundings	No No-Go areas have been identified to date. This must be verified during a detailed investigation as part of the EIA phase

	components as well as increasing the visibility of overhead power lines and installing perch-deterrents on electrical components		

Summary of the nature, significance, consequence, extent, duration and probability of the impacts

» The above mentioned impact is considered to be probable, although the extent, duration, and magnitude of these impacts can be minimised to levels where this impact can be regarded as low significance through implementation of appropriate mitigation measures.
» The duration of the project is expected to be long-term and subsequently the impact is also expected to be long-term.
» The impact associated with the proposed development is expected to be local, affecting mainly the immediate environment and the surroundings.

Gaps in knowledge & recommendations for further study:

» Each power line alternative route (to be determined) from the facility will be assessed in detail within the EIA phase once the alignment is known and each specialist study will consider the impact of the power line/s routes on the environment.
» The largest opportunity for mitigating any negative impacts exists during the design phase, if layouts adhere to the findings and recommendations of detailed field studies carried out during the EIA phase

Table 5.4: Evaluation of potential cumulative impacts associated with the Woodhouse Solar 2 PV Facility and Other Solar Projects in the Area

Approach to Cumulative Effects Assessment

Cumulative impacts, in relation to an activity, refer to the impact of an activity that in-itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. For cumulative effects analysis to help the decision-maker and inform interested parties, it must be limited to effects that can be evaluated meaningfully (DEAT, 2004). Boundaries must be set so analysts are not attempted to measure effects on everything. Therefore, the cumulative impacts associated with the proposed Woodhouse Solar 2 PV Facility have been viewed from two perspectives within this report:

» Cumulative impacts associated with the scale of the projects i.e. one 100MW facility proposed on the Remaining Extent of the Farm Woodhouse 729;

» Cumulative impacts associated with other relevant approved or existing solar developments within a 10 km radius of the proposed Woodhouse Solar 2 site

Cumulative effects are commonly understood as the impacts which combine from different projects and which result in significant change, which is larger than the sum of all the impacts (DEAT, 2004). The complicating factor is that the projects that need to be considered are from past, present and reasonably foreseeable future development. Cumulative effects can be characterised according to the pathway they follow. One pathway could be the persistent additions from one process. Another pathway could be the compounding effect from one or more processes. Cumulative effects can therefore occur when impacts are:

* additive (incremental);
* interactive;
* sequential; or
* synergistic.

Canter and Sadler (1997) describe a three step process for addressing cumulative effects in an EIA:

* delineating potential sources of cumulative change (i.e. GIS to map the relevant renewable energy facilities in close proximity to one another).
* identifying the pathways of possible change (direct impacts)
* indirect, non-linear or synergistic processes; and
* Classification of resultant cumulative changes

The Woodhouse Solar 2 PV Facility is proposed to be located on the Remaining Extent of the Farm Woodhouse 729, approximately 10km south east of the town of Vryburg in the North West Province. **Table 5.5** below shows the known solar projects in the broader area (at least 5 other facilities, 1 of which are preferred bidder projects).

Table 5.5: Other projects/developments within 10km from the Woodhouse Solar 2 site

Project Name	Location	Approximate distance from the site (measured from the centre)	Project Status
Proposed 60MW Carocraft PV Solar Park and associated infrastructure (a.k.a. the Carocraft Solar Park)	Remaining Extent and Portion 1 of Farm Weltevrede 681	~11.9km to the north east of the site	Authorised
Construction of the 75MW Photovoltaic facility and associated infrastructure in Naledi (a.k.a. the Sediba Solar Energy Facility)	Remaining Extent of the Farm Rosendal 673	~8.4km to the west of the site	Authorised
Proposed Tiger Kloof Solar Photovoltaic energy facility near Vryburg, North West Province (a.k.a. the Tiger Kloof Solar Energy Facility)	Portion 3 (RE) and Portion 4 of the Farm Waterloo 730	~8.2km to the west of the site	Authorised
The Proposed Construction Of The 75MW Photovoltaic Solar Plant And Associated Infrastructure On A Portion Of The Farm Waterloo 992 In, Naledi Local Municipality Of The North West Province (a.k.a. the Waterloo Solar Park)	Remaining Extent of Farm Waterloo 992	~4.2km to the west of the site	Authorised: Preferred Bidder Round 4.5
Proposed Woodhouse Solar 1 PV Facility, North West Province	Remaining Extent of the Farm Woodhouse 729	Located within the same farm portion as the Woodhouse Solar 2 PV Facility.	In process

The impact of solar facilities on the landscape is considered likely to be a key issue in certain parts of South Africa where there is a growing number of solar energy facility applications. Cumulative impacts are expected to be associated with the following:

» Loss of natural vegetation and species of conservation concern
» Impacts on faunal habitats and sensitive faunal species
» Impacts on soil resources, land use and agricultural potential
» Loss of heritage resources
» Visual impacts
» Impacts on the social environment (both positive and negative)

The location of the proposed Woodhouse Solar 2 Facility is situated in a Renewable Energy Development Zone (REDZ) and has resulted in the identified area being earmarked for the development of renewable energy facilities specifically that of solar energy facilities, as the area receives a suitable annual amount of solar radiation. It can thus be expected that the area will be intensely developed for solar energy facilities, adding to the cumulative impact of the overall area.

In addition to cumulative impacts associated with this proposed development and other similar developments in the area, cumulative impacts are also to be considered at a site level. The potential direct cumulative impacts associated with the PV facility is expected to be associated predominantly with the potential ecology impact, potential soil impacts and potential impacts on visual and social in the surrounding area.

Summary of the nature, significance, consequence, extent, duration and probability of the impacts

» The above mentioned impacts are considered to be probable, although the extent, duration, and magnitude of these impacts can be minimised to levels where this impact can be regarded as low significance through implementation of appropriate mitigation measures.
» The duration of the project is expected to be long-term and subsequently the impact is also expected to be long-term.
» The impact associated with the proposed development is expected to be local, affecting mainly the immediate environment and the surrounding areas, as well as other renewable energy facilities within the vicinity.

Gaps in knowledge & recommendations for further study:

» Each specialist study will consider and assess the cumulative impacts of proposed, approved and authorised renewable projects in the area.
» Cumulative impacts will be fully assessed in the EIA phase.

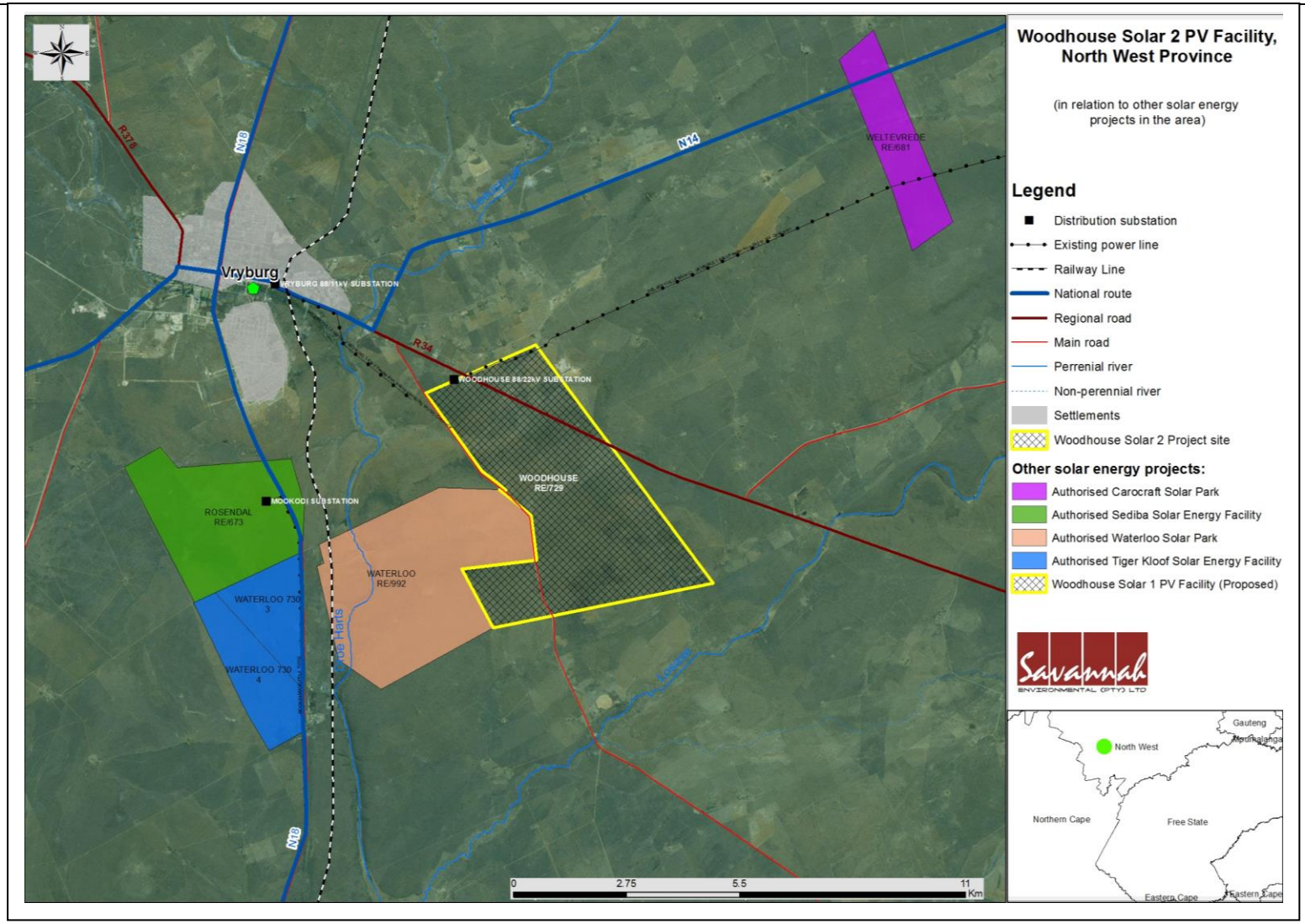

Figure 5.2: Woodhouse Solar 2 site in relation to other solar projects within 10km of the site (NB: representation is based on the farm portions where developments

CONCLUSIONS CHAPTER 6

Genesis Woodhouse Solar 2 (Pty) Ltd is proposing the development of the Woodhouse Solar 2 PV Facility as well as associated infrastructure within the Remaining Extent of the Farm Woodhouse 729. The proposed site is located approximately 10 km south west of the town of Vryburg and falls under the jurisdiction of the Naledi Local Municipality and within the greater Dr Ruth Segomotsi Mompati District Municipality in the North West Province.

This draft scoping report is aimed at detailing the nature and extent of this facility, identifying potential issues associated with the development and defining the extent of studies required within the EIA phase. This was achieved through an evaluation of the proposed PV facility, involving the project proponent, specialist consultants, and a consultation process with key stakeholders (including relevant government authorities) and interested and affected parties (I&APs). The public consultation process is extensive and every effort is being made to include representatives of all stakeholder groupings in the study area and the Province. This chapter concludes the Scoping Report and provides an evaluation of the identified potential environmental risks and impacts associated with the construction and operation phases of the Woodhouse Solar 2 PV Facility. Recommendations regarding investigations required to be undertaken within the EIA are provided within the Plan of Study for EIA, contained within Chapter 7 of this scoping report.

The conclusions and recommendations of this scoping report are the result of the review of existing information, desk-top evaluations of impacts identified by specialists and limited field work, with the aim of identifying risks and sensitivities on the proposed development site and thereby screening out those areas which are not considered acceptable for a development of this nature.

6.1 Legal Requirements as per the EIA Regulations, 2014

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report of the EIA Regulations, 2014:

Requirement	Relevant Section
(h)(xi) a concluding statement indicating the preferred alternatives, including the preferred location of the activity.	A concluding statement regarding the PV facility is included within this chapter as a whole.

6.2 Conclusions drawn from the Evaluation of the Proposed Site for Development of the Woodhouse Solar 2 PV Facility

The PV facility is proposed to include several arrays of photovoltaic solar panels (static or tracking) with a contracted capacity of up to 100MW. The development footprint for the PV facility is anticipated to be approximately 300 hectares in extent.

Infrastructure associated with the facility will include:

» Arrays of PV panels with a capacity of up to 100MW
» Mounting structures to support the PV panels.
» On-site inverters to convert the power from a direct current to an alternating current and a substation to facilitate the connection between the solar energy facility and the Eskom electricity grid.
» A new 132kV power line between the on-site substation and the Eskom grid connection point. Three alternatives are being considered for the grid connection:
    - A direct connection to the proposed Eskom Bophirima substation to be constructed on-site, or
    - A direct connection to the existing Mookodi 400/132KV substation located to the west of the site, or
    - A connection to the existing Woodhouse 88/22KV Substation located on the boundary of the site in the north.
» Cabling between the project components, to be laid underground where practical.
» Offices and workshop areas for maintenance and storage.
» Temporary laydown areas.
» Internal access roads and fencing around the development area.

The height of the power lines will be approximately 28-30m, with a servitude of 32m wide, and will be similar in appearance to a standard Eskom power line structure.

The key issues and potential impacts identified through this scoping study associated with the Woodhouse Solar 2 PV Facility is summarised in **Table 6.1**.

From this table it can be concluded that the majority of potential impacts identified to be associated with the construction of the proposed Woodhouse Solar 2 PV Facility are anticipated to be mostly localised with few impacts extending from a local to regional extent. From the specialist studies undertaken, the following expected significance is attributed to the identified impacts:

» Impacts on ecology – most of the impacts associated with the ecological functioning and features within the site are considered to be probable, although the extent, duration, and magnitude of these impacts can be minimised to levels where these impacts can be regarded as low significance through implementation of appropriate mitigation measures as well as the avoidance of sensitive areas within the site. Probably the most significant impacts that the proposed development will have are the impacts on Critical Biodiversity Areas and Broad-Scale Ecological Processes. The development is located within a Critical Biodiversity Area and the presence of the facility would potentially impact the ecological functioning of the CBA. However, after a site inspection was conducted it was determined that the sensitivity of the majority of the CBA areas within the site is considered as medium-low as a result of previous disturbance that has taken place. These medium-low CBA features include dams, Ecological Support Areas, a CBA corridor and a CBA link. Other CBA features within the site includes hills which are classified as a medium –high sensitivity, drainage lines classified as a medium-high/high sensitivity and wetland areas ranging from a high to very high sensitivity. As the majority of the site is classified as medium-low sensitivity the PV facility can be placed within a suitable location which avoids any major ecological impacts.
» Impacts on archaeological resources – to determine the significance of impacts on archaeological sites present within the Woodhouse Solar 2 site a site visit is required. However previous work that has been conducted within the study area suggests Stone Age sites of medium to medium high significance can be present within the site.
» Impacts on palaeontological resources – without the consideration of due care in regards to possible fossil resources that may be present within the Woodhouse Solar 2 site the resultant damage, destruction or inadvertent relocation of any affected fossils will be permanent and irreversible. Thus, any fossils occurring within the study area are potentially scientifically and culturally significant and any negative impact on them would be of high significance. Although trace fossils and plants could be present in the Dwyka the likelihood of significant fossil heritage in the Vryburg area is considered to be low.
» Impacts on soils and agricultural potential – The overall impacts of the proposed facility on agriculture and soil conditions will be of low significance, mainly because of the climatic conditions and the low agricultural and grazing potential of the site and low susceptibility to soil erosion of the soils.
» Social impacts – social impacts associated with the development of the facility can either be of a positive or negative nature. The positive impacts associated with the construction of the development will be probable, short term and have a low –

medium significance. Positive impacts associated with the development of the PV facility includes the creation of employment opportunities and skills development opportunities as well as economic multiplier effects from the use of local goods and services. Negative impacts associated with the construction of the development ranges from a low to medium significance. Negative impacts associated with the development of the PV facility includes a temporary increase in safety and security concerns, traffic disruptions and increased safety risks for road users, added pressure on economic and social infrastructure and limited nuisance impacts.

The operation phase impacts range from local to regional, with one positive impact extending toward a national level. From the specialist studies undertaken, the following expected significance is attributed to the identified impacts:

» Impacts on ecology – most of the impacts associated with the ecological functioning and features within the site are considered to be probable, although the extent, duration, and magnitude of these impacts can be minimised to levels where these impacts can be regarded as low significance through implementation of appropriate mitigation measures as well as the avoidance of sensitive areas within the site. Probably the most significant impacts that the operation of the proposed development will have is the disturbance, loss or alteration of the species composition (vegetation), altered runoff patterns, disturbance to migration routes and associated impacts, an increase in mortalities of low-flying and perching birds, impacts in wetlands and the establishment and spread of declared weeds and alien invader plants.
» Impacts on soils and agricultural potential – the overall impacts of the proposed facility on agriculture and soil conditions will be of low significance, mainly because of the climatic conditions and the low agricultural and grazing potential of the site and low susceptibility to soil erosion of the soils. The possibility to house substantial commercial farming practices (agriculture or grazing) on the property is not realistic, because of the dominant climatic conditions and prevailing soil conditions. Irregular rainfall, along with other soil-related factors, lead to low agricultural potential.
» Visual Impacts –the operation of the proposed facility could impact on the current landscape character and particularly the Natural Landscape Character of the area. This impact is likely to occur in areas exposed to the development area, and is expected to be limited within 2-5 km of the site. The significance of this impact will be confirmed after a site visit has been undertaken and impacts have been ground-truthed within the EIA phase.
» Social impacts - social impacts associated with the operation of the facility can either be of a positive or negative nature. The positive impacts associated with the construction of the development will be positive, probable and long term and will have a significance which ranges from low to medium. Negative impacts associated with the operation of the development ranges from a low to medium significance.

No environmental fatal flaws were identified to be associated with the site. Features within the larger site have been identified as areas of high ecological sensitivity that should ideally be avoided by the PV facility but was however not classified as no-go areas (refer to Section 6.5).

Table 6.1: Summary of the extent of the potential impacts associated with the Woodhouse Solar 2 PV Facility, as identified at the scoping phase

Construction / Decommissioning Impacts	Extent
Disturbance to and loss of indigenous natural vegetation	L
Disturbance or loss of threatened / protected plants	L
Loss of protected trees	S-L
Loss of habitat for fauna species of conservation concern	L
Disturbance to migration routes and associated impacts to species populations	S-L
Impacts on wetlands	L-R
Impact on Critical Biodiversity Areas	L-R
Establishment and spread of declared weeds and alien invader plants.	L-R
Loss of agricultural land use	L
Soil erosion and loss of topsoil	L
Soil Contamination	L
Disturbance and destruction of archaeological sites and graves.	L
Loss of Palaeontological Heritage	L
Nuisance impacts associated with the generation of noise and dust.	L
Direct employment opportunities and skills development and economic multiplier effects	L-R
Safety and security impacts	L
Impacts on daily living and movement patterns	L
Pressure on economic and social infrastructure impacts from an in-migration of people	L-R

Operational Impacts	Extent
Disturbance, loss or alteration of the species composition (vegetation)	L
Altered runoff patterns due to rainfall interception by PV panels and compacted areas	S-L
Disturbance to migration routes and associated impacts to species populations.	S-L
Increase in mortalities of low-flying and perching birds	L
Impacts on wetlands	L-R
Establishment and spread of declared weeds and alien invader plants.	L-R
Implementation of a tracking/static PV system	L
Loss of agricultural land use	L
Soil erosion	L
Industrialisation of a natural landscape	L
Impact on small holdings located in the surrounding areas	L
Industrialisation of views from the southern edge of Vryburg.	L
Impact of the visibility of the facility to the N14, the N18 and the R34.	L
Impact on farmsteads located in the surrounding areas	L
Nuisance impacts associated with glare including effects on flight paths and adjacent roads.	L
Direct employment opportunities and skills development and economic multiplier effects	L-R
Socio-Economic Development (SED), Enterprise Development (ED) and share ownership in the project company with local communities	L
Development of clean, renewable energy infrastructure	L-R-N
Visual impact and impacts on sense of place	L
Impacts associated with the loss of agricultural land	

S	Site	L	Local	R	Regional	N	National

6.3 Conclusions drawn from the Evaluation of the Potential Issues with Associated Infrastructure - Power Line, Invertors, Substation and Access Roads

In order to connect the Woodhouse Solar 2 PV Facility to the Eskom national electricity grid an on-site substation and power line for the facility will be constructed. For the establishment of the grid connection, three grid connection points are being considered. The grid connection for the PV facility will however be finalised based on input from Eskom and the environmental assessment.

The potential impacts associated with the power line, substation, access road and inverters will be considered in detail within the EIA phase. Recommendations regarding preferred locations for this infrastructure and appropriate mitigation measures (if required) will be made.

6.4 Risks Associated with the Proposed Project

The most significant risk associated with the development of the PV facility will be potential conflict with the land-use of the area. As the land is currently primarily used for grazing the development of the facility will lead to a limited loss of space for the undertaking of this activity. As the site is located within an identified REDZ for solar development, it is considered that this risk will be low.

Other risks associated with the project include those posed to sensitive environments within the site. The proposed site (~2263ha) for the development of the PV facility is significantly larger than the area required to house the PV facility and associated infrastructure (approximately 300ha). The facility can therefore be appropriately placed within the larger site with the aim of avoiding identified areas of high sensitivity and thereby major environmental impacts.

6.5 Sensitivity Analysis for the Study Site

The **potentially sensitive areas** which have been identified through the scoping study are listed below and summarised in **Figure 6.1** (Sensitivity Map). The scoping phase sensitivity map provides an informed illustration of sensitivity within and around the larger site. The detail is based on the desktop review of the available baseline information for the study area as well as limited field surveys. The sensitivity map is intended to inform the location and layout of the PV facility within the broader site, and must be used as a tool by the developer to avoid those areas flagged to be of potential high sensitivity as far as possible.

Specific sensitivities identified within the scoping study are summarised below.

Visual receptors

The visual study has indicated that the proposed PV facility is likely to have a visual impact on a relatively limited area of 2 – 3 km from the site and that impacts are unlikely to extend outside 5km from the site. There are potentially sensitive visual receptors that occur in the areas surrounding the site. These receptors include the town of Vryburg located to the north west of the site, the surrounding roads including the R34, N18 and N14, small holdings located to the north of the site and potential farmsteads located within the surrounding area of the site. The presence of potential sensitive visual receptors will be ground-truthed in the EIA phase and the sensitivity thereof described and assessed in detail.

Archaeological resources

As a result of the previous and historical land-use of the site, which has been inhabited from the 1800's onwards, the possibility exists that structures/ features older than 60 years may occur within the site. Previous work done in the study area indicated that pans, drainage lines and ridges are sensitive from a heritage perspective. Wetlands and other waterbodies that occur within the site can thus be described as heritage sensitive areas. Areas that may be of concern are located throughout the extent of the broader site. A drainage line located within the south eastern portion of the site and three pans, one located in the northern portion, one located within the centre and one located on the eastern boundary of the site are all highlighted as areas of potential sensitivity from a heritage perspective.

Palaeontological resources

The development area is underlain by Ghaap Group (Schmidtsdrif Subgroup, and Vryburg Formation), as well as the Dwyka Group of the Karoo Supergroup. Small outcrops of Permo-Carboniferous Dwyka Group, Vryburg Formation, (north-western and south-eastern borders) and Schmidtsdrif Subgroup (south-western

margin) is present in the development area. The Boomplaas Formation stromatolites represent some of the oldest examples of these microbial fossils in South Africa. Detailed descriptions of these fossils have yet to be documented while their stratigraphic and geographical distributions are poorly understood. Although trace fossils and plants could be present in the Dwyka the likelihood of significant fossil heritage in the Vryburg area is considered to be low.

Ecological sensitive features

The study area is situated in the Savanna biome and Eastern Kalahari Bushveld Bioregion. The vegetation in and surrounding the study area is Ghaap Plateau Vaalbosveld. The conservation status of this unit is classified as Least Threatened and is not listed under the National List of Ecosystems that are Threatened and in need of protection. There are however a variety of **ecological** sensitive features identified within the site including:

» According to NFEPA wetland classification, two wetland depressions and two small wetland flats, as well as two channelled valley bottom wetlands can be found within the study area. A desktop delineation using Google Earth identified five depression wetlands, one valley bottom wetland which has been transformed by the presence of a small dam, one flat/depression wetland which also seems to have been dammed and one other artificially constructed dam is present within the site. These areas and their associated buffers are considered sensitive from an ecological perspective and should be avoided as far as possible.
» Three potential aquifer types may be present within the broader study site including the Basement Aquifer, Inter-granular aquifer and Karst aquifer.
» The protected plant species, *Boscia albitrunca*, as per the National Forest Act may potentially occur within the site. Other species of concern in the area, as per the South African Red List Categories, is the *Gnaphalium nesonii*, listed as rare, the *Rennera stellate*, listed as vulnerable and the *Lithops lesliei,* listed as near threatened.
» Almost half of the broader site is covered by the Terrestrial Critical Biodiversity Areas. The largest portion of the CBA consists out of Important Ecological Corridors (T2 CBA). Three hill features have been classified as T2 CBA (Hills). The south-western corner of the site is classified as a T2 CBA (features) according to its association with carbonate rocks and because of its importance as a potential groundwater recharge zone. The only T1 CBA found within the site is located in a small section of the north western corner and is due to the areas ecological function as critical linkage and corridor zone. From the brief field survey undertaken, these areas have all been confirmed to range from a low – medium and medium -high sensitivity as a result of previous disturbance, current grazing practise and infrastructure development within these areas.
» A much more extensive area of the site is covered by Aquatic Critical Biodiversity Areas, with more than half of the site falling within some kind of

CBA. The largest portion of CBA falls within the A2 CBA due to its location within a sub-Quaternary catchment (Droë Harts) as identified by the CSIR national assessment. The wetland body located within the centre of the study area is regarded as an A1 CBA wetland feature and the buffer area around the wetland as an A1 ESA area. The smaller wetland bodies occurring in and around the study area is regarded as A2 CBA wetland features and their buffer areas (ecological support areas) as A2 ESA. A2 ESA (Dolomite) is consistent with T2 CBA and covers the south western corner of the site. From the brief field survey undertaken, these areas have all been confirmed to range from a low – medium, high and very-high sensitivity. Some of the above mentioned features are considered as no-go areas or possible no-go areas where disturbance of the particular features or areas should be avoided..

The above mentioned sensitivities (visual, heritage and ecological) are illustrated within the overall sensitivity map in **Figure 6.1** below. Any portions of the site which are proposed to be used for development will be subject to survey and ground-truthing during the EIA phase of the project. The potentially sensitive areas identified to date will therefore be further investigated and assessed through detailed specialist studies (including field surveys) during the EIA phase of the process (refer to Chapter 7 for more details). The sensitivity map will be further refined in the EIA phase on the basis of these specialist studies, in order to provide an assessment of environmental acceptability and suitability of the final design of the facility.

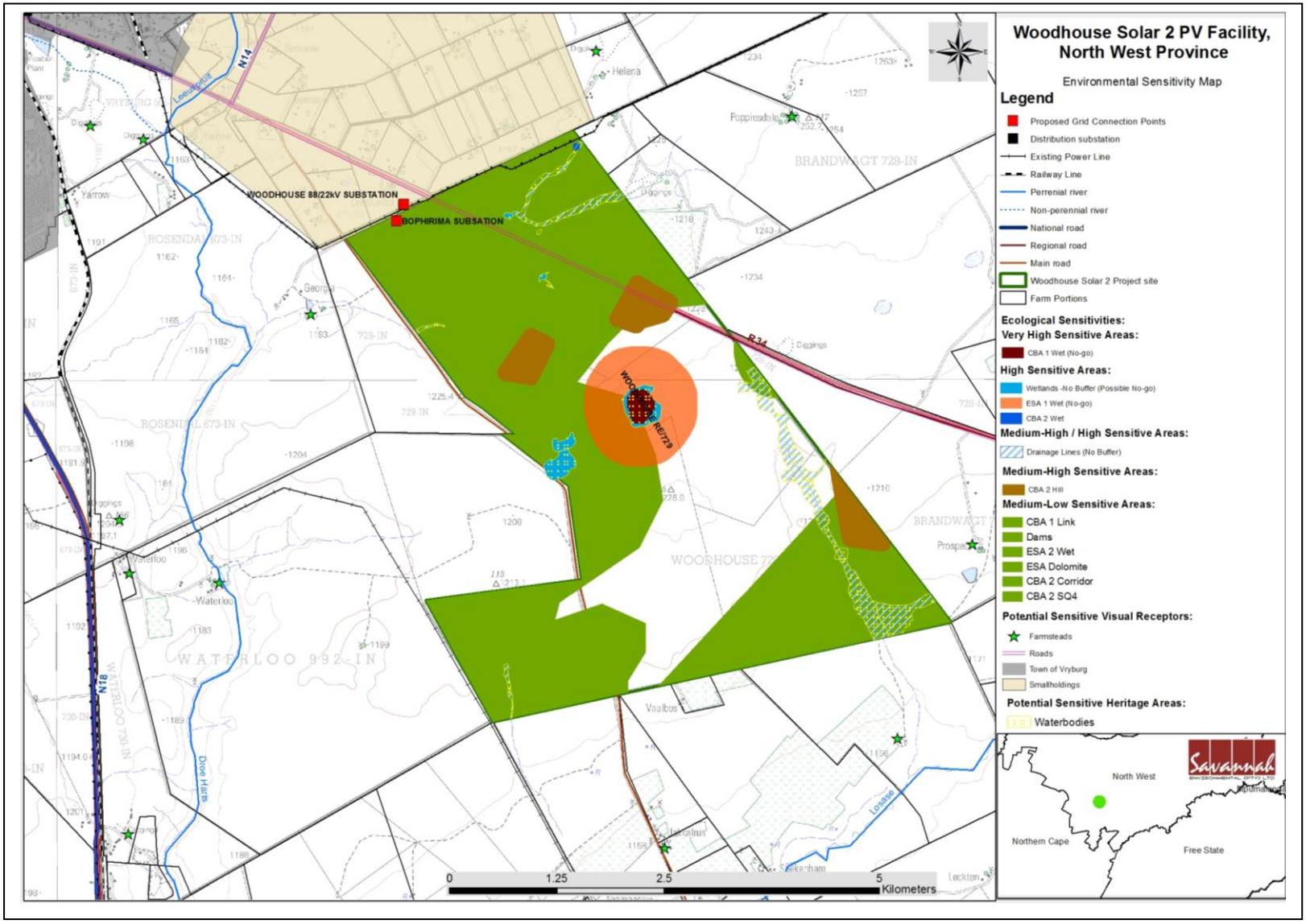

Figure 6.1: Environmental Sensitivity Map from the results of the scoping evaluation for the Woodhouse Solar 2 PV Facility.

6.6 Recommendations

At this stage in the process, there are no environmental fatal flaws associated with the Woodhouse Solar 2 PV Facility within the Remaining Extent of the Farm Woodhouse 729. It is however recommended that the focus areas for the development of the solar PV facility be considered outside of the identified areas of a high sensitivity.

With an understanding of which areas within the site are considered sensitive to the development of the proposed facility, Genesis Woodhouse Solar 2 Pty (Ltd) can prepare the detailed infrastructure layout for consideration within the EIA Phase. During the EIA phase more detailed environmental studies will be conducted in line with the Plan of Study contained in Chapter 7 of this report. These studies will consider the detailed layouts produced by the developer and make recommendations for the implementation of avoidance strategies (if required), mitigation and management measures to ensure that the final assessed layout retains an acceptable environmental impact.

PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT CHAPTER 7

This Scoping Report includes a description of the nature and extent associated with the development of the proposed Woodhouse Solar 2 PV Facility with details regarding the Scoping Phase, as well as the issues identified, described and evaluated. This chapter provides the Plan of Study for the Environmental Impact Assessment (EIA) which is relevant to the development phase for the PV facility, based on the outcomes of the Scoping Study and associated specialist investigations.

The key findings of the Scoping Phase includes inputs from authorities, the public, the proponent and the EIA specialist team, and are used to inform the Plan of Study for EIA together with the requirements of the NEMA EIA Regulations of 2014 and applicable guidelines. The Plan of Study describes how the EIA Phase will proceed and includes details of the detailed specialist studies required to be undertaken for those potential impacts recorded to be of potential significance.

Genesis Woodhouse Solar 2 (Pty) Ltd proposes the development of the Woodhouse Solar 2 PV Facility as well as all associated infrastructure within the Remaining Extent of the Farm Woodhouse 729.

7.1 Legal Requirements as per the EIA Regulations, 2014

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report of the EIA Regulations, 2014:

Requirement	Relevant Section
(i) a plan of study for undertaking the environmental impact assessment process to be undertaken	A plan of study for the undertaking of the EIA phase for the PV facility is included within this chapter as a whole.

7.2 Aims of the EIA Phase

The EIA Phase to be undertaken for the PV facility will aim to achieve the following:

» Provide an overall description and assessment of the social and biophysical environment affected by the development of the proposed PV facility.
» Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the proposed PV facility.
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.

» Undertake a fully inclusive public involvement process to ensure that I&APs are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA will address potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with each phase of the development including design, construction, operation and decommissioning; and will aim to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed projects. All feasible alternatives (including the 'do nothing' alternative and technology alternatives) will be assessed.

7.3 Authority Consultation

Consultation with the regulating authorities (i.e. Department of Environmental Affairs (DEA) and the North West Department of Rural, Environment and Agricultural Development (READ)) will be undertaken and will continue throughout the EIA process. On-going consultation will include the following:

» Submission of a Final Scoping Report following a 30-day review period (and consideration of comments received).
» Submission of a Draft EIA Report for review and comment
» Submission of a Final EIA Report following a 30-day review period.
» Consultation and a site visit with DEA and READ (if required) in order to discuss the findings and conclusions of the EIA Report.

7.4 Consideration of Alternatives

The following project alternatives will be investigated in the EIA Phase:

» **The 'do nothing' alternative:** Genesis Woodhouse Solar 2 Pty (Ltd) does not establish the proposed PV facility on the Remaining Extent of the Farm Woodhouse 729
» **Site-specific layout/design alternatives:** in terms of the position of the facility within the larger site, and layout and/or design of the facility within the 300ha development footprint, particularly the layout of the PV panels and corridors/servitudes for associated infrastructure such as the access roads and power lines.
» **Alternative servitudes for power line routing:** the power line routes for the facility will be assessed in detail in the EIA report.
» **Technology alternatives:** the option of implementing either a fixed or tracking PV facility will be assessed.

7.5 Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

A summary of the issues which require further investigation within the EIA phase, as well as the proposed activities to be undertaken in order to assess and ground-truth the significance of these potential impacts is provided within **Table 7.1**. The specialists involved in the EIA Phase are also reflected within this table. These specialist studies will consider the development footprints proposed for the facility and all associated infrastructure, as well as feasible and reasonable alternatives identified for the project.

Table 7.1: Issues requiring further investigation during the EIA Phase and activities to be undertaken in order to assess the significance of these potential impacts relevant to the Woodhouse Solar 2 PV Facility.

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Ecology (Flora, Fauna, Water Resources and Ecosystems)	***Sensitivity Analysis and EIA assessment*** The current study is based on a desktop assessment and a preliminary site inspection. The current knowledge is sufficient to proceed to the EIA stage and additional fieldwork is required to provide additional insight into the area and to ground-truth the impacts and sensitivities identified within this scoping phase. The specialist study to be undertaken in the EIA phase will include: » A site visit to the proposed site to ground-truth and confirm the sensitivity of the site and gain a better and in-depth understanding of the area in terms of all ecological features present within the site (including fauna and flora). This must be undertaken in the growing season between November and April. » Plant species of conservation concern will only be identifiable during the growing season, thus any field survey of vegetation should only commence from November and be completed by April. » Although previous collection records from the Vryburg area exist, the site itself may not have been previously surveyed and there may be additional species that have not yet been captured in the existing species databases for the area. A detailed ecological survey and sensitivity assessment will be undertaken during the EIA phase according to the methods outlined in section 4 of the Ecology Scoping Report (**Appendix D**). As part of the EIA process, a detailed field survey of the vegetation will be undertaken in order to inform the following: » A phytosociological classification of the vegetation found in the study area according to vegetation survey data and its TWINSPAN / PC ORD analysis » A corresponding description of all defined plant communities and their typical habitats, including a full species list for each plant community and a representative photographic record taken on site of each community » A map of all plant communities within the boundaries of the study area » A description of the sensitivity of each plant community, based on sensitivity criteria outlined in section 3.3 of the Ecology Scoping Report (**Appendix D**) » A full assessment of impacts according to section 3.4 of the Ecology Scoping Report (**Appendix**	Gerhard Botha of Savannah Environmental

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	D) ***Assessment of Impacts for the EIA*** This methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	
Heritage: Archaeology and Palaeontology	***Sensitivity Analysis and EIA assessment*** The specialist study to be undertaken in the EIA phase will include: Archaeology: » In order to comply with the National Heritage Resources Act (Act 25 of 1999), a Phase 1 Archaeological Impact Assessment must be undertaken. » During this study sites of archaeological, historical significance or places of cultural interest must be located, identified, recorded, photographed and described. » The levels of significance of the recorded heritage resources must be determined and mitigation proposed should any significant sites be impacted upon, ensuring that all the requirements of SAHRA are met. » Description and assessment of all potential impacts (direct, indirect and cumulative) identified in this scoping phase report and; » Recommendations will be made for the management of identified impacts.	Jaco van der Walt of Heritage Contract and Archaeological Consulting (Archaeology) Elize Butler of the Bloemfontein National Museum (Palaeontology)

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	Palaeontology: » A phase 2 Palaeontological assessment including a site visit and a detailed assessment of the impacts must be conducted to assess the value and prominence of stromatolites in the development area and the effect of the proposed development on the palaeontological heritage. ***Assessment of Impacts for the EIA*** This methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	
Visual	***Sensitivity Analysis and EIA assessment*** The specialist study to be undertaken in the EIA phase will include: » A level 2 Visual Impact Assessment which includes the description of issues raised in the scoping phase, site visit, description of the receiving environment and the proposed project, and the establishment of view catchment areas and receptors, brief indication of potential visual impacts, and recommendations regarding possible mitigation measures. The following methodology will be used in preparation of the VIA report: » Verification of issues raised in scoping phase through a site visit » Description of the receiving environment and the proposed project » Establishment of view catchment area, view corridors, viewpoints and receptors » Indication of potential visual impacts using established criteria provided by the EAP	Jon Marshall of Afzelia Environmental Consultants

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Consideration of potential lighting impacts at night » Description of alternatives, mitigation measures and monitoring programmes. » Review by independent, experienced visual specialist (confirmation needed if required) ***Assessment of Impacts for the EIA*** This methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	
Social	***Sensitivity Analysis and EIA assessment*** The main aim for the Social Impact Assessment (SIA) to be conducted during the EIA phase, will be to determine the social impacts that may arise from the proposed development. The key objectives in the SIA process will include: » Describing and obtaining an understanding of the proposed development (type, scale, location), the communities likely to be affected and determining the need and scope of the SIA; » Collecting baseline data on the current social environment and historical social trends; » Identifying and collecting data on the Social Impact Assessment variables and social change processes related to the proposed intervention. This requires consultation with affected individuals and communities; » Assessing and documenting the significance of social impacts associated with the proposed	Candice Hunter of Savannah Environmental (with external review by Neville Bews)

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	project; » Assessing the project (including any feasible alternatives) and identifying potential mitigation and enhancement measures; » Developing an Environmental Management Programme. ***The collection of data*** Primary and secondary data sources will be utilised to inform the study in aid of the objectives of the study. Primary data sources for the SIA will include the following: » A site visit will be undertaken. Observations will also be made while on site and within the study area. » Meetings will be undertaken to collect information from representatives of key stakeholder groups. These included individuals both directly and indirectly associated with the proposed development. The meetings will mostly be undertaken face-to-face and where not possible telephonically. A project specific questionnaire will be developed and utilized for the semi-structured interviews. These meetings will form the basis of the primary data collection and assisted with the gathering of baseline information as well as establishing the stakeholder's perceptions, interests and concerns on the proposed development. Secondary data collection methods mostly centred on desktop study will be gathered and analysed for the purpose of the study, in which the following documents will be examined: » Project maps. » A desktop aerial study of the affected area through the use of the latest version of Google Earth 2015. » Other technical specialist studies undertaken for the Scoping and EIA will feed into the SIA. » Cross-cutting issues raised during the SIA will be communicated to the relevant specialist for consideration in their studies. » The comments and responses report (compiled from the public participation process completed as part of the scoping phase) » Review of data primarily retrieved from Census data, the 2011 Census Survey. » Planning documentation such as District Municipality (DM) Integrated Development Plans	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	(IDPs), Spatial Development Framework (SDF) and Environmental Management Framework (EMF) as well as Local Municipality (LM) IDPs and policies. » Review of relevant guidelines, policies and plan frameworks in relation to the project and in relation to the area will be utilised. » Literature reviews of social issues associated with solar energy facilities. Information that is relevant to the project will be identified and assessed from these sources within the context of the pre-construction, construction, operational and decommissioning phases of the proposed project. ***Assessment of Impacts for the EIA*** This methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	
Soils and agricultural potential	***Sensitivity Analysis and EIA assessment*** The overall impacts of the proposed facility on agriculture and soil conditions will be of low significance, mainly because of the climatic conditions and the low agricultural and grazing potential of the site and low susceptibility to soil erosion of the soils. The possibility to house substantial commercial farming practices (agriculture or grazing) on the property is not realistic, because of the dominant climatic conditions and prevailing soil conditions. Irregular rainfall, along with other soil-	Jaco Jansen of Savannah Environmental

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	related factors, lead to low agricultural potential. The soil and rock type properties tend to be very homogenous in the area and the whole site can be better utilised for power generation than any other practise. This is not regarded as viable commercial farming site and would be suited to house the facility. As a result of the low significance of impacts, no further studies are required to be undertaken.	

7.6 Methodology for the Assessment of Potential Impacts

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
  - Local extending only as far as the development site area – assigned a score of 1;
  - Limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  - Will have an impact on the region – assigned a score of 3;
  - Will have an impact on a national scale – assigned a score of 4; or
  - Will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - Medium-term (5–15 years) – assigned a score of 3;
  - Long term (> 15 years) - assigned a score of 4; or
  - Permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;
  - 8 is high (processes are altered to the extent that they temporarily cease); and
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely); and
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The **status**, which will be described as *either positive, negative or neutral*.

» The degree to which the impact can be *reversed*.
» The degree to which the impact may cause *irreplaceable loss of resources*.
» The degree to which the impact can be *mitigated.*

The **significance** is determined by combining the criteria in the following formula:

S= (E+D+M) P; where

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

» < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
» 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
» > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

As the applicant has the responsibility to avoid and/or minimise impacts as well as plan for their management (in terms of the EIA Regulations), the mitigation of significant impacts will be discussed. Assessment of mitigated impacts will demonstrate the effectiveness of the proposed mitigation measures.

The results of the specialist studies and other available information will be integrated and synthesised by the Savannah Environmental project team. The EIA Report will be compiled, and will include:

» The details and expertise of the **EAP** who prepared the report.
» The **location** of the activity and a locality map illustrating the location of the proposed activity.
» A **description** of the scope of the proposed activity including all listed activities triggered and a description of associated structures and infrastructure.
» The **policy and legislative** context within which the development is located and an explanation of how the development complies and responds to the legislation and policy context.
» The **need and desirability** of the proposed development of the activity in the context of the preferred location.
» A motivation for the **preferred development footprint** within the approved site.

- A description of the **process** followed to reach the proposed development footprint within the approved site, including:
  - details of the development footprint considered;
  - details of the public participation process undertaken in terms of Regulation 41 of the 2014 EIA Regulations, including copies of supporting documents;
  - a summary of issues raised by interested and affected parties and the manner in which the issues were incorporated;
  - the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
  - the impacts and risks identified 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;
  - the methodology used for determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks;
  - positive and negative impacts that the activity and alternatives will have on the environment and the community;
  - possible mitigation measures to be applied and the level of residual risk;
  - a motivation for not considering alternative development locations (if applicable);
  - a concluding statement indicating the preferred alternative development location; and
  - a full description of the process followed to identify, assess and rank impacts of the activity and associated infrastructure on the preferred location including all environmental issues and risks that have been identified and an assessment of the significance of each issue and risk and the extent to which the issue/risk can be avoided or mitigated.
- An **assessment** of the identified potentially significant impacts and risks.
- A summary of the **findings and recommendations** of any specialist report and an indication as to how these findings and recommendations have been included.
- An **environmental impact assessment** containing a summary of key findings, an environmental sensitivity map and a summary of the positive and negative impacts and risks of the proposed activity.
- **Recommendations** from specialist, the recording of proposed impact management **objectives** and the impact management **outcomes** for inclusion in the **EMPr** as well as inclusion as conditions of authorisation.
- The final **alternatives** which respond to the impact management measures, avoidance and mitigation measures identified.
- Any aspects which were **conditional** to the findings of the assessment.
- Description of the assumptions, uncertainties and gaps in knowledge relating to the assessment and mitigation measures proposed.
- An **opinion** as to whether the proposed activity should or should not be authorised and the conditions thereof.

» An undertaking under **affirmation** by the EAP in relation to the correctness of the information, the inclusion of comments and inputs from stakeholders and Interested and affected parties, the inclusion of inputs and recommendations from the specialists and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.
» Any specific information that may be required by the competent authority.

The Draft EIA Report will be released to the public and relevant Organs of State for a 30-day review period. The comments received from I&APs will be captured within a Comments and Response Report, which will be included within the Final EIA Report, for submission to the authorities for decision-making.

7.7 Public Participation Process

A public participation process will be undertaken by Savannah Environmental during the EIA phase. Consultation with key stakeholders and I&APs will be on-going throughout the EIA Phase. Through this consultation process, stakeholders and I&APs will be encouraged to verify that their issues were recorded in the Scoping Phase and to identify additional issues of concern or highlight positive aspects of the PV facility, and to comment on the findings of the EIA Phase. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their inputs, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA Phase of the process, as follows:

» Focus group or public meetings (pre-arranged and I&APs invited to attend).
» One-on-one consultation meetings (for example with directly affected and surrounding landowners).
» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the public participation consultant, lead EIA consultant as well as specialist consultants).
» Written, faxed or e-mail correspondence.

The Draft EIA Report will be made available for a 30-day review period prior to finalisation and submission to the DEA for decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, a public meeting may be held during this public review period, depending on the specific needs of the stakeholders in the area.

7.8 Key Milestones of the Programme for the EIA

The envisaged key milestones of the programme for the EIA Phase are outlined in the following table (and include indicative dates):

Key Milestone Activities	Proposed timeframe
Make Draft Scoping Report available to the public, stakeholders and authorities	13 November 2015 to 14 December 2015
Finalisation of Scoping Report, and submission of the Final Scoping Report to DEA	December 2015
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA	within 43 days of receipt of the Final Scoping Report
Undertake specialist studies and public participation process	January 2016 to March 2016
Make Draft EIA Report and EMPr available to the public, stakeholders and authorities	April 2016
Finalisation of EIA Report, and submission of the Final EIA Report to DEA	June 2016
Authority review period and decision-making (107 calendar days)	June 2016 – August 2016

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