Sannaspos PV Additional Footprint

Free State Province

Environmental Impact Assessment Report

August 2022

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PROJECT DETAILS

Title	:	Environmental Impact Assessment Report for the Sannaspos Solar PV Additional Footprint, Free State Province
Authors	:	Savannah Environmental (Pty) Ltd Tamryn Lee Goddard Jo-Anne Thomas
Client	:	Sannaspos Solar PV (Pty) Ltd
Report Revision	:	Final Environmental Impact Assessment Report for decision making by the DFFE
Date	:	August 2022

When used as a reference this report should be cited as: Savannah Environmental (2022). Environmental Impact Assessment Report for the Sannaspos Solar PV Additional Footprint, Free State Province.

PURPOSE OF THE REPORT

Sannaspos Solar PV Project (Pty) [1]Ltd received an Environmental Authorisation for the proposed Sannaspos PV Plant Phase 1 and associated infrastructure, located on Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe, within the Mangaung Metropolitan Municipality, Free State Province in May 2013 (**DFFE Reference No.: 14/12/16/3/3/2/360**). The project has been selected as a Preferred Bidder project under Round 5 of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

The proposed facility will have a contracted capacity of 75MW (90MW installed capacity) and will include the following infrastructure:

- PV arrays and inverters
- Cabling between project components, laid underground as far as possible
- An on-site 132kV Independent Power Producer (IPP) substation to facilitate the grid connection
- Internal access roads.
- Guard house
- Laydown, Campsite, and assembly area.
- Office and Control centre.

A developmental footprint of 150 ha in extent is authorised for the facility and associated infrastructure. In order to implement the project, an additional 50ha is required. This additional area is located within the properties assessed for the project.

The need for the additional footprint is due to the advancements in technology and spatial needs for the optimised operation of the facility. The developer is proposing to install bifacial PV modules, which enable energy generation from both sides of the PV modules, thereby improving the efficiency of the facility. This technology requires additional space between PV module rows, compared to traditional monofacial PV modules as originally considered for the project, to enable reflected solar irradiation (solar energy) to reach the underside of the bifacial modules. The purpose of the Environmental Impact Assessment is therefore to analyse the impacts of the portion of infrastructure on the additional footprint, namely:

- A total of 28 325 bifacial solar panels with a combined capacity of 15 MW
- Internal Access roads

Sannaspos Solar PV (Pty) Ltd appointed Savannah Environmental as the independent environmental consultant to undertake the Environmental Impact Assessment (EIA) for the required 50-hectare additional footprint. The EIA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations, as amended, promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

[1] Sannaspos Solar PV Facility is an already authorised facility and has been selected as a Preferred Bidder Project in Round 5 of the REIPPPP. In terms of the requirements the EA for the Project is required to be held in the name of the Special Purpose Vehicle (SPV) constituted for the project. Therefore, a new SPV name is being applied for with this report. The application for EA accompanied by the Scoping Report referred to the Applicant as "The Engie Sannaspos Solar Project (Pty) Ltd." The Applicant is now referred to as Sannaspos Solar PV (Pty) Ltd

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

- **Chapter 1** provides a background for the additional footprint for the Sannaspos Solar PV Projectand the environmental impact assessment.
- **Chapter 2** gives a description of the area where the additional footprint is located in relation to the authorised facility, the identified project alternatives, and the need and desirability for the additional footprint for the Sannaspos Solar PV Project.
- **Chapter 3** outlines strategic regulatory and legal context for energy planning in South Africa and specifically relating to the project.
- **Chapter 4** outlines the approach to undertaking the Environmental Impact Assessment.
- **Chapter 5** describes the existing biophysical and social environment within and surrounding the study and development area.
- **Chapter 6** provides an identification and assessment of the potential impacts (direct, indirect, and cumulative) associated with the proposed solar PV facility and associated infrastructure.
- **Chapter 7** presents the conclusions of the Environmental Impact Assessment for the additional footprint
- **Chapter 8** lists the references used to compile the Environmental Impact Assessment report.

The draft EIA Report was made available for review from **24 June 2022 – 25 July 2022** at http://www.savannahsa.com/public-documents/energy-generation/.

All comments received and recorded during the 30-day review and comment period have been included, considered, and addressed within this final EIA report for the consideration of the National Department of Forestry, Fisheries and the Environment (DFFE). All changes made have been underlined for ease of reference.

EXECUTIVE SUMMARY

Sannaspos Solar PV Project (Pty) Ltd received an Environmental Authorisation for the proposed Sannaspos PV Plant Phase 1 and associated infrastructure, located on Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe, within the Mangaung Metropolitan Municipality, Free State Province in May 2013 (DFFE Reference No.: 14/12/16/3/3/2/360). The project has been selected as a Preferred Bidder project under Round 5 of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

A developmental footprint of 150 ha in extent is authorised for the facility and associated infrastructure. In order to implement the project, an additional 50ha is required. This additional area is located within the properties assessed for the project.

The need for the additional footprint for the construction of the solar PV facility is due to the advancements in technology and spatial needs for the optimised operation of the facility. The developer (Sannaspos Solar PV Project (Pty) Ltd) proposes to install bifacial PV modules, which enable energy generation from both sides of the PV modules thus requiring additional space between PV module rows, compared to traditional monofacial PV modules, for reflected solar irradiation (solar energy) to reach the underside of the bifacial modules. This will improve the technical and economic feasibility of the project, ultimately reducing the cost of the electricity.

The Environmental Impact Assessment study included the identification of potential impacts associated with the additional footprint through a desktop study, specialist inputs and consultation with affected parties and key stakeholders. An assessment of potential impacts associated with the development on the additional footprint has been detailed in **Chapter 6**.

The following paragraphs provide a summary of the most significant impacts outlined in **Chapter 6** of this Basic Assessment Report.

1. Conclusions drawn from the Evaluation of the PV Facility Development

No environmental fatal flaws were identified in the detailed specialist studies conducted. It is recommended that mitigation measures are implemented to reduce impacts to acceptable levels. The potential environmental impacts associated with development within the additional footprint identified and assessed through the EIA process include:

- Impacts on Terrestrial Biodiversity
- Impacts on Aquatic Ecology
- Impacts on Soils and Agricultural Potential

Based on the ecological assessment undertaken and consideration of the Site Ecological Importance as detailed in the specialist impact assessment (refer to Appendix I all habitats within the assessment area of the proposed project were allocated a sensitivity category (refer to Table 6.1 and Figure 6.2).

'High Sensitivity' areas are due to the following:

- Unique and low resilience habitats; and

» Water resources.

Table 6.1: SEI Summary of habitat types delineated within field assessment area of project area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Water Resource	High	Medium	Medium	Low	High
Degraded Grassland	Medium	Medium	Medium	Medium	Medium
Old Agriculture	Low	Low	Low	High	Low

Potential Impacts on Terrestrial Ecology

The completion of a comprehensive desktop study, in conjunction with the results from the field survey, suggest there is a good confidence in the information provided. The survey ensured that there was a suitable ground truth coverage of the assessment area, and most habitats and ecosystems were assessed to obtain a general species (fauna and flora) overview and the major current impacts were observed. The conservation status is classified as Least Concern albeit the protection level is regarded as 'Not Protected and Poorly Protected' Ecosystem. Moreover, the proposed activity overlaps with an ESA1, ESA2 and NPAES.

The current layout, the project area overlaps within sensitive habitats and other areas of high biodiversity potential. Portions current layout as well as the expected access and service road of the development would be considered to have a significant and high negative impact as it would directly affect the habitat of threatened plant species and expected listed avifaunal species that use these ecosystems;

» The assessment area possesses a protected flora species. Moreover, protected fauna are ubiquitous within the assessment area and surrounding landscape was ubiquitous within the assessment area and surrounding landscape; and
» One threatened species of avifauna were observed to occur and utilise the habitats within the assessment area during the survey period. *Sagittarius serpentarius* (Secretarybird) possess high priority scores indicating that they are particularly susceptible to collisions with power lines. Excessive noise will lead to displacement of the species and the vehicle traffic potentially will lead to direct mortality.

The developer is urged to alter the layout or design which represents a compromise between the needs of the development and the environmental concerns at the site, especially in regard to the high sensitivity areas. Historically, overgrazing from livestock (Sheep, goats and cattle) and mismanagement has led to the deterioration these habits. However, the high sensitivity areas can be regarded as important, not only within the local landscape, but also regionally; as they are used for habitat, foraging, water resource and movement corridors for fauna within the landscape.

The habitat existence and importance of these habitats is regarded as crucial, due to the species recorded as well as the role of this intact unique habitat to biodiversity within a very fragmented disturbed local landscape, not to mention the sensitivity according to various ecological datasets.

The very high and sensitivity terrestrial areas surrounding the development site still:

» Serve as and represent ESA as per the Conservation Plan;
» Supports and protects fauna and flora; and

» Support various organisms and may play a more important role in the ecosystem if left to recover from the superficial impacts.

The ecological integrity, importance and functioning of these terrestrial biodiversity areas provide a variety of ecological services considered beneficial, with one key service being the maintenance of biodiversity. The preservation of these systems is the most important aspect to consider for the proposed project.

Any development on the high sensitivity areas will lead the direct destruction and loss of portions of functional ESA, and also the floral and faunal species that are expected to utilise this habitat. Thus, if these areas are not maintained in a natural or near natural state, destroyed or fragmented, then meeting targets for biodiversity features will not be achieved. The mitigations, management and associated monitoring regarding these operational impacts will be the most important factor of this project and must be considered by the issuing authority.

The main expected impacts of the proposed project will include the following:

» habitat loss and fragmentation;
» degradation of surrounding habitat;
» disturbance and displacement caused during the construction, operational and maintenance phases; and
» direct mortality during the construction phase.

Mitigation measures as described in this report can be implemented to reduce the significance of the risk but there is still a possibility of impacts. Considering that this area that has been identified as being of significance for biodiversity maintenance and ecological processes (ESAs), development may proceed but with caution and only with the implementation of mitigation measures.

Considering the above-mentioned information, no fatal flaws are evident for the proposed project. It is the opinion of the specialist that the project may be favourably considered, on condition all prescribed mitigation measures and supporting recommendations are implemented.

Potential Impacts on Freshwater Resources

In total four (4) water resources were identified and delineated for the project. These included both natural and artificial systems, with the artificial systems comprising of impoundments and drainage features. Three (3) natural wetland hydrogeomorphic (HGM) units belonging to three HGM types (unchannelled valley bottom, depression and seepage) were identified within the 500 m regulated area. The unchannelled valley bottom (HGM 1) is traversed by a portion of the project area and was determined to be the only system at an appreciable level of risk and was the focus for the functional assessment. No functional assessment was completed for the artificial systems.

Overall, HGM 1 scored Moderately Low in terms of the wetland ecosystem services. The wetland was considered relatively important for regulating and supporting benefits. The integrity (or health) for HGM 1 was rated as being in a Largely Modified state (class D). The unchanneled valley bottom wetland type is classified as Critically Endangered and the ecological importance and sensitivity is Moderate.
A 30 m buffer width was recommended for the project. All identified natural wetland units and the Modder River were classified as having a High sensitivity, while the artificial systems and the associated 30 m buffer

was assigned a Medium sensitivity. The remaining extent of the project area was assigned a Low sensitivity from a water resource perspective.

A risk assessment was conducted in line with Section 21 (c) and (i) of the National Water Act, 1998, (Act 36 of 1998). High risks are applicable based on the fact that wetlands may be be directly impacted on by the proposed development. Medium risk refers to wetland areas that are either on the periphery of the infrastructure and at an indirect risk. Low risks are wetland systems beyond the project area that would be avoided, or wetland areas that could be avoided if feasible. Development in all the 'segments' of the project area is permissible, and the significance of all post-mitigation risks was determined to be low. All recommendations and mitigation measures are applicable to these areas, in order to achieve a low residual risk significance.

In terms of Water Use Authorisation, owing to the expected post-mitigation Low risks, a General Authorisation is permissible for the development. A General Authorisation has been issued for one of the affected farm portions, namely the farm Basemkop 1808 (reference number: WU23983). An application for the other affected farm (Portion 0 of Farm 2962 Lejwe) is in process (reference number: WU25438).

Potential Impacts on soil and agriculture

One soil form was identified within the project area, namely the Swartland soil form. The land capability of the abovementioned soil has been determined to be class "III" and a climate capability level 8 given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capabilities and climate capabilities results in a land potential "L6". The "L6" land potential level is characterised by very restricted potential. Regular and/or severe limitations are expected due to soil, slope, temperatures or rainfall. This land potential is regarded as non-arable.

This land potential level was used to determine the sensitivities of soil resources. Only "Low" sensitivities were determined throughout the project area by means of baseline findings. Potential impacts identified include:

Direct impacts:
» Erosion due to heavy trucks transporting PV structures

Indirect impacts:
» Water runoff
» Low penetration of rainwater
» Loss of arable land for grazing
» Desertification

Considering the low sensitivities associated with land potential resources, it is the specialist's opinion that the proposed activities will have an acceptable impact on soil resources and that the proposed activities should proceed as have been planned.

Potential Cumulative Impacts

A total of 3067 ha of cumulatively transformed land comprising of other renewable energy developments is located within the 30 km (282 700 ha) radius of the additional footprint for the Sannaspos Solar Project. With

the development of solar energy facilities in the Free State Province it is expected that the landscape will be altered by renewable energy development (Lavin, 2021). However, the facilities surrounding the additional footprint are scarcely located throughout the greater project area and comprise of a small fraction of the total land area which is predominantly agricultural fields and open natural areas. There are no other renewable energy facilities to the north of the project site. Furthermore, existing facilities are evenly distributed throughout the landscape imposing no major aesthetic alteration to the landscape or impacts regarding species fragmentation.

Based on the specialist studies undertaken, the following conclusions can be drawn regarding the cumulative impacts associated with the project:

- There will be no unacceptable loss or impact on ecological aspects (vegetation types, species, and ecological processes) due to the development of the PV facility within the additional footprint and other renewable energy projects within the surrounding area, provided the recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.
- There will be no significant loss of sensitive and significant aquatic features. The cumulative impact is therefore acceptable.
- There will be no unacceptable loss of land capability due to the development of the PV facility within the additional footprint and other renewable energy projects within the surrounding area, provided recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.

All cumulative impacts associated with the development of the PV facility within the additional footprint will be of a medium or low significance. A summary of the cumulative impacts is included in the table below.

Issue	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Ecology	Medium	Medium
Soils and land Capability	Low	Low

2. Sensitivity Analysis for the Development Area

Figure 7.1 and 7.2 displays the environmental sensitivities as identified in this Environmental Impact Assessment as well as the detailed layout produced by the applicant. The layout overlain with environmental sensitivities aims to make recommendations for the implementation of avoidance strategies and mitigation and management measures to ensure that the final assessed layout retains an environmental impact within acceptable limits. No high sensitivity areas or no-go areas have been identified within the additional footprint. The project overlaps with an ESA1, ESA2 and NPAES. Impacts on these features were assessed to be of low significance after the implementation of mitigation.

Based on an analysis of the identified sensitivities for the project development area, no optimisation of the layout is required. The layout as presented within **Figure 3** is therefore considered to be the most appropriate from an environmental perspective.

3. Environmental Costs versus Benefits of the Project

Environmental costs can be anticipated at a local and site-specific level and are considered acceptable provided the mitigation measures as outlined in the EIA report and the EMPr are implemented and adhered to. No fatal flaws have been identified.

These environmental costs could include:

» A loss of biodiversity, flora, and fauna due to the clearing of land for the construction and utilisation of land for the PV facility. The cost of loss of biodiversity has been minimised/avoided through the placement of project components and infrastructure outside of CBA1 areas considered to be of high sensitivity.
» Heritage impacts associated with the PV facility. Although no resources were identified within the proposed additional footprint area, there is the potential for impacts on heritage resources during construction. Impacts can be minimised though the implementation of a Chance Finds Procedure, as detailed in the EMPr in **Appendix K**.
» Loss of land for agriculture. The development will remove areas available for agricultural activities. However, based on the low sensitivity of the soils within the additional development footprint for the PV Facility, all activities will have an acceptable impact on agricultural productivity.

Benefits of the project include the following:
» The project will result in important economic benefits at the local and regional scale through job creation, income and other associated downstream economic development identified in the EIA for the Sannaspos Solar PV Facility. This will occur as the implementation of the Sannaspos Solar PV facility, a Preferred Bidder project, will be facilitated with the addition of the 50ha. These will persist during the preconstruction, construction, operation, and decommissioning phases of the project.
» The project provides an opportunity for a new land use on the affected properties which is considered as a more efficient use of the land and provides an opportunity for financial benefits to the current land use.
» The project contributes towards the Provincial and Local goals for the development of renewable energy as outlined in the respective IDPs.
» The project serves to diversify the economy and electricity generation mix of South Africa through the addition of solar energy.
» South Africa's per capita greenhouse gas emissions are amongst the highest in the world due to the reliance on fossil fuels. The Sannaspos Solar PVFacility (including the additional footprint) will contribute to achieving goals for implementation of renewable energy and sustaining a 'green' economy within South Africa.

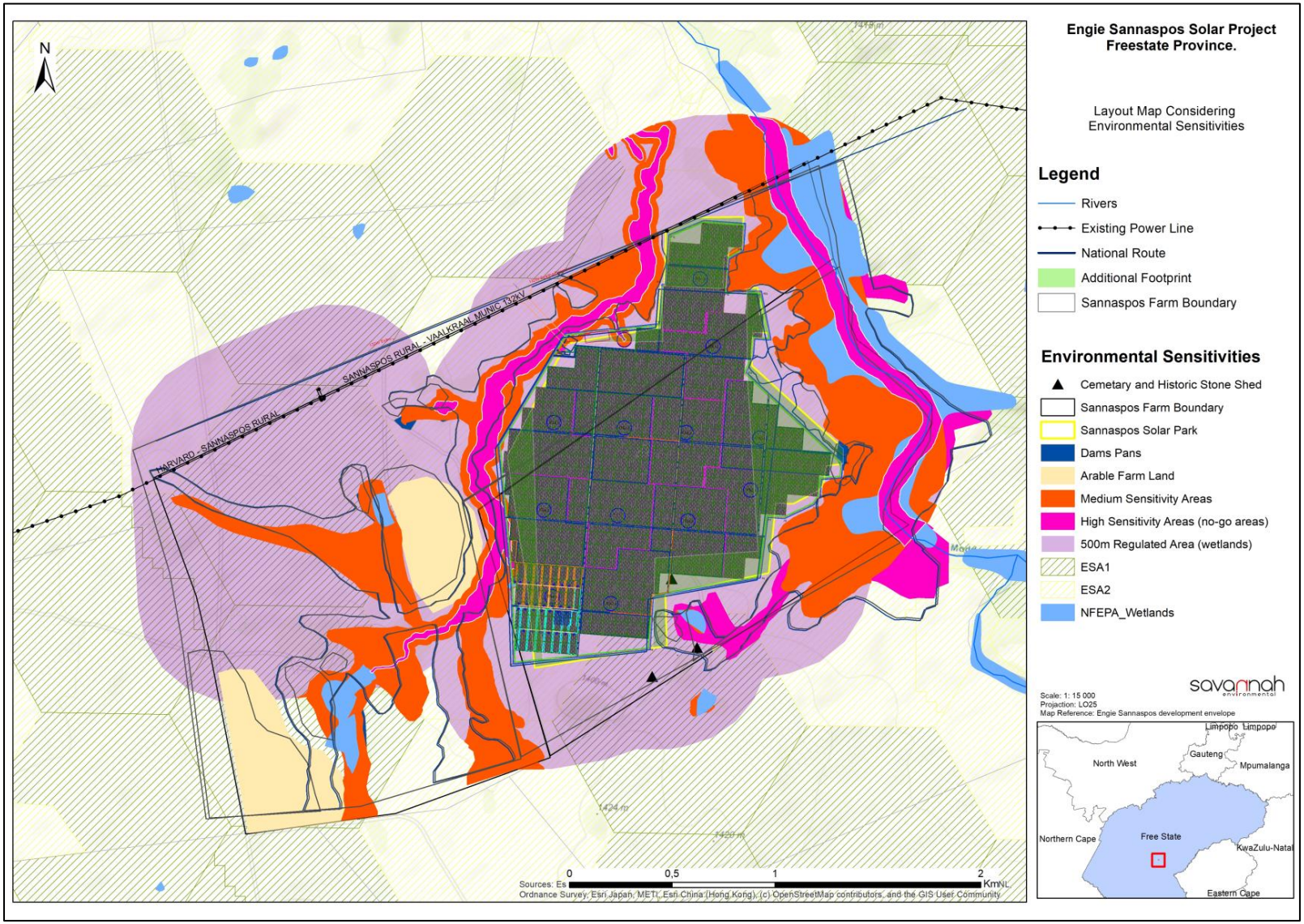

Figure 7.1: Final Layout for the Sannaspos Solar PV Project considering Environmental Sensitivities

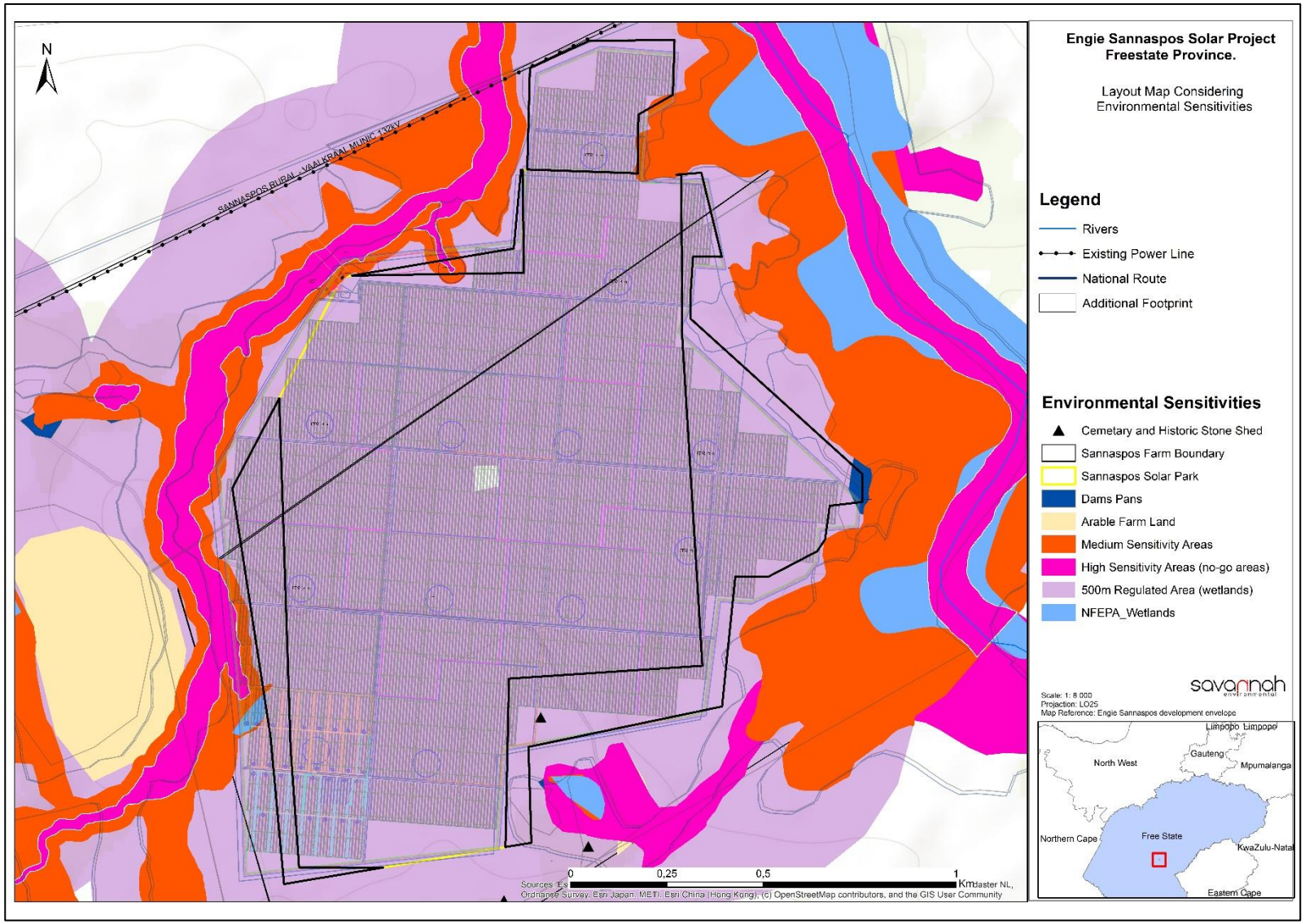

Figure 7.2: Final layout of the Sannaspos Solar PV Facility on the Authorised Area and on the Additional Footprint

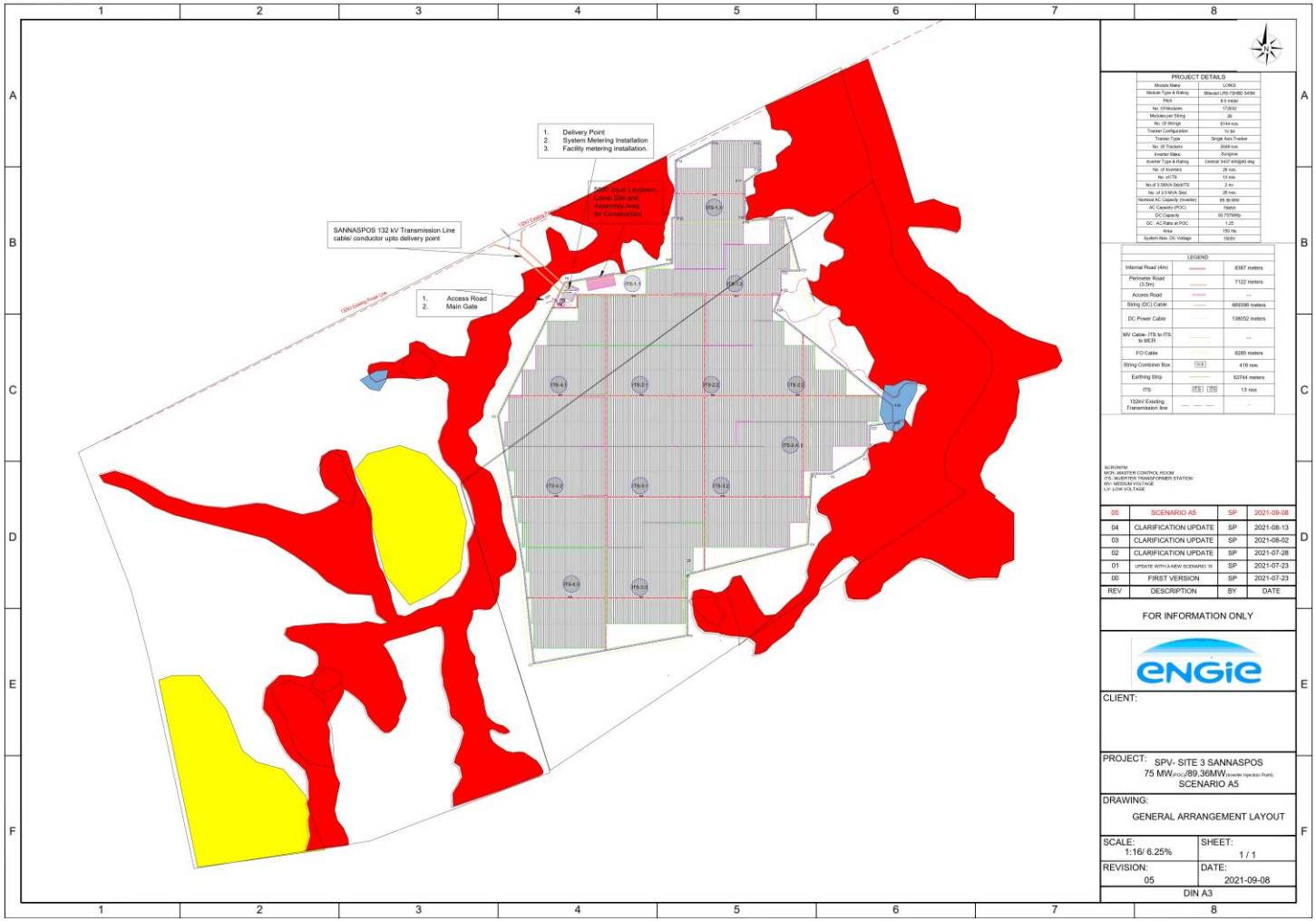

Figure 3: Micro setting of Infrastructure provided by the Applicant for the final layout of the Sannaspos Solar PV Facility

The benefits of the development of the Sannaspos Solar PVFacility (including the additional footprint) are expected to occur at a national, regional, and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of infrastructure on the project site within lower sensitive areas through the avoidance of features and areas considered to be sensitive, the benefits of the project are expected to partially offset the localised environmental costs of the PV facility.

4. Overall Conclusion (Impact Statement)

The Sannaspos Solar PVFacility, located on Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe, near Sannaspos, has been selected as a Preferred Bidder project under Round 5 of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP). A developmental footprint of 150 ha in extent is authorised for the facility and associated infrastructure. In order to implement the project using the preferred technology, an additional 50ha is required. This additional area is immediately adjacent to the authorised area.

Independent specialists appointed to undertake the assessment of potential impacts associated with the development of PV infrastructure within the additional footprint considered desktop data, results from field work, existing literature and the National Web-based Environmental Screening Tool to inform the identification of sensitivities. The findings of the assessment undertaken have informed the results of this EIA report. The specialist findings have indicated that there are no identified fatal flaws associated with the implementation of the project within the project site.

From a review of the relevant policy and planning framework, it was concluded that the project is well aligned with the policy framework, and a clear need for the project is seen from a policy perspective at a local, provincial, and National level. The project development area is located outside of any formal protected areas and falls within ESA1, ESA2 and NPAES areas as defined within the Provincial Conservation Plan.

As detailed in the cost-benefit analysis, the benefits of the development of the Sannaspos Solar PV project (including that within the additional footprint) are expected to occur at a national, regional and local level. While some impacts of potential significance do exist, it is anticipated that the implementation of appropriate mitigation measures would assist in reducing the significance of such impacts to acceptable levels.

Based on the conclusions of the specialist studies undertaken, it can be concluded that the development of infrastructure associated with the Sannaspos Solar PVfacility within the additional footprint based on the current layout as provided by the developer will not result in unacceptable environmental impacts (subject to the implementation of the recommended mitigation measures).

5. Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the development footprint proposed by the developer, the absence of the sensitive environmental features within the project site, as well as the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the EAP that the development of infrastructure associated with the Sannaspos Solar PV facility within the identified additional footprint is acceptable within the landscape and can reasonably be authorised. The proposed layout as provided by the developer (**Figure 7.1**) is considered to be the most

appropriate from an environmental perspective as it avoids identified sensitivities and recommended buffer areas.

The following infrastructure would be included within an authorisation issued for the project:

» A total of 28 325 bifacial solar panels with a combined capacity of 15 MW
» Internal Access roads

The following key conditions would be required to be included within an authorisation issued for the development of infrastructure associated with the Sannaspos Solar PV facility within the identified additional footprint:

» All mitigation measures detailed within this EIA report, as well as the specialist reports contained within **Appendices G to I** are to be implemented.
» The EMPr as contained within **Appendix K** of this EIA report should form part of the contract with the Contractors appointed to construct and maintain the solar facility in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the project is considered key in achieving the appropriate environmental management standards as detailed for this project.
» Implement a chance finds procedure for the rescuing of any fossils or heritage resources discovered during construction.
» Maintain vegetation cover (i.e., either natural or cultivated) immediately adjacent to the actual development footprint, both during construction and operation of the proposed facility.

A validity period of 10 years of the Environmental Authorisation is requested, should the project obtain approval from DFFE.

TABLE OF CONTENTS

APPENDICES LIST

CHAPTER 1: INTRODUCTION

Sannaspos Solar PV (Pty) Ltd received an Environmental Authorisation for the proposed Sannaspos PV Plant Phase 1 and associated infrastructure, located on Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe, within the Mangaung Metropolitan Municipality, Free State Province in May 2013 (**DFFE Reference No.: 14/12/16/3/3/2/360**). The project has been selected as a Preferred Bidder project under Round 5 of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

The proposed facility will have a contracted capacity of 75MW (90MW installed capacity) and will include the following infrastructure:

» PV arrays and inverters
» Cabling between project components, laid underground as far as possible
» An on-site 132kV Independent Power Producer (IPP) substation to facilitate the grid connection
» Internal access roads.
» Guard house
» Laydown, Campsite, and assembly area.
» Office and Control centre.

A developmental footprint of 150 ha in extent is authorised for the facility and associated infrastructure. In order to implement the project, an additional 50ha is required. This additional area is located within the properties assessed for the project.

The need for the additional footprint is due to the advancements in technology and spatial needs for the optimised operation of the facility. The developer is proposing to install bifacial PV modules, which enable energy generation from both sides of the PV modules, thereby improving the efficiency of the facility. This technology requires additional space between PV module rows, compared to traditional monofacial PV modules as originally considered for the project, to enable reflected solar irradiation (solar energy) to reach the underside of the bifacial modules. The purpose of the Environmental Impact Assessment is therefore to analyse the impacts of the portion of infrastructure on the additional footprint, namely:

» A total of 28 325 bifacial solar panels with a combined capacity of 15 MW
» Internal Access roads

Site-specific studies and assessments undertaken as part of the EIA process aim to delineate areas of potential sensitivity within the proposed additional footprint. Once constraining factors have been confirmed, the layout of the solar PV facility can be planned to minimise social and environmental impacts. The location of the additional footprint is indicated in **Figure 1.2**.

1.1. Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This EIA Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (as amended) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
(a) (i) the details of the EAP who prepared the report; and (ii) the expertise of the; including a curriculum vitae	The details of the EAP who prepared the report is included in **Section 1.3**. The Curriculum vitae of the Savannah Environmental team have been included as **Appendix A**.
(c) a plan which locates the proposed activity or activities applied as well as the associated structures and infrastructure at an appropriate scale, or, if it is (i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken	A locality map illustrating the location of additional footprint for the Sannaspos Solar PV Projecthas been included as **Figure 1.1** in this chapter. A layout map is contained in **Appendix D**.

This Environmental Impact Assessment Report consists of eight chapters, which include:

- **Chapter 1** provides background to the additional footprint for the Sannaspos Solar PV Project and the environmental impact assessment process.
- **Chapter 2** provides a description of the area where the additional footprint is proposed in relation to the authorised facility, details of the proposed activities within this additional footprint, the identified project alternatives, and the need and desirability for the additional footprint for the Sannaspos Solar PV Project.
- **Chapter 3** outlines strategic regulatory and legal context for energy planning in South Africa and specifically relating to the project.
- **Chapter 4** outlines the approach to undertaking the EIA process.
- **Chapter 5** describes the existing biophysical and social environment within and surrounding the study and development area.
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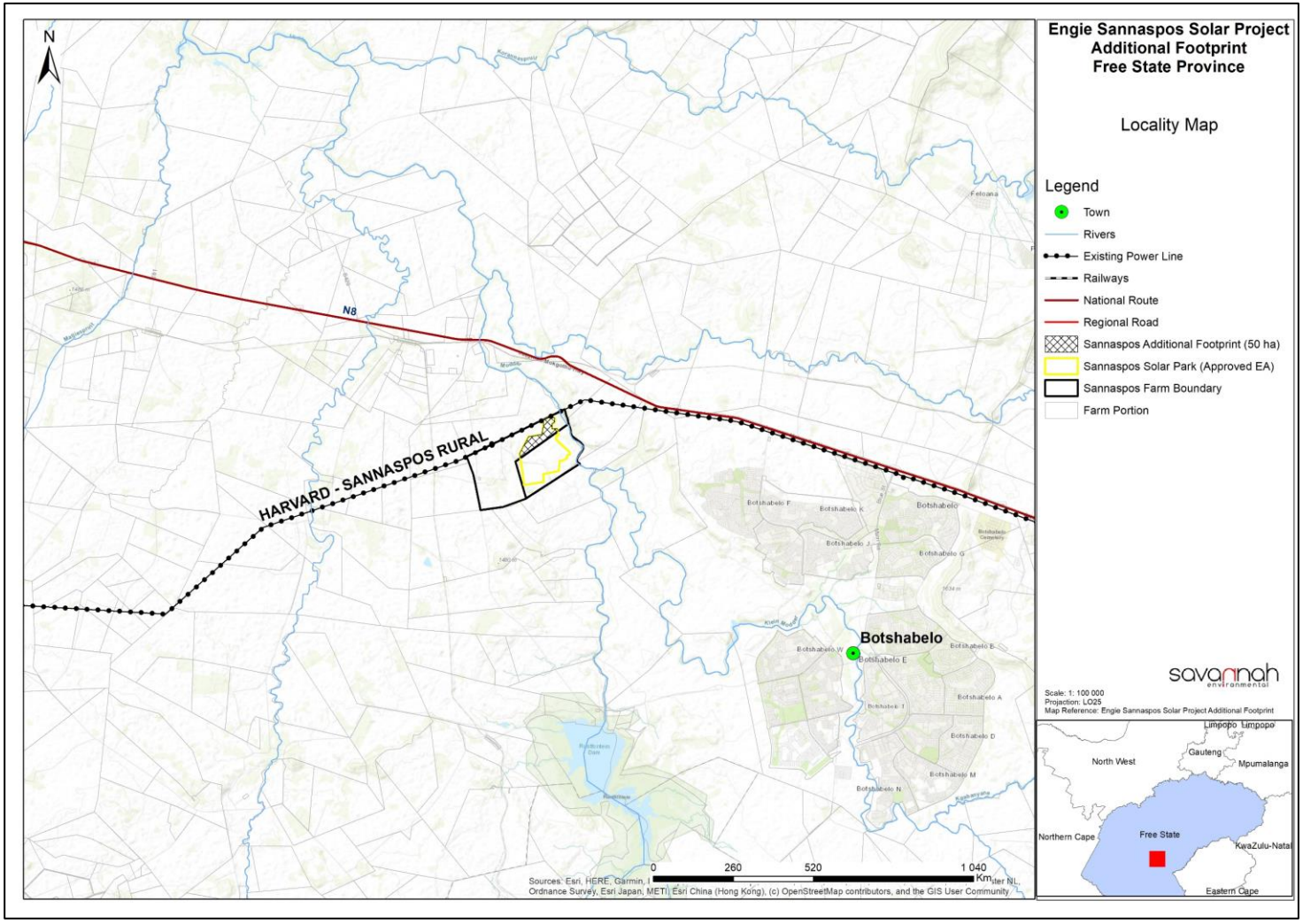


Figure 1.1: Locality map illustrating the location of the proposed additional footprint on Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe in relation to the nearest town (refer also to **Appendix D**)

1.2. Requirement for an Environmental Impact Assessment Process

Section 24 of South Africa's National Environmental Management Act (No. 107 of 1998) (NEMA) pertains to Environmental Authorisations (EA), and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the Competent Authority (CA). The 2014 Environmental Impact Assessment (EIA) Regulations, as amended (GNR 326) published under NEMA prescribe the process to be followed when applying for Environmental Authorisation (EA), while the Listing Notices (Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324)) contain those activities which may not commence without EA from the CA.

In terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notices (Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324)), the proposed development of the additional footprint requires Environmental Authorisation (EA) from the National Department of Environment, Forestry and Fisheries (DFFE) subject to the completion of a full Scoping and Environmental Impact Assessment (S&EIA), as prescribed in Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326). The need for EA subject to the completion of a full S&EIA is triggered by the inclusion of, amongst others, Activity 15 of Listing Notice 2 (GNR 325)[2], namely:

"*The clearance of an area of 20 hectares or more of indigenous vegetation*."

In terms of GNR 779 of 01 July 2016, the National DFFE has been determined as the Competent Authority (CA) for all projects which relate to the Integrated Resource Plan for Electricity (IRP) 2010 – 2030, and any updates thereto. As the Sannaspos PV Plant Phase 1 is a Preferred Bidder under Round 5 fo the REIPPP, the DFFE is the CA for the project. Through the decision-making process, the DFFE will be supported by the Free State Department of Agriculture and Rural Development as the commenting authority.

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 potential environmental issues and allows for the 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 of two (2) phases (i.e., Scoping and Impact Assessment) and involves the identification and assessment of potential environmental impacts through the undertaking of independent specialist studies, as well as public participation. The processes followed in these two phases is as follows:

- The **Scoping Phase** includes the identification of potential issues associated with the project through a desktop study (considering existing information) and consultation with affected parties and key stakeholders. This phase considers the broader project site in order to identify and delineate any environmental fatal flaws, no-go and / or sensitive areas. Following a public review period of the Scoping report, this phase culminates in the submission of a final Scoping Report and Plan of Study for the EIA to the CA for consideration and acceptance.
- The **EIA Phase** involves a detailed assessment of the potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considers a proposed development footprint within the project site and includes detailed specialist investigations as well as public consultation. Following a public review period of the EIA Report, this phase culminates in the

[2] Refer to **Chapter 6** for a full list of applicable listed activities.

submission of a final EIA Report and an Environmental Management Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to the CA for final review and decision-making.

1.3 Details of the Environmental Assessment Practitioner and Expertise to conduct the EIA process

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), the applicant has appointed Savannah Environmental (Pty) Ltd as the independent environmental consultants to undertake the Scoping and Environmental Impact Assessment (S&EIA) process, inclusive of comprehensive, independent specialist studies. Neither Savannah Environmental nor any of its specialists are subsidiaries of or are affiliated to the applicant. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed additional footprint.

Savannah Environmental is a specialist environmental consulting company providing a holistic environmental management service, including environmental assessment, 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 have considerable experience in basic 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.

The Savannah Environmental team for this project includes:

» **Tamryn Lee Goddard** is the principle author of this report. She holds a bachelor's degree in Environmental Management, and postgraduate higher diplomas in Environmental Engineering, monitoring, and conservation ecology. She has 2 years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments, GIS mapping, public participation, environmental management plans and programmes. She is registered as a young professional with the International Association of Impact Assessors (IAIA).

» **Jo-Anne Thomas** is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA), a professional natural scientist registered with SACNASP, and is the registered EAP for this project. She has experience in providing technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and monitoring, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Key focus on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management (including client and authority liaison and management of specialist teams); review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures. Compilation of the reports for environmental studies is in accordance with all relevant environmental legislation. She has the ability in undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental

legislation and policy requirements. Recent projects have been undertaken for both the public- and private-sector, including compliance advice and monitoring, electricity generation and transmission projects, various types of linear developments (such as National Road, local roads, and power lines), waste management projects (landfills), mining rights and permits, policy, strategy, and guideline development, as well as general environmental planning, development, and management

» **Nondumiso Bulunga** is a Social, GIS and Stakeholder Engagement Specialist at Savannah Environmental. Nondumiso has eight (8) years working experience in project management and facilitation in various industries such as environmental services field including but not limited to recycling, industrial, energy, mining, and agriculture. Working for small and large organisations, Nondumiso has gained exposure in research, collection of data, critical analysis, GIS, and environmental solutions. Nondumiso has worked on projects in South Africa and Malawi. Nondumiso is very well versed in the IFC Environmental and Social Performance Standards (including IFC PS 2012) and the associated Equator Principles, which have informed the approach and standard for projects regarding ESIA. Nondumiso is skilled at organising and driving effective project teams at a scale relevant to the project's requirements. She has technical experience and can quickly identify the most pertinent issues of a particular project whilst focussing on driving project success by rigorously implementing project management tools.

Curricula Vitae (CVs) detailing the Savannah Environmental team's expertise and relevant experience are provided in **Appendix A**.

In order to adequately identify and assess potential environmental impacts associated with the proposed project, the following specialist consultants have provided input into this EIA Report:

Specialist	Field of Study
CTS Heritage	
Jenna Lavin	Heritage Assessment
The Biodiversity Company	
Andrew Husted	Wetland and Biodiversity
Martinus Erasmus	Terrestrial ecology and botany
Ivan Baker	Wetland and ecosystem services, hydropedology and pedologic

CHAPTER 2: PROJECT DESCRIPTION

This chapter provides a description of the proposed additional footprint for the authorised Sannaspos Solar PV Project and associated infrastructure, including details of the need and desirability and an overview of the various alternatives considered.

2.1. Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
(b) the location of the development footprint of the activity on the approved site as contemplated in the scoping report, 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	(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 property is detailed in **section 2.2.**
(c) a plan which locates the proposed activity or activities applied as well as the associated structures and infrastructure at an appropriate scale, or, if it is (i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken	A description of the associated structures and infrastructure is included in **Section 2.4**.
(f) a motivation for the need and desirability, including the need and desirability of the activity in the context of the preferred [location] development footprint within the approved site as contemplated in the accepted scoping report.	The need and desirability of the additional footprint is included and discussed in **Section 2.3**.
(h)a full description of the process followed to reach the proposed development footprint within the proposed site as contemplated in the accepted scoping report including (i) details of all the alternatives considered (ix) if no alternative development footprints for the activity were investigated, the motivation for not considering such	The details of the alternatives considered as part of the Sannaspos Solar PV additional have been included in **Section 2.5** and in **Section 6.6** of **Chapter** 6 as part of the "do-nothing" alternative.

2.2. Project Overview

Sannaspos Solar PV (Pty) Ltd received an Environmental Authorisation for the proposed Sannaspos PV Plant Phase 1 and associated infrastructure, located on Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe, within the Mangaung Metropolitan Municipality, Free State Province in May 2013 (**DFFE Reference No.: 14/12/16/3/3/2/360**). The project has been selected as a Preferred Bidder project under Round 5 of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

The proposed facility will have a contracted capacity of 75MW (90MW installed capacity) and will include the following infrastructure:

- PV arrays and inverters.
- Cabling between project components, laid underground as far as possible.
- An on-site 132kV Independent Power Producer (IPP) substation to facilitate the grid connection.
- Internal access roads.
- Guard house.
- Laydown, Campsite, and assembly area.
- Office and Control centre.

A developmental footprint of 150 ha in extent is authorised for the facility and associated infrastructure. In order to implement the project, an additional 50ha is required. This additional area is located within the properties assessed for the project.

The EIA undertaken for the authorised facility considered monofacial PV Array technology with typical anodized aluminium frames. The developer (Sannaspos Solar PV Project (Pty) Ltd) now proposes the use of single-axis trackers with bi-facial PV modules, which enable energy generation from both sides of the PV modules thus requiring additional space between PV module rows, compared to traditional monofacial PV modules, for reflected solar irradiation (solar energy) to reach the underside of the bifacial modules. Bifacial solar panels are more efficient than monofacial, as they collect sunlight on either side. They also perform better in diffuse light because the extra surface area allows bifacial panels to capture more light. This means that the long-term costs are lower than monofacial panels. With the implementation of bifacial PV panels, an additional area of approximately 50 ha is needed for project implementation. Although no additional electricity will be generated, the infrastructure for the authorised facility will be located within this area. The purpose of the Environmental Impact Assessment is therefore to analyse the impacts of the portion of infrastructure on the additional footprint, namely:

- A total of 28 325 bifacial solar panels with a combined capacity of 15 MW
- Internal Access roads

From a regional perspective, the area within which the project site is located is considered favourable for the development of a commercial solar energy facility by virtue of prevailing climatic conditions, relief, aspect, the extent of the affected property, the availability of a direct grid connection (i.e., a point of connection to the national grid) and the availability of land on which the development can take place. Furthermore, other authorised solar facilities are located within the study area to the east, west, north, and south of the authorised area and additional footprint. Owing to its proximity to the authorised area, the additional footprint has been identified by the applicant as a technically feasible site which has the potential for the development of a solar PV facility. The additional footprint of approximately 50 ha was identified by

the developer to accommodate a portion of the infrastructure (as detailed above) for the Sannaspos Solar PV facility.

The full extent of the proposed additional footprint has been considered within this EIA report with the aim of determining the suitability from an environmental and social perspective and identifying areas that should be avoided in development planning.

Details of the project site are provided in Table 2.1 below. The location of the site is provided in Figure 2.1.

With the inclusion of the authorised area, the additional footprint is larger than the area needed for the development footprint of the PV facility, and therefore provides the opportunity for the optimal placement of the infrastructure, ensuring avoidance of major identified environmental sensitivities or constraints identified through this Scoping and EIA process.

On the basis of the findings of the EIA Study, the PV facility and associated infrastructure have been appropriately designed and sited taking environmental and any other identified constraints into consideration.

Table 2.1: A detailed description of the project.

Province	**Free State Province**
District Municipality	Mangaung District Municipality
Local Municipality	Mangaung Metropolitan Municipality
Ward Number (s)	27
Nearest town(s)	Sannaspos (~5km north-west) and Kromdraai (~6km west)
Farm name(s) and number(s) of properties affected by the Solar Facility	Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe
Portion number(s) of properties affected by the Solar Facility	Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe
SG 21 Digit Code (s)	Farm 1808 Basemkop F00300000000180800000 Farm 2962 Lejwe F03200000000296200000
Current zoning	Agricultural
Site Coordinates (centre of affected property)	29°11'57.60"S 26°35'16.63"E

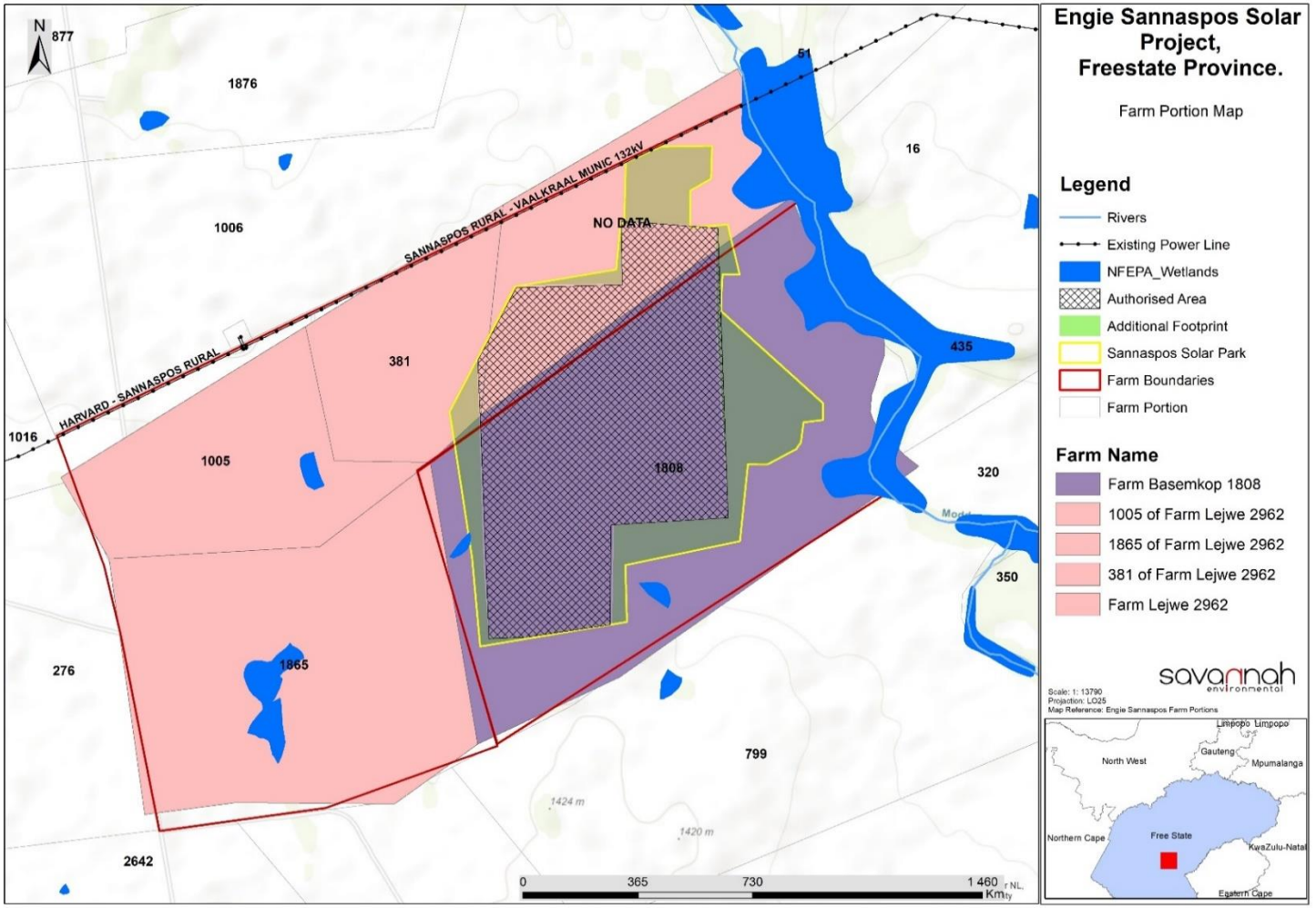


Figure 2.1: Locality map illustrating the location of the proposed additional footprint on Portion 0 of Farm 2962 Lejwe (refer to **Appendix D** for A3 map)

Table 2.2: Details of infrastructure for the Sannaspos Solar PV Project spanning the authorised area and additional footprint

PROJECT DETAILS/ AUTHORISED AREA	
Model/make	LONGI
Model type/ rating	Bifacial/ LR5-72HBD 545M
Pitch	8 meters
Number of Modules	172 032
Modules per string	28
No. of Strings	6144
Inverter make	Sungrow
Inverter type/ rating	Central/ 3437kW@40 deg
No of inverters	26
No of ITS	13
No of 3.5 MVA skid/ITS	2
No of 3.5 MVA skid	26
Nominal AC capacity (inverter)	89.36 MW
AC Capacity (POC)	75MW
DC Capacity	93.757MWp
DC:AC ratio at POC	1.25
Area	150 ha
System Max DC Voltage	1500V

Table 2.3: Details of infrastructure for the additional footprint as assessed in this EIA process

ADDITIONAL FOOTPRINT	
Infrastructure	**Capacity**
28 325 bifacial solar panels	15 MWp
Perimeter roads and internal road network	N/A
Facility metering installation and delivery point	N/A
5000m^2 laydown, campsite, and assembly area for construction	N/A

2.3. Need and desirability

Appendix 3 of the 2014 EIA Regulations (GNR 326) requires that a EIA Report include a motivation for the need and desirability of the proposed development, including the need and desirability of the activity in the context of the preferred location. The need and desirability of the development needs to consider whether it is the right time and the right place for locating the type of land-use/activity being proposed. The need and desirability of a proposed development is, therefore, associated with the wise use of land, and should be able to respond to the question such as, but not limited to, what the most sustainable use of the land may be.

As stated previously, the Sannaspos Solar PV Facility is an already authorised facility and has been selected as a Preferred Bidder Project in Round 5 of the REIPPPP. The need for the PV project in terms of its contribution to the energy mix of the country as determined by the Integrated Resource Plan (IRP) 2019 has therefore been confirmed and the project will be implemented provided it meets all requirements of Financial Close. The need for the additional footprint is directly related to that of the authorised facility, as well as to the technical and economic feasibility of the project in order to develop a cost-effective solution for implementation. The inclusion of the additional footprint will allow for the implementation of the most efficient technology (i.e. single-axis trackers with bi-facial modules) for the power generation facility thereby improving the economic feasibility of the project. The location of the additional footprint is directly related to the location of the authorised facility and is considered to be appropriate and desirable.

2.4. Technology considered for the Solar Energy Facility and the Generation of Electricity

As stated previously, Sannaspos Solar PV Facility will have a contracted capacity of 75MW (90MW Installed Capacity) and will make use of single-axis trackers with bi-facial modules on the authorised area and on the proposed additional footprint.

According to Solar Mag (2020), a bifacial solar panel is a double-sided energy factory that transforms sunlight into electrical energy on both its top and bottom sides. They are different from monofacial solar panels which only use one side for solar energy production. The word bifacial comes from the prefix "bi-" (meaning two), and "facial" (for face).

Bifacials are equipped with solar cells on both the top and the rear of the panel. They are usually monocrystalline, although polycrystalline can be used. Because they are slim, they resemble thin-film panels. Bifacial solar panels are frequently frameless, too. The top of each solar module is covered in protective glass. The flipside may be glass or a clear backsheet. This is different from conventional solar panel systems with opaque backings. The hardware used to mount a bifacial solar array is designed to minimize shading. This means there are only very narrow support rails and corner-only vertical supports.

The typically backside-placed junction box the electronic guts and brain of your solar panel system is smaller than in traditional solar arrays. So, it takes up less space and casts less shade on the back solar cells.

Figure 2.4: Image of a typical Bifacial Solar Array

The top solar cells of a bifacial solar panel system face the sun, so they capture incident sun rays directly, absorbing only certain wavelengths. The top solar cells function like those of a conventional solar panel array. The bottom solar cells absorb light that is reflected off the ground. This light is called albedo light. White or light colours reflect better than dark colours. Painting a white or silver surface on a roof or concrete driveway under the panels provides the same effect, too. Studies show that a white surface reflects more than 80% of albedo light (Grass, by comparison: 23%).

Unlike monofacial solar panel systems that are placed in racks parallel to a surface such as a rooftop, bifacials produce more energy when they are angled off of the roof or ground at varying degrees. In these types of titled installations, there is a great amount of reflection. Because sunlight bounces off of all objects reflectively at many different angles, bifacial solar panels are better able to capture more of it. They are even productive on cloudy days when monofacial solar cells are at a greater disadvantage.

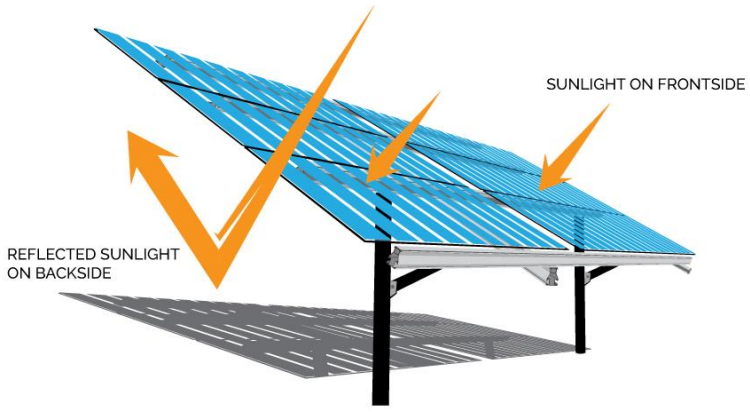


Figure 2.5: Diagram showing how bifacial Solar PV panels work (Source: https://sinovoltaics.com/learning-center/solar-cells/bifacial-solar-modules/)

Efficiency comparisons between bifacial and monofacial solar panels

Efficiency refers to how well a solar cell converts the total amount of solar energy impinging on its surface into electrical energy. A 2018 study by LONGi Solar showed that bifacials can increase efficiency by 11% compared to a conventional solar panel system. The bifacial solar cell efficiency increase can be as high as 27% with a solar tracking system that tilts solar cells continuously toward the sun during its trajectory across the sky. This system maintains a perpendicular panel orientation toward the sun throughout the day for maximum direct exposure of the cells to radiant solar energy. To achieve the same degree of solar power as a typical monofacial solar array, fewer bifacial solar panels are needed. As the bifacial solar panel price becomes competitive with monofacials, consumers searching for maximum efficiency with fewer panels, (because of limited space, for example), would do best by choosing bifacial solar panels.

Because bifacial solar panels take up less space to provide the same amount of solar power as some conventional solar panel systems, you don't need as much land, but you do need a light-coloured surface for optimal performance.

2.5. Consideration of alternatives

In terms of Appendix 2 of the 2014 Environmental Impact Assessment (EIA) Regulations (GNR 326), reasonable and feasible alternatives including but not limited to site and technology alternatives, as well as the "do-nothing" alternative should be considered.

2.5.1. Site Alternatives

Site alternatives such as land suitability, solar resource, and landowner support were addressed in the EIA undertaken for the authorised PV facility. The study concluded that the development area located within the study area (i.e., Portion 0 of Farm 2962 Lejwe and Portion 0 of Farm 1808 Besemkop) is highly preferred in terms of the development of a solar PV facility as a result of the various criteria listed above. Owing to its proximity to the authorised area, the additional footprint has been identified by the applicant as a technically feasible site which has the potential for the development of a solar PV facility. No alternative sites for the additional footprint have been identified for consideration within this EIA process.

2.5.2. Technology Alternatives

The EIA for the PV facility considered financial, technical, and environmental factors when choosing the type of solar power technology to be implemented, including the local solar resource and its likely generation output, the economics of the proposed facility and availability of government feed-in tariffs and energy production licenses, and the requirement for other development inputs such as water resource requirements. It was concluded that PV technology was considered to be the most environmentally sensitive technology for the preferred site, as large volumes of water are not needed for power generation purposes compared to the CSP option, which requires large volumes of water for cooling purposes. PV is also preferred when compared to CSP technology because of the lower visual profile.

The EIA considered the installation of fixed monofacial PV technology, being the most appropriate technology available at the time. Due to technology advancements since the initial assessment for the project, the developer (Sannaspos Solar PV Project (Pty) Ltd) proposes single-axis trackers with bi-facial

modules for implementation of the project. As detailed in Section 2.4 above, this technology enables energy generation from both sides of the PV modules thus requiring additional space between PV module rows.

2.5.3. Design and Layout Alternatives

The affected property (i.e., Portion 0 of Farm 2962 Lejwe and Portion 0 of Farm 1808 Besemkop) is approximately 1350ha in extent, which is sufficient for the development of a solar PV facility with an installed capacity of up to 90MW, while allowing for the avoidance of environmental sensitivities. A development area of ~ 200 ha (150 ha authorised area and 50 ha proposed additional footprint) has been identified within the project site within which the solar PV facility will be sited.

Potential environmentally sensitive areas were identified as part of the Scoping Phase for further detailed consideration (through site-specific specialist studies) during the EIA Phase. The environmental sensitivity identification process has informed the layout design for the PV facility, avoiding sensitive areas as far as possible, and thereby ensuring that the layout plan for the infrastructure on the additional footprint is the most optimal from an environmental perspective.

2.5.4. The 'Do-Nothing' Alternative

The 'Do-Nothing' alternative is the option of not utilising the additional footprint for the Sannaspos Solar PV Facility. This means utilising only the authorised 150 ha area. Should this alternative be selected, there would be no environmental impacts on the additional footprint. In addition, the benefits as a result of the opportunity to utilise bifacial panels and install a more efficient solar PV facility on the site will be foregone. The 'do-nothing' alternative is assessed in Chapter 6 of this EIA report.

CHAPTER 3: POLICY AND LEGISLATIVE CONTEXT

This Chapter provides an overview of the policy and legislative context within which the development of an additional footprint for a solar PV project, such as the Sannaspos Solar PV Facility, is proposed. It identifies environmental 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 which may be applicable to or have bearing on the proposed project.

3.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of an Impact Assessment Report

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.	Chapter 3, as a whole, provides an overview of the policy and legislative context which is considered to be associated with the development of the solar energy facility on an additional footprint where an authorized area is adjacent to an additional footprint. The regulatory and planning context has been considered at national, provincial, and local levels. A description of the policy and legislative context within which the additional footprint for the Sannaspos solar PV project is proposed is included in **sections** which **3.3, 3.4, 3.5** and **3.6.**

3.2. Strategic Electricity Planning in South Africa

The need to expand electricity generation capacity in South Africa is based on national policy and informed by on-going strategic planning undertaken by the Department of Mineral Resources and Energy (DMRE). The hierarchy of policy and planning documentation that support the development of renewable energy projects such as a solar energy facility is illustrated in **Figure 3.1**. These policies are discussed in more detail in the following sections, along with the provincial and local policies or plans that have relevance to the development of an additional footprint for the Sannaspos Solar PV project.

The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for an energy generation project 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 developments are a multi-sectoral issue (encompassing economic, spatial, biophysical, and cultural dimensions) various statutory bodies are likely to be involved in the approval process of a solar energy project and the related statutory environmental assessment process.

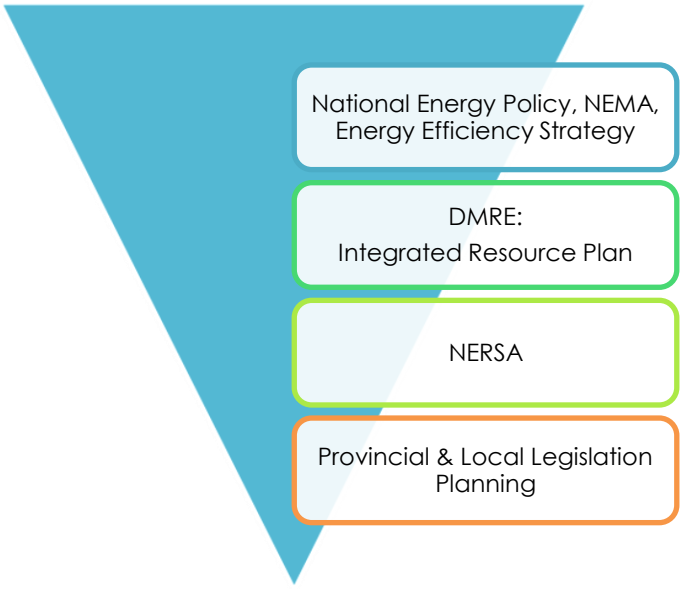


Figure 3.1: Hierarchy of electricity and planning documents

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

- **Department of Mineral Resources and Energy (DMRE):** This Department is responsible for policy relating to all energy forms and for compiling and approving the Integrated Resource Plan (IRP) for electricity. Furthermore, the Department is also responsible for granting approvals for the use of land which is contrary to the objects of the Mineral and Petroleum Resource Development Act (Act No. 28 of 2002) (MPRDA) in terms of Section 53 of the Act. Therefore, in terms of the Act, approval from the Minister is required to ensure that proposed activities do not sterilise mineral resources that may occur within the project site and development area.
- **National Energy Regulator of South Africa (NERSA):** NERSA is responsible for regulating all aspects of the electricity sector and will ultimately issue licenses for IPP projects to generate electricity.
- **Department of Environment, Forestry and Fisheries (DEFF):** This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations, 2014 (GN R326) as amended. DEA is the Competent Authority for this project (as per GN R779 of 01 July 2016), and is charged with granting the EA for the project under consideration.
- **The South African Heritage Resources Agency (SAHRA):** SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- **South African National Roads Agency Limited (SANRAL):** This Agency is responsible for the regulation and maintenance of all national road routes.
- **Department of Water and Sanitation:** This Department is responsible for effective and efficient water resources management to ensure sustainable economic and social development. This Department is also responsible for evaluating and issuing licenses pertaining to water use (i.e. Water Use Licenses (WUL) and General Authorisation).
- **The Department of Agriculture, Forestry and Fisheries (DAFF) is soon to be known as the Department of Agriculture, Rural Development and Land Reform :** This Department is the custodian of South Africa's agricultural resources and is primarily responsible for the formulation and implementation of policies governing the agriculture sector. Furthermore, the Department is also responsible for issuing permits for the disturbance or destruction of protected tree species listed under Section 15 (1) of the National Forest Act (No. 84 of 1998) (NFA).

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

- **Provincial Government of the Free State – Free State Department of Small Business Development, Tourism and Environmental Affairs (DESTEA):** This Department is the commenting authority for the EIA process for the project and is responsible for issuing of biodiversity and conservation-related permits.
- **Free State Department: Police, Roads and Transport:** This Department provides effective co-ordination of crime prevention initiatives, provincial police oversight, traffic management and road safety towards a more secure environment.
- **Free State Heritage Resources Authority (FSHRA):** This department is responsible for the identification and management of heritage resources in the Free State, which, in a provincial context, have special significance. A heritage resource is a place or object of cultural significance.

At the **Local Level,** the local and district municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Free State Province, both the local and district municipalities play a role. The site falls within the **Mangaung Metropolitan Municipality**. In terms of the Municipal Systems Act (No. 32 of 2000), it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control.

3.3. International Policy and Planning Context

A brief review of the most relevant international policies relevant to the establishment of Sannaspos Solar PV Facility are provided below in **Table 3.1**. Sannaspos Solar PV project is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 3.1: International policies relevant to Sannaspos Solar PV Facility and the Additional Footprint

Relevant policy	Relevance to Sannaspos Solar PV Additional Footprint
United Nations Framework Convention on Climate Change (UNFCCC) and Conference of the Party (COP)	The Conference of the Parties (COP), established by Article 7 of the UNFCCC, is the supreme body and highest decision-making organ of the Convention. It reviews the implementation of the Convention and any related legal instruments and takes decisions to promote the effective implementation of the Convention. The Conference of the Parties (COP) 21 was held in Paris from 30 November to 12 December 2015. From this conference, an agreement to tackle global warming was reached between 195 countries. This Agreement is open for signature and subject to ratification, acceptance or approval by States and regional economic integration organisations that are Parties to the Convention from 22 April 2016 to 21 April 2017. Thereafter, this Agreement shall be open for accession from the day following the date on which it is closed for signature. The agreement can only be sanctioned once it has been ratified by 55 countries, representing at least 55% of emissions. South Africa signed the Agreement in April 2016 and ratified the agreement on 01 November 2016. The Agreement was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016. The Agreement was promulgated on 04 November 2016, thirty days after the date on which at least 55 Parties to the Convention, which account for at

Relevant policy	Relevance to Sannaspos Solar PV Additional Footprint
	least 55% of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval, or accession with the Depositary. The Paris Agreement set out that every 5 years countries must set out increasingly ambitious climate action. This meant that, by 2020, countries needed to submit or update their plans for reducing emissions, known as nationally determined contributions (NDCs). The COP26 summit held on 2021 brought parties together to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change. On 13 November 2021, COP26 concluded in Glasgow with all countries agreeing the Glasgow Climate Pact to keep 1.5˚C alive and finalise the outstanding elements of the Paris Agreement. South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively. The policy provides support for Brakpan 1 Solar Energy Facility which will contribute to managing climate change impacts, supporting the emergency response capacity, as well as assist in reducing GHG emissions in a sustainable manner.
The Equator Principles 4 (October 2020)	The Equator Principles (EPs) IV constitute a financial industry benchmark used for determining, assessing, and managing project's environmental and social risks. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs are applicable to large infrastructure projects (such as Sannaspos Solar PV facility) and apply globally to all industry sectors. Such an assessment should propose measures to minimise, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of Sannaspos Solar PV facility. In terms of the EPs, South Africa is a non-designated country, and as such the assessment process for projects located in South Africa evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability, and Environmental Health and Safety (EHS) Guidelines. Sannaspos Solar PV facility is currently being assessed in accordance with the requirements of the EIA Regulations, 2014 as amended (GN R326), published in terms of Section 24(5) of the National Environmental Management Act (No. 107 of 1998) (NEMA), which is South Africa's national legislation providing for the authorisation of certain controlled activities. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed.

Relevant policy	Relevance to Sannaspos Solar PV Additional Footprint
International Finance Corporation (IFC) Performance Standards and Environmental and Social Sustainability (January 2012)	The International Finance Corporation's (IFC) Performance Standards (PSs) on Environmental and Social Sustainability were developed by the IFC and were last updated on 1 January 2012. Performance Standard 1 requires that a process of environmental and social assessment be conducted, and an ESMS appropriate to the nature and scale of the project, and commensurate with the level of its environmental and social risks and impacts, be established and maintained. The above-mentioned standard is the overarching standard to which all the other standards relate. Performance Standard 2 through to 8 establish specific requirements to avoid, reduce, mitigate, or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, the standards 2 and 8 describe potential social and environmental impacts that require particular attention specifically within emerging markets. Where social or environmental impacts are anticipated, the developer is required to manage them through its ESMS consistent with Performance Standard 1. Given the nature of Sannaspos Solar PV facility, it is anticipated (at this stage of the process) that Performance Standards 1, 2, 3, 4, 6, and 8 may be applicable to the project.

3.4. National Policy

Further to the South African government's commitment in August 2011 to support the development of renewable energy capacity, the DMRE initiated the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) to procure renewable energy from the private sector in a series of rounds. To date, the Department has procured 6 422MW of renewable energy capacity from 102 independent power producers (IPPs), with 3 876MW operational and made available to the grid[3]. National policies have to be considered for the construction and operation of the solar PV facility to ensure that the development is in line with the planning of the country.

A brief review of the most relevant national policies is provided below in **Table 3.2**. The development of Sannaspos Solar PV project is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 3.2: Relevant national legislation and policies for the Sannaspos Solar PV Projectand the additional footprint

Relevant legislation or policy	Relevance to the Sannaspos Solar PV Additional Footprint
Constitution of the Republic of South Africa, 1996	Section 24 of the Constitution pertains specifically to the environment. It states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically

[3]https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html

Relevant legislation or policy	Relevance to the Sannaspos Solar PV Additional Footprint
	sustainable development, and use of natural resources while promoting justifiable economic and social development. The Constitution outlines the need to promote social and economic development. Section 24 of the Constitution therefore requires that development be conducted in such a manner that it does not infringe on an individual's environmental rights, health, or well-being. This is especially significant for previously disadvantaged individuals who are most at risk to environmental impacts.
National Environmental Management Act (No. 107 of 1998) (NEMA)	This piece of legislation is South Africa's key piece of environmental legislation and sets the framework for environmental management in South Africa. NEMA is founded on the principle that everyone has the right to an environment that is not harmful to their health or well-being as contained within the Bill of Rights. The national environmental management principles state that the social, economic, and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed, and evaluated, and decisions must be appropriate in the light of such consideration and assessment. The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within NEMA.
White Paper on the Energy Policy of the Republic of South Africa (1998)	The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa's energy security. This can be achieved through increased use of RE and encouraging new entries into the generation market. The policy states that the advantages of RE include, minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include higher capital costs in some cases, lower energy densities, and lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future.
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)	The White Paper on Renewable Energy Policy Supplements Government's predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of RE and aims to create the necessary conditions for the development and commercial implementation of RE technologies. The White Paper on RE sets out Government's vision, policy principles, strategic goals, and objectives for promoting and implementing RE in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and fairly accessible and affordable coal resources. However, massive RE resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The White Paper on Renewable Energy of 2003 set a target of 10 000GWh to be generated from RE by 2013 to be produced mainly from biomass, wind, solar and small-scale hydro. The target was subsequently reviewed in 2009 during the RE summit of 2009. The policy supports the investment in RE facilities as they contribute towards ensuring energy security through the diversification of energy supply, reducing GHG emissions and the promotion of RE sources.

Relevant legislation or policy	Relevance to the Sannaspos Solar PV Additional Footprint
National Energy Act (No. 34 of 2008)	The purpose of the National Energy Act (No. 34 of 2008) is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, while taking environmental management requirements into account. In addition, the Act also provides for energy planning, and increased generation and consumption of Renewable Energies (REs). The Act provides the legal framework which supports the development of RE facilities for the greater environmental and social good and provides the backdrop against which South Africa's strategic planning regarding future electricity provision and supply takes place.
The Electricity Regulation Act (No. of 2006)	The Electricity Regulation Act of 2006, replaced the Electricity Act (No. 41 of 1987), as amended, with the exception of Section 5B, which provides funds for the energy regulator for the purpose of regulating the electricity industry. The Act establishes a national regulatory framework for the electricity supply industry and introduces the National Energy Regulator (NERSA) as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licences and registration as the manner in which the generation, transmission, distribution, trading, and import and export of electricity are regulated.
Integrated Energy Plan (IEP), 2015	The Integrated Energy Plan (IEP) (which was developed under the National Energy Act (No. 34 of 2008)), recognises that energy is essential to many human activities, and is critical to the social and economic development of a country. The purpose of the IEP is essentially to ensure the availability of energy resources, and access to energy services in an affordable and sustainable manner, while minimising associated adverse environmental impacts. Energy planning therefore needs to balance the need for continued economic growth with social needs, and the need to protect the natural environment.
Integrated Resource Plan for Electricity (IRP) 2010-2030 (2019)	The Integrated Resource Plan (IRP) for electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's National electricity plan. The primary objective of the IRP 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. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation. On 27 August 2018, the then Minister of Energy published a draft IRP which was issued for public comment. The lengthy public participation and consultation process has culminated in the issue of the overdue IRP 2019 which updates the energy forecast from the current period to the year 2030. Since the promulgated IRP 2010, the following capacity developments have taken place: » A total 6 422 MW under the Renewable Energy Independent Power Producers Programme (REIPPP) has been procured, with 3 876 MW operational and made available to the grid as of 31 March 2021[4] with 5 078MW from 79 IPP projects operational and made available to the grid[5]..

4 Bid windows 1, 2 ,3, 3.5, 4 and small BW1(1S2) and small BW2(2S2). 2 583 MW of renewable energy capacity was awarded to IPPs in the REIPPPP bid window 5 in October 2021.

[5]https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html

Relevant legislation or policy	Relevance to the Sannaspos Solar PV Additional Footprint
	» 2 000MW of generating capacity (comprising various technologies) has been awarded to 8 Independent Power Producers under the RMIPPPP in March 2021. » 2 583MW of electricity in bid window 5 of the REIPPPP, announced on 28 October 2021 (DMRE, 2021). » IPPs have commissioned 1005MW from two (2) Open Cycle Gas Turbines (OCGT) peaking plants; and » Under the Eskom Build Programme, 1 332MW has been procured from the Ingula Pumped Storage Project, 1 588MW and 800MW from the Medupi and Kusile power stations and 100MW from the Sere Wind Farm. Provision has been made for the following new capacity by 2030: » 1 500MW of coal; » 2 500MW of hydro; » 6 000MW of solar PV; » 14 400MW of wind; » 1 860MW of nuclear; » 2 088MW of storage; » 3 000MW of gas/diesel; and » 4 000MW from other distributed generation, co-generation, biomass and landfill technologies. Based on the IRP 2019, 1 474MW has been installed for solar PV facilities, whereas, 814MW has already been procured. In addition, 1 000MW has been allocated for solar PV facilities from 2022 to 2030. This will bring the total installed capacity of solar PV facilities by 2030 to 8 288MW. Therefore, the development of the Sannaspos Solar PV Projectis supported by the IRP 2019.
National Development Plan 2030 (2012)	The National Development Plan (NDP) 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030. In terms of the Energy Sectors role in empowering South Africa, the NDP envisages that, by 2030, South Africa will have an energy sector that promotes: » Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation. » Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households. » Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The development of Sannaspos Solar PV Facility supports the NDP through the development of energy-generating infrastructure which will not lead to the generation of GHGs and will result in economic development and growth of the area surrounding the development area.
Strategic Integrated Projects (SIPs)	The Presidential Infrastructure Coordinating Commission (PICC) is integrating and phasing investment plans across 18 Strategic Integrated Projects (SIPs) which have 5 core functions, including to unlock opportunity, transform the economic landscape,

Relevant legislation or policy	Relevance to the Sannaspos Solar PV Additional Footprint
	create new jobs, strengthen the delivery of basic services, and support the integration of African economies. SIP 8 of the energy SIPs supports the development of RE projects as follows: 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. SIP 10 relates to electricity transmission and distribution for all » Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. » Align the 10-year transmission plan(link is external), the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity. The development of Sannaspos Solar PV Facility is aligned with SIP 8 and SIP10 as it constitutes a green energy initiative that would contribute clean energy in accordance with the IRP 2010 – 2030. As the project is a Preferred Bidder, it has been confirmed as a SIP by the DMRE and as such is to be expedited in terms of Schedule 2 (Section 17(2)) of the Infrastructure Development Act (Act No. 23 of 2014)(refer to **Appendix L**).
National Climate Change Response Policy, 2011	The Conference of the Parties (COP) 21 was held in Paris from 30 November to 12 December 2015. From this conference, an agreement to tackle global warming was reached between 195 countries. This Agreement is open for signature and subject to ratification, acceptance or approval by States and regional economic integration organisations that are Parties to the Convention from 22 April 2016 to 21 April 2017. Thereafter, this Agreement shall be open for accession from the day following the date on which it is closed for signature. The agreement can only be sanctioned once it has been ratified by 55 countries, representing at least 55% of emissions. South Africa signed the Agreement in April 2016 and ratified the agreement on 01 November 2016. The Agreement was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016. The Agreement was promulgated on 04 November 2016, thirty days after the date on which at least 55 Parties to the Convention, which account for at least 55% of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary. South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively. The policy provides support for Sannaspos Solar PV Facility, which will contribute to managing climate change impacts, supporting the emergency response capacity, as well as assist in reducing GHG emissions in a sustainable manner.

Relevant legislation or policy	Relevance to the Sannaspos Solar PV Additional Footprint
Climate Change Bill, 2018	On 08 June 2018, the Minister of Environmental Affairs published the Climate Change Bill ("the Bill") for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. Sannaspos Solar PV Facility consists of a renewable energy generation facility and would not result in the generation or release of emissions during its operation.

3.5. Provincial Planning and Context

A brief review of the most relevant provincial policies is provided below in **Table 3.3**. The proposed development is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 3.3: Relevant provincial legislation and policies for Sannaspos Solar PV Facility and the Additional Footprint

Relevant policy	Relevance to the Sannaspos Solar PV Additional Footprint
Free State Provincial Spatial Development Framework (PSDF) 2012	The Free State Provincial Spatial Development Framework (PSDF) 2007 states that sustainable economic development is the only effective means by which the most significant challenge of the Free State, namely poverty, can be addressed is. The PSDF gives practical effect to sustainable development, which is defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The FSGDS is supported by two PSDF Pillars and drivers that focus on the sustainability of the resource base and the strategic spatial context. Pillar 1 is stated as sustainability and Pillar 2 as Spatial context. Here sustainability refers to development that promotes human well-being and human integrity through efficient use of resources. The overall energy objective for the province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the province through appropriate financial and fiscal instruments. The development of Sannaspos Solar PV Projectsupports the overall energy objective of the province for development that promotes human well-being and human integrity through efficient use of resources.
The Free State Green Economy Strategy (2014)	This green economy strategy for Free State Province (FSGES) was developed in alignment with the national green economy strategy elaborated in the National Green Economy Framework and Green Economy Accord, as well the Free State Provincial Growth and Development Strategy. The development process was spearheaded by the Department of Economic Development, Tourism and Environmental Affairs (DETEA). The objective was to develop a green economy strategy to assist the province to: » Improve environmental quality and economic growth;

Relevant policy	Relevance to the Sannaspos Solar PV Additional Footprint
	» Develop green industries and energy efficiency; » Expand productive capacity and service delivery; » Adopt sustainable consumption and production processes; » Improve policy making, permitting, monitoring and enforcement on Green Economy Initiatives/Programmes; and » Create decent green jobs and build capacity of relevant personnel from DETEA, municipalities and other relevant stakeholders. To address these challenges and following the South Africa's National Government directive that requires all government departments to develop implementation plans and align their programmes with the job creation imperative, the government of the Free State has set their vision to transit to green economy by the year 2045. Each of the four district municipalities and the metro has come up with their vision and a mission statement. The province has drafted long-term and short-term building blocks to the green economy transition being resource efficiency; low carbon growth and job creation focussing on agriculture, energy and energy efficiency, infrastructure, transport, water, buildings and built environment sectors. The development of Sannaspos Solar PV Project will assist in achieving (although only to a limited extent) the promotion of the provincial green economy of the Free State.

3.6. Local Policy and Planning Context

The local tiers of government relevant to the Sannaspos Solar PV Project and the additional footprint are the Mangaung Metropolitan Municipality. Instruments and/or policies at both the district and local level contain objectives which align with the development of Sannaspos Solar PV Project and the additional footprint. These include, economic growth, job creation, community upliftment and poverty alleviation.

Table 3.4: Relevant local legislation and policies for Sannaspos Solar PV Project and the Additional Footprint

Relevant policy	Relevance to Sannaspos Solar PV Additional Footprint
Manguang Metropolitan Municipality (MMM) Integrated Development Plan (2021-2022)	Included in the Mangaung Metropolitan Municipality (MMM) Integrated Development Plan (2020-2021) is the framework of current and future climate variability and change, vulnerability, and risk profile of the municipality. Several key vulnerable sectors include: agriculture, air quality, water, human health, human settlements, agro ecosystems that provide food security, water security (both supply and fitness for use), energy demand for domestic and industrial use and compromised ecosystems goods and services (biodiversity). Section 3.2.6 outlines the MMM's 2030 vision is alignment with the National Development Plan and the Sustainable Development Goals (SDGs). Part of this entails a transition to a low carbon economy. Transition to a low-carbon economy: » Speed up and expand renewable energy, waste recycling, ensure buildings meet energy efficient standards » Set a target of 5 m solar water heaters by 2029 The MMM endeavours to promote; » Environmental sustainability

Relevant policy	Relevance to Sannaspos Solar PV Additional Footprint
	» Increase the environmental literacy level of stakeholders » Reduce the major sources of greenhouse gas emissions and catalysing the large-scale supply of clean energy » Energy saving » Environmental Management and Climate change The development of the Sannaspos Solar PV Project on the additional footprint is in line with the objectives of the MMM IDP through their goals of catalysing large-scale supply of clean energy.

CHAPTER 4: APPROACH TO UNDERTAKING THE ENVIRONMENTAL IMPACT ASSESSMENT

In terms of the EIA Regulations of December 2014 (as amended) published in terms of the NEMA (Act No. 107 of 1998) as amended, the construction on the additional footprint for the Sannaspos Solar PV Projectis a listed activity requiring Environmental Authorisation (EA). The application for EA is required to be supported by an Environmental Impact Assessment (EIA) process based on Activity 15 of Listing Notice 2 (GNR 325) and Activity 12 of Listing Notice 3 (GNR 324) namely the clearance of an area of 20 hectares or more of indigenous vegetation.

An EIA process refers to the process undertaken in accordance with the requirements of the relevant EIA Regulations (the 2014 EIA Regulations (GNR 326), as amended), which involves the identification 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., the **Scoping** and the **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 in **Figure 4.1**.

Figure 4.1: The Phases of an Environmental Impact Assessment (EIA) Process

4.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of an Impact Assessment Report

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
(d)(i) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for and	All listed activities triggered and applied for are included in **Section 4.2**.
(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 followed throughout the EIA process of the additional footprint for the Sannaspos Solar PV Project is included in **Section 4.5.2** and copies of

Requirement	Relevant Section
	the supporting documents and inputs are included in **Appendix C**.
(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.	The main issues raised through the undertaking of the public participation process, including consultation with I&APs, are included in the Comments and Responses Report in **Appendix C8**.
(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 in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives are included in **Section 4.7**.

4.2. Relevant legislative permitting requirements

The legislative permitting requirements applicable to the additional footprint for the Sannaspos Solar PV Facility, as identified at this stage in the process and considered within this EIA process, are described in more detail under the respective sub-headings. Additional permitting requirements are detailed within **Section 4.6**.

4.2.1 National Environmental Management Act (No. 107 of 1998) (NEMA)

NEMA (No. 107 of 1998) is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed, and reported on to the Competent Authority (the decision-maker) charged by NEMA with granting of the relevant Environmental Authorisation (EA). Due to the fact that Sannaspos Solar PV (Pty) Ltd is a power generation project and therefore relates to the IRP for Electricity 2010 – 2030, the National Department of Forestry, Fisheries and the Environment (DFFE) has been determined as the Competent Authority (CA) in terms of GNR 779 of 01 July 2016. The Provincial Free Department of Small Business Development, Tourism and Environmental Affairs (DESTEA) is the Commenting Authority on the project.

The need to comply with the requirements of the EIA Regulations published under NEMA ensures that developers are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised, or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the Competent Authority with sufficient information in order for an informed decision to be taken regarding the Application for EA.

The EIA process being conducted for the proposed additional footprint is undertaken in accordance with Section 24(5) of the NEMA, which defines the procedure to be followed in applying for EA, and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

Table 4.1 contains all the listed activities identified in terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324) which may be triggered by the proposed development on the additional footprint, and for which EA has been applied:

Table 4.1: Listed activities identified in terms of the Listing Notices (GNR 327, 325 and 324).

Notice Number	Activity Number	Description of listed activity
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	**1**	The development of facilities or infrastructure for the generation of electricity from a renewable resource where: (i) the electricity output is more than 10 megawatts but less than 20 megawatts; ***Infrastructure on the additional area will result in the generation of electricity up to 15 MW.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	28 (ii)	Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes, or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1ha. ***The proposed additional footprint to be developed for the solar PV facility is larger than 1 hectare. The site is currently used for agricultural purposes. The total extent of the additional footprint is 50ha.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	12 (ii)	The development of – (ii) infrastructure or structures with a physical footprint of 100 square meters or more; Where such development occurs – (a) Within a watercourse (b) If no development setback exists; within 32 meters of a watercourse, measured from the edge of a watercourse **Infrastructure or structures greater than a physical footprint of 100 square meters will be placed on the additional area. In total four (4) water resources were identified and delineated for the project. These included both natural and artificial systems, with the artificial systems comprising of impoundments and drainage features. Three (3) natural wetland hydrogeomorphic (HGM) units belonging to three HGM types (unchannelled valley bottom, depression and seepage) were identified within the 500 m regulated area. An unchannelled valley bottom (HGM 1) is traversed by a portion of the project area.**

Notice Number	Activity Number	Description of listed activity
Listing Notice 2 (GNR 325) 08 December 2014 (as amended)	15	The clearance of an area of 20ha or more of indigenous vegetation[6]. ***The proposed additional footprint is located on agricultural land where the predominant land use is livestock grazing and is therefore likely to comprise indigenous vegetation. The project would therefore result in the clearance of an area of land greater than 20ha of indigenous vegetation.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	12(b)(iv)	The clearance of an area of 300 square meters or more of indigenous vegetation, (b) in the Free State, (iv) in areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland. ***The Sannaspos Solar PV additional footprint is located within the regulated area of three natural HGM Units (unchannelled valley bottom, depression and seepage) present within the development area to the north-east. As a result, a water use authorisation for the project will be required from DWS; however, the process will only be completed once a positive EA has been received. This is in line with the requirements from DWS.***

4.2.2 National Water Act (No. 36 of 1998) (NWA)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the Competent Authority (i.e., the Regional Department of Water and Sanitation (DWS) or the relevant Catchment Management Agency (CMA)). Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

Table 4.2 contains Water Uses associated with the proposed project and identified in terms of the NWA which require licensing either in the form of a General Authorisation (GA), or in the form of a Water Use License (WUL). The table also includes a description of those project activities which relate to the applicable Water Uses.

Table 4.2: List of Water Uses published under Section 21 of NWA, as amended.

Notice No.	Activity No.	Description of Water Use
NWA (No. 36 of 1998)	Section 21 (c)	Impeding or diverting the flow of water in a watercourse ***Infrastructure associated with Sannaspos Solar PV Facility will be located within the GN 509 regulated area of a***

[6] "Indigenous vegetation" as defined by the 2014 EIA Regulations (GNR 326) refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

Notice No.	Activity No.	Description of Water Use
		watercourse (100m zone surrounding the identified unchannelled valley bottom, depression and seepage to the east and south boundaries of the additional footprint).
NWA (No. 36 of 1998)	Section 21 (i)	Altering the bed, banks, course, or characteristics of a watercourse. ***Infrastructure associated with Sannaspos Solar PV Facility will be located within the GN 509 regulated area of a watercourse (100m zone surrounding the identified unchannelled valley bottom, depression and seepage).***

Due to the additional footprint for the Sannaspos Solar PV Facility being located within the regulated area of a watercourse (unchannelled valley bottom, depression and seepage) located along the eastern and southern boundaries an application for a water use authorisation in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GN R267), or a GA registered in accordance with the GN R509 of 2016. According to the aquatic ecology assessment undertaken the proposed Photovoltaic Solar Facility development will have a Low post-mitigation impact (Low Risk) on freshwater resource features and as such only a General Authorisation in terms of Section 39 of the NWA will likely be required. A GA Registration application for the project has been submitted to DWS.

4.2.3 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources, and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –

- *a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- *b. the construction of a bridge or similar structure exceeding 50m in length;*
- *c. any development or other activity which will change the character of a site –*
  - *i). exceeding 5 000m² in extent; or*
  - *ii). involving three or more existing erven or subdivisions thereof; or*
  - *iii). involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
  - *iv). the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA),

provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed development, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the South African Heritage Resources Agency (SAHRA) Permit Regulations (GNR 668). According to the heritage screening study undertaken as part of the Scoping Phase of this EIA process, no heritage sites of significance were recorded within the project area. Therefore, no Heritage Impact Assessment (HIA) was required for the project.

4.3. Overview of the Scoping Phase

The Scoping Report evaluated the potential environmental impacts of the Sannaspos Solar PV Project on the additional footprint and is the first step in the EIA process. The Scoping Phase was conducted in accordance with the requirements of the EIA Regulations, 2014, as amended in April 2017, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

The Scoping Phase aimed to:

- Identify and evaluate potential environmental (biophysical and social) impacts and benefits of the Sannaspos Solar PV Project (including design, construction, operation and decommissioning) within the broader study area and the identified project site through a review of existing baseline data and specialist studies.
- Identify potentially sensitive environmental features and areas on the project site to inform the preliminary design process of the solar facility.
- Define the scope of studies to be undertaken within the EIA Phase.
- Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA Phase, as well as the scope and extent of specialist studies that will be required to be undertaken as part of the EIA report.

Within this context, the following objectives of the scoping process, through the undertaking of a consultative process and with the assistance of specialist input, have been met.

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Submission of the completed Application for EA to the competent authority (DFFE) in terms of Regulations 5 and 16 of the 2014 EIA Regulations (GNR 326).
- Undertaking a public participation process (in line with the approved public participation plan submitted to DFFE) in accordance with Chapter 6 of GNR326, and the Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa (hereinafter referred to as "the Guidelines") in order to identify issues and concerns associated with the proposed project.
- Preparation of a Scoping Report and Plan of Study for EIA in accordance with the requirements of Appendix 2 of the 2014 EIA Regulations (GNR 326).
- Preparation of a Comments and Response (C&R) Report detailing all comments raised by I&APs and responses provided as part of the Scoping Phase.

» Submission of a Final Scoping Report, including a Plan of Study for the EIA, to DFFE for review and approval.

The Scoping Report considered the impact of infrastructure for the Sannaspos Solar PV Projecton the additional footprint. The broader site was considered during the Scoping study to identify and delineate any environmental fatal "no-go" or sensitive areas which should be avoided. This was undertaken through specialist studies and process of consultation. The preparation and release of the Scoping Report for a 30-day public review period provided stakeholders and I&APs with an opportunity to verify that the issues they had raised during the Scoping process had been captured and adequately considered and provided a further opportunity for additional key issues to be raised for consideration. The Final Scoping Report and Plan of Study for EIA was submitted to DFFE on **11 March 2022** and acceptance was received on **26 April 2022**, marking the start of the EIA Phase (refer to **Appendix B**). Additional information requested by the DFFE in the Acceptance of the Scoping Report and the location of the requested information in this EIA Report is detailed in **Table 5.2**.

DFFE Requirements for EIA		Response/Location in EIA Report
(a)	Listed Activity	
(i)	The EIAr must provide an assessment of the impacts and mitigation measures for each of the listed activities applied for.	All relevant listed activities applied for are specific and can be linked to the development activity or infrastructure as described in the project description.
(ii)	The EIAr must assess the correct sub listed activity for each listed activity applied for.	All sub-listed activities applied for in the application are assessed in Chapter 6 of this report.
(iii)	The listed activities represented in the EIAr and the application form must be the same and correct.	The listed activities in section 4.2.1 of the EIAr and in the application are the same and correct.
(b)	Public Participation	
(i)	The departments would like to further highlights its comments on the draft SR, more specifically the paragraph pertaining to Regulation 25 (4) which reads as follows "the competent authority may replace an existing valid environmental authorisation with an environmental authorisation contemplated in this regulation, indicating the extent of replacement in the environmental authorisation, if the existing valid environmental authorisation is directly related to the application for environmental authorisation".	This comment has been noted.
(ii)	Please ensure that comments from all relevant stakeholders are submitted to the Department with the EIAr. This includes but is not limited to the Department of Water and Sanitation, the provincial Department of Agriculture, SANRAL, Local Municipality, the District Municipality, the Department of Water and Sanitation (DWS), the South African Heritage Resources Agency (SAHRA), the Endangered Wildlife Trust (EWT), BirdLife SA, the Department of Mineral Resources, the Department of Rural Development and Land Reform, and the Department of Forestry, Fisheries and the Environment: Directorate Biodiversity and Conservation.	a) A list of registered interested and affected parties has been included in Appendix C1 of the EIAr. b) Copies of all comments received during the Final SR comment period has been included in Appendix C6 of the EIAr. d) All correspondence records have been appended to the EIAr. Appendix C4 includes correspondence with the Organs of State (OoS) and Appendix C5 includes correspondence with Stakeholders and I&APs. Comments received have been responded to in the CRR included in

DFFE Requirements for EIA		Response/Location in EIA Report
		Appendix C8 and will be addressed within the FEIAr where relevant.
(iii)	Please ensure that all issues raised and comments received during the circulation of the draft SR and draft EIAr from registered I&APs and organs of state which have jurisdiction in respect of the proposed activity are adequately addressed in the final EIAr. Proof of correspondence with the various stakeholders must be included in the final EIAr. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments.	All issues and comments/ queries raised have been incorporated into the C&RR, which will further be updated with the during the EIA phase. All correspondence records have been appended to the Final EIA Report. Appendix C4 includes correspondence with the Organs of State (OoS) and **Appendix C5** includes correspondence with Stakeholders and I&APs. The public participation process has been facilitated in accordance with the plan approved by the DFFE on Thursday, 30 November 2021 (included in Appendix C9 of the Final EIA Report.
(iv)	A Comments and Response trail report (C&R) must be submitted with the final EIAr. The C&R report must incorporate all comments for this development. The C&R report must be a separate document from the main report and the format must be in the table format as indicated in Appendix 1 of this comments letter. Please refrain from summarising comments made by I&APs. All comments from I&APs must be copied verbatim and responded to clearly. Please note that a response such as "noted" is not regarded as an adequate response to I&AP's comments.	A comments and responses report, including all comments received and responses provided is appended to the final EIA Report (**Appendix C8**).
(v)	Comments from I&APs must not be split and arranged into categories. Comments from each submission must be responded to individually.	All comments received and included in the comments and responses report have been arranged into categories and each submission addressed individually.
(vi)	The Public Participation Process must be conducted in terms of Regulation 39, 40, 41, 42, 43 & 44 of the EIA Regulations, 2014, as amended.	The public participation process conducted for the additional footprint follows the regulations as stated.
(vii)	The EAP is requested to contact the Department to make the necessary arrangements to conduct a site inspection prior to the submission of the final EIAr.	The comment has been noted and the Department will be contacted to arrange a site visit prior to submission of the final EIAr.
(c)	Alternatives	
(i)	Please provide a description of each of the preferred alternative type and provide detailed motivation on why it is preferred.	A description of alternatives relevant to the additional footprint is included in Chapter 2, Section 2.5 of this EIAr
(d)	Layout & Sensitivity Maps	
(i)	The EIAr must provide the four corner coordinate points for the proposed development site (note that if the site has numerous bend points, at each bend point coordinates must be provided) as well as the start, middle and end point of all linear activities.	Table 2.1 of the EIAr includes the four corned co-ordinates of the additional footprint.
(ii)	The EIAr must provide the following: - Clear indication of the envisioned area for the proposed additional 50ha in relation to approeved	Figure 2.1, Figure 2.2 and Figure 7.2 give a clear indication of the envisioned area for the proposed additional 50ha development area in

DFFE Requirements for EIA	Response/Location in EIA Report
Sannaspos Solar PVFacility; i.e. placing of solar panels and all associated infrastructure should be mapped at an appropriate scale. - Clear description of all associated infrastructure. This description must include, but is not limited to the following: ➢ Internal roads infrastructure; and; ➢ All supporting onsite infrastructure such as laydown area, guard house and control room etc. ➢ All necessary details regarding all possible locations and sizes of the proposed satellite substation and the main substation.	relation to the Sannaspos Solar PV facility. Section 2.1 and Table 2.3 and 2.3 provide a clear description of all associated infrastructure (locations, lengths, widths and/or capacities) of the facility.
(iii) Specialist studies to be conducted must provide a detailed description of their methodology, as well as indicate the locations and descriptions of turbine positions, and all other associated infrastructures that they have assessed and are recommending for authorisations.	There are no turbine positions associated with the project. Each specialist study conducted (refer to **appendices G to I**) includes a description of their methodology and recommendations for avoidance or mitigation of environmental sensitivities as outlined in this EIAr.
(iv) A copy of the final preferred route layout map and or consolidated layout map as per point F(iii) below. All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible e.g. roads. The layout map must indicate the following: ➢ Permanent laydown area footprint; ➢ Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible); ➢ Wetlands, drainage lines, rivers, stream and water crossing of roads and cables indicating the type of bridging structures that will be used; ➢ The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected by the facility and its associated infrastructure; ➢ Substation(s) and/or transformer(s) sites including their entire footprint; ➢ Location of access and service roads; ➢ Connection routes (including pylon positions) to the distribution/transmission network; ➢ All existing infrastructure on the site, especially railway lines and roads; ➢ Buffer areas; ➢ Buildings, including accommodation; and ➢ All "no-go" areas.	A detailed description of all limitations of specialist studies are included in section 4.7 of this EIAr. Seasonal studies were not listed as limitations for the study as identified in the specialist report included in **Appendix I.**
(v) An environmental sensitivity map indicating environmental sensitive areas and features identified during the assessment process.	**Figure 7.1** displays the environmental sensitive areas and features identified during the assessment process.

DFFE Requirements for EIA	Response/Location in EIA Report
(vi) A map combining the final layout map (for both the authorised facility and the additional 50ha) superimposed (overlain) on the environmental sensitivity map.	**Figure 7.1** provides a final layout of the authorised area and additional footprint overlain with Environmental Sensitivities.
(e) Specialist Assessments	
(i) The EAP must ensure that the terms of reference for all the identified specialist studies must include the following: ➢ A detailed description of the study's methodology; indication of the locations and descriptions of the development footprint, and all other associated infrastructures that they have assessed and are recommending for authorisations. ➢ Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the right season and providing that as a limitation will not be allowed. ➢ Please note that the Department considers a 'no-go' area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure including access roads is allowed in the 'no-go' areas. ➢ Should the specialist definition of 'no-go' area differ from the Departments definition; this must be clearly indicated. The specialist must also indicate the 'no-go' area's buffer if applicable. ➢ All specialist studies must be final, and provide detailed/practical mitigation measures for the preferred alternative and recommendations, and must not recommend further studies to be completed post EA. ➢ Should a specialist recommend specific mitigation measures, these must be clearly indicated. ➢ The list of specialist studies indicated in the background information letter that is attached as Appendix C3 of the Public Participation Process Report will be regarded as the ones that will be undertaken as part of the EIA phase. ➢ Regarding cumulative impacts: - Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land. - A detailed process flow to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project. - Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology used in the process. - The significance rating must also inform the need and desirability of the proposed development.	The methodology used to assess the significance of the impacts of infrastructure for the Sannaspos Solar PVfacility on the additional footprint is included in section 4.5 of the EIAr. Specialist studies are being undertaken in accordance with the relevant Protocols. Where required, specialists are appropriately registered. The EIAr also includes a table which summarises the specialist studies required by the Department's Screening Tool, a column indicating whether these studies are to be conducted or not, and a column with motivation for any studies not to be undertaken in Table 4.6 of Chapter 4.

<table>
<tr><th colspan="2">DFFE Requirements for EIA</th><th>Response/Location in EIA Report</th></tr>
<tr><td colspan="2">- A cumulative impact environmental statement on whether the proposed development must proceed.</td><td></td></tr>
<tr><td>(ii)</td><td>Should the appointed specialists specify contradicting recommendations, the EAP must clearly indicate the most reasonable recommendation and substantiate this with defendable reasons; and were necessary, include further expertise advice.</td><td>During our review of the specialist reports Savannah Environmental did not identify recommendations that contradict one another, therefore the most reasonable recommendations have been presented in the EIAr.</td></tr>
<tr><td>(iii)</td><td>It is further brought to your attention that Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation, which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols"), and in Government Notice No. 1150 of 30 October 2020 (i.e. protocols for terrestrial plant and animal species), have come into effect. Please note that specialist assessments must be conducted in accordance with these protocols.</td><td>The Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998 were followed according to the outcomes of the DFFE screening tool of the affected area. A motivation and project team response to the requirements are listed in Section 4.5 of this EIAr.</td></tr>
<tr><td>(iv)</td><td>Please be reminded that section 2(3) of NEMA requires developments to be socially, environmentally and economically sustainable, while section 2(4)(i) of NEMA requires the social, economic and environmental impacts of activities, including disadvantages and benefits, to be considered, assessed and evaluated</td><td>Section 7.4 assesses the social, economic and environmental impacts of activities, iand provides the disadvantages and benefits to be considered, assessed and evaluated.</td></tr>
<tr><td>(v)

(vi)</td><td>The following Specialist Assessments will form part of the EIAr:
<table><tr><th>Specialist Study</th><th>Company</th></tr><tr><td>Heritage Assessment</td><td>Jenna Lavin</td></tr><tr><td>Wetland and Biodiversity</td><td>Andrew Husted</td></tr><tr><td>Terrestrial ecology and botany</td><td>Martinus Erasmus</td></tr><tr><td>Wetland and ecosystem services, hydropedology and pedologic</td><td>Ivan Baker</td></tr></table></td><td>Section 4.5 provides a summary of the specialist studies included in the EIAr and a motivation for each assessment.</td></tr>
<tr><td colspan="2">(a) Environmental Management Programme</td><td></td></tr>
<tr><td>(i)</td><td>Please ensure that the mitigation measures specified in the EIAr and specialist reports are also incorporated into the EMPr. In addition, ensure that the EMPr complies with the content of the EMPr in terms of Appendix 4 of the EIA Regulations, 2014, as amended.</td><td>All mitigation measures relevant to the additional footprint are included in the EMPr (Appendix K). The EMPr is formulated in accordance with the content of the EMPr in terms of Appendix 4 of the EIA Regulations, 2014.</td></tr>
<tr><td>(ii)</td><td>Please also include in the EMPr, a recommended frequency for the auditing of compliance with the conditions of the EA and EMPr, and for the submission of such compliance reports to the competent authority.</td><td>Section 4.2 and 4.4 of Appendix K The EMPr outline the roles and responsibilities of the applicant and the ECO including the frequency on monitoring and submission</td></tr>
</table>

DFFE Requirements for EIA	Response/Location in EIA Report
(iii) Should the applicant wish to consolidate the two EAs, (which the department strongly recommends and supports, subject to a positive environmental authorisation being obtained), as per Regulation 25 (4) then the following information will need to be provided and or included when submitting the EIAr: • A consolidated draft EMPr; and • A consolidated layout Map (which will include the additional 50ha).	The applicant wishes to consolidate the two EAs subject to a positive authorisation. In which case the following will be included in the final EIAr. • A consolidated draft EMPr; and • A consolidated layout Map (which will include the additional 50ha).
(b) General	
The EIAr must provide the technical details for the proposed facility in a table format as well as their description and/or dimensions. A sample for the minimum information required is listed under Annexure 2 below.	The Applicant acknowledges that no activity may commence prior to receipt of the Environmental Authorisation.
Details of the future plans for the site and infrastructure after decommissioning in 20-30 years and the possibility of upgrading the proposed infrastructure to more advanced technologies must be indicated.	Future plans for the project are stated in Chapter 7 of the EIAr.
Should a Water Use License be required, proof of application for a license needs to be submitted.	A water use licence application has been initiated for the project (ENGIE Southern Africa (Pty) Ltd - General Authorisation for the Sannaspos Solar PV Facility in the Free State Province (WU23983)).
The EAP must provide landowner consent for all farm portions affected by the proposed project, whether the project component is linear or not, i.e. all farm portions where the access road, solar panels and associated infrastructure is to be located.	Landowner consent forms have been included in **Appendix M** of the EIAr.
A construction and operational phase EMPr that includes mitigation and monitoring measures must be submitted with the final EIAr.	An EMPr for the project which provides mitigation and monitoring measures during each phase of the project is included in this EIAr as **Appendix K.**

4.4. Overview of the EIA Phase

The EIA Phase has been undertaken in accordance with the amended EIA Regulations published in terms of NEMA in Government Notice 40772 of 07 April 2017. Key tasks undertaken within the EIA phase included:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Undertaking of independent specialist studies in accordance with Appendix 6 of Government Notice R326 of 2017 (amended EIA Regulations, 2014) and the relevant specialist protocols in terms of GNR320 of 20 March 2020 and GNE1150 of 30 October 2020.
- Preparation of an EIA Report in accordance with the requirements of Appendix 3 of Government Notice No R326 of 2017 (amended EIA Regulations, 2014).
- Undertaking a public involvement process throughout the EIA process in accordance with Chapter 6 of Government Notice R326 of 2017 (amended EIA Regulations, 2014) in order to record any comments and concerns associated with the additional footprint.
- Preparation of a Comments and Response Report detailing key issues raised by I&APs as part of the EIA Process.

The tasks above are discussed in further detail below.

4.5.1 Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended)

As stated previously, the DFFE has been identified and the CA in terms of GNR 779 of 1 July 2016, and the Department of Small Business Development, Tourism and Environmental Affairs (DESTEA) is the provincial commenting authority. Consultation with these authorities is being undertaken throughout the Scoping Phase. To date, this consultation has included the following:

- Requesting a Pre-Application Meeting and submission of a Public Participation Plan. The Public Participation Plan was approved via email on **30 November 2021.**
- Submission of the Application for Environmental Authorisation to the DFFE via the use of the DFFE Novell Filer System.
- Submission of the Final Scoping Report for review and comment by:
  - The competent and commenting authorities.
  - State departments that administer laws relating to a matter affecting the environment relevant to an Application for EA.
  - Organs of State which have jurisdiction in respect of the activity to which the application relates.

The submissions, as listed above, were undertaken electronically, as required by the DFFE. A record of all authority correspondence undertaken during the Scoping Phase is included in **Appendix B** and **Appendix C**.

4.5.2 Public Participation Process

Public participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GN R326) (as amended). The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GN R326) (as amended) and is being followed for this proposed project.

The Public Participation Process undertaken for the additional footprint for the Sannaspos Solar PV Facility was undertaken in terms of the requirements of the EIA Regulations and the approved Public participation Plan for the project[7]. The sharing of information forms the basis of the public participation process and offers the opportunity for 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. The public participation process affords I&APs opportunities to provide input into and receive information regarding the EIA process in the following ways:

- During the **Scoping Phase**:
  - provide an opportunity to submit comments regarding the project;
  - assist in identifying reasonable and feasible alternatives, where required;
  - identify issues of concern and suggestions for enhanced assessment;

[7] The requirement to submit a Public Participation Plan for approval was a requirement at the time of the commencement of the EIA process for this project.

- contribute relevant local information and knowledge to the environmental assessment;
- allow registered I&APs to verify that their comments have been recorded, considered and addressed, where applicable, in the environmental investigations;
- foster trust and co-operation;
- generate a sense of joint responsibility and ownership of the environment;
- comment on the findings of the Scoping Phase results; and
- identify issues of concern and suggestions for enhanced benefits.

» During the **EIA Phase**:
- contribute relevant local information and knowledge to the environmental assessment;
- verify that issues have been considered in the environmental investigations as far as possible as identified within the Scoping Phase;
- comment on the findings of the environmental assessments; and
- attend a Focus Group Meeting to be conducted for the project.

» During the **decision-making phase**:
- to advise I&APs 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 containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review;
» The information presented during the public participation process is presented in such a manner, i.e. local language and technical issues, that it avoids the possible alienation of the public and prevents them from participating;
» Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project;
» A variety of mechanisms are provided to I&APs to correspond and submit their comments i.e., fax, post, email, telephone, text message (SMS and WhatsApp); and
» An adequate review period is provided for I&APs to comment on the findings of the Scoping and EIA Reports.

The following sections detail the tasks undertaken as part of the public participation process within the EIA Phase.

i. Advertisements and Notifications

The availability of the EIA Report for review and comment was announced to the Organs of State, potentially affected and adjacent landowners, tenants and occupiers, and general public via the following:

» Notification letter distributed to all registered parties advising them of the availability of the EIA Report for review on comment on **24 June 2022**.
» An advertisement announcing the availability of and inviting comment on the EIA Report in the Express Bloemfontein Newspaper on **24 June 2022**. A copy of the newspaper adverts as sent to the newspaper and the advert tear sheet are included in **Appendix C3** of the EIA Report.
» The EIA Report was made available for review by I&APs for a 30-day review and comment period from **24 June 2022 to 25 July 2022**. The EIA Report was made available on the Savannah Environmental

website (https://savannahsa.com/public-documents/energy-generation/) and all registered I&APs were notified of the availability on **24 June 2022**. I&APs were encouraged to view the EIA Report and submit written comment. The EIA Report was circulated to Organs of State via electronic transfer (Dropbox, WeTransfer, etc), or CD and/or hardcopy as per individual request. Evidence of distribution of this EIA Report is included in Appendix C of this final EIA Report.

ii. Public Involvement and Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the surrounding area, as well as capture their views, comments, issues and concerns regarding the project, various opportunities are being provided to I&APs to note their comments and issues. I&APs are being consulted through the following means:

- Opportunity to review the EIA Report for a 30-day review and comment period from **24 June 2022** to **25 July 2022**.
- Comments received during this review period will be captured within a Comments and Responses Report (**Appendix C9**), which will be included within the final EIA Report.
- Focus group meetings: Virtual focus group meetings will be held with key government departments, stakeholders, and landowners during the 30-day review and comment period of the EIA Report. The purpose of these focus group meetings is to provide an overview of the findings of the EIA studies in order to facilitate comments on the EIA process and EIA Report, as well as to record any issues or concerns raised by stakeholders regarding the project. The minutes of these meetings will be included in the final EIA Report as **Appendix C8**.
- Telephonic consultation sessions.
- Written, faxed or e-mail correspondence.

Table 7.5: Public involvement during EIA Phase

Activity	Date
Advertising of the availability of the EIA Report for a 30-day review and comment period in the Zululand Observer.	24 June 2022
Distribution of notification letters announcing the availability of the EIA Report for a 30-day review and comment period. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the surrounding area (including neighbouring landowners), registered I&APs and key stakeholder groups.	24 June 2022
30-day review and comment period of the EIA Report.	24 June 2022 to 25 July 2022
Virtual meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: » Landowners » Authorities and key stakeholders (including Organs of State, local municipality and official representatives of community-based organisations). » Where an I&AP does not have access to a computer and/or internet to participate in a virtual meeting telephonic discussions (including WhatsApp video call) will be set-up and minuted for inclusion. The preferred language of the I&AP has been considered when setting up these discussions.	Focus group meetings were held with key stakeholders during the 30-day review and comment period of the EIA Report via a virtual platform, where relevant.

Activity	Date
On-going consultation (i.e., telephone liaison; e-mail communication) with all I&APs.	Throughout the EIA process

iii. Registered I&APs entitled to Comment on the EIA Report

43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

(2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.

44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in sub regulation (1) due to –

(a) A lack of skills to read or write;
(b) Disability; or
(c) Any other disadvantage;

Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database were notified by means of a notification letter of the release of the EIA Report for a 30-day review and comment period, invited to provide comment on the EIA Report, and informed of the manner in which, and timeframe within which such comment must be made. The report was made available in soft copies to I&APs. Hard copies of the report were available on request, on condition that sanitary conditions could be maintained.

The EIA Report was made available on the Savannah Environmental website (i.e., online stakeholder engagement platform) (https://savannahsa.com/public-documents/energy-generation/). A notification letter to all registered parties was distributed prior to commencement of the 30-day review and comment period, on **24 June 2022**. Where I&APs are not able to provide written comments (including SMS and WhatsApp), other means of consultation, such as telephonic discussions and discussions at the information session to be held in the project area were used.

All comments raised as part of the discussions and written comments submitted during the 30-day review and comment period will be recorded and included in **Appendix C** of this Final EIA Report.

iv. Identification and Recording of Comments

Comments raised by I&APs to date have been included into a Comments and Responses (C&R) Report, which is included in **Appendix C9** of this EIA Report. The C&R Report includes detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised. The C&R Report has been updated with all comments received during the 30-day review and comment period of the EIA Report and are included as **Appendix C9** in this Final EIA Report submitted to the DFFE for decision-making.

Notes of all the telephonic discussions, virtual meetings, and the information session conducted during the 30-day review and comment period of the EIA Report are included in **Appendix C8** of the Final EIA Report.

4.5. Outcomes of the DFFE Web-Based Screening Tool

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations 19 and 21 of the EIA Regulations.

The requirement for the submission of a Screening Report (included as **Appendix F**) for the additional footprint associated with the Sannaspos Solar PV Facility is applicable as it triggers Regulation 19 of the EIA Regulations, 2014 (as amended). **Table 4.4** provides a summary of the specialist assessments identified in terms of the screening tool and responses to each assessment from the project team considering the development area under consideration.

Table 4.4: Sensitivity ratings from the DFFE's web-based online Screening Tool

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Agricultural Impact Assessment	High	A specialist Pedology Assessment was undertaken during the scoping phase to assess the soil and land capability on the additional footprint. Although the DFFE screening triggered high sensitivity, the soils specialist has confirmed the sensitivity on the additional footprint to be low and therefore a compliance statement will be provided as part of EIA process. The specialist pedologic report is included in this Scoping Report as **Appendix H.**
Landscape/Visual Impact Assessment	Very high	A visual impact assessment is not required as the additional footprint is adjacent to the authorised area which has already been assessed. The impact is therefore not expected to change.
Archaeological and Cultural Heritage Impact Assessment	High	A Heritage screening study (which covers both archaeological and cultural aspects of project site and development footprint) was undertaken for the PV facility in the scoping phase and concluded that no further assessment was required to be undertaken in the EIA Phase of the process. The Scoping reports were made available to SAHRA for review and comment by the Heritage Specialist. No further comments were received from SAHRA and therefore the findings of the specialist heritage study are acceptable.
Avian Theme	High	An Ecological scoping Assessment (including flora, fauna, wetlands and avifauna) has been undertaken for the additional footprint and is included as **Appendix I** of the Scoping Report. A detailed assessment will be undertaken considering flora, fauna and avifauna in the EIA phase of the process.

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Palaeontology Impact Assessment	Very High	A Heritage screening study (which covers both archaeological and cultural aspects of project site and development footprint) was undertaken for the PV facility in the scoping phase and concluded that no further assessment was required to be undertaken in the EIA Phase of the process.
Terrestrial Biodiversity Impact Assessment	Very high	An Ecological scoping Assessment (including flora, fauna, wetlands and avifauna) has been undertaken for the additional footprint and is included as **Appendix I** of the Scoping Report. A detailed assessment will be undertaken considering flora, fauna and avifauna in the EIA phase of the process.
Aquatic Biodiversity Impact Assessment	High	An Ecological scoping Assessment (including flora, fauna, wetlands and avifauna) has been undertaken for the additional footprint and is included as **Appendix I** of the Scoping Report. Based on the conclusions of this report, no impact assessment is required to be undertaken.
Civil Aviation Assessment	Low	The Civil Aviation Authority will be consulted throughout the EIA process to obtain input.
Defence Assessment	Medium	The South African National Defence Force is located 35km west of the project site in Bloemfontein. Given the distance between the project site and SANDF no impacts are likely to occur.
RFI Assessment	Medium	There are currently no known RFI stations near to the project site. The South African Radio Astronomy Observatory (SARAO) will however be consulted during the 30-day review and comment period of the EIA Report to provide written comment on the proposed development.
Plant Species Assessment	Low	An Ecological scoping Assessment (including flora, fauna, wetlands, and avifauna) has been undertaken for the additional footprint and is included as **Appendix I** of the Scoping Report. A detailed assessment will be undertaken considering flora, fauna and avifauna in the EIA phase of the process.
Animal Species Assessment	Medium	

4.6. Assessment of Issues Identified through the EIA Process

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the Sannaspos Solar PV facility on the additional footprint. Issues were assessed in terms of the following criteria:

- The **nature**, 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, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high);
- The **duration**, wherein it is 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;
- 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);
- 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

» The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is 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);
- Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

» The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
» The **status**, which is 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).

radius of the proposed project. The purpose of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e., whether the addition of the proposed project

in the area will increase the impact). In this regard, specialist studies considered whether the construction of the proposed development will result in:

» Unacceptable risk
» Unacceptable loss
» Complete or whole-scale changes to the environment or sense of place
» Unacceptable increase in impact

A conclusion regarding whether the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

As the proponent has the responsibility to avoid or minimise impacts and plan for their management (in terms of the EIA Regulations, 2014 (as amended)), the mitigation of significant impacts is discussed. An assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. An Environmental Management Programme (EMPr) that includes all the mitigation measures recommended by the specialists for the management of significant impacts is included as **Appendix J**.

4.7. Assumptions and Limitations of the EIA Process

The following assumptions and limitations are applicable to the EIA process for the additional footprint for the Sannaspos Solar PV Facility:

» All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
» It is assumed that the proposed additional footprint for the solar PV facility identified by the developer represents a technically suitable site for the establishment of Sannaspos Solar PV which is based on the design undertaken by technical consultants for the project.
» The development footprint on the proposed additional footprint (the area that will be affected during the operation phase) will include the footprint for the PV facility and associated infrastructure (i.e., solar panels and internal access roads).
» Previously authorised grid connection infrastructure, including the Eskom collector substation, switching station and grid connection power line to Sannaspos Rural 132kV will provide the grid connection solution for the facility, and is not required to be reassessed through this process.

4.8. Legislation and Guidelines

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

» National Environmental Management Act (Act No. 107 of 1998).
» EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended).
» Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations.
» Department of Environmental Affairs (2017), Integrated Environmental Management Guideline: Guideline on Need and Desirability.

- Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation.
- International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines).

Several other Acts, standards or guidelines have also informed the project process and the scope of issues addressed and assessed in this EIA Report. A review of legislative requirements applicable to the proposed project is provided in **Table 4.5**.

Table 4.5: Relevant legislative permitting requirements applicable to the additional footprint

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* ∗ *Prevent pollution and ecological degradation,* ∗ *Promote conservation, and* ∗ *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No 107 of 1998) (NEMA)	The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326). In terms of Section 24(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.	DFFE – Competent Authority Free State Department of Small Business Development, Tourism and Environmental Affairs (DESTEA) – Commenting Authority	The listed activities triggered by the proposed project have been identified and are being assessed as part of the EIA process currently underway for the project.
National Environmental Management Act (No 107 of 1998) (NEMA)	In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA every person who causes, has caused or may cause significant pollution or degradation of the environment must	DFFE DESTEA	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section finds application through the consideration of potential cumulative, direct,

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.		and indirect impacts. It will continue to apply throughout the life cycle of the project.
Environment Conservation Act (No. 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, Free State, Northwest, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces. The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties. In terms of the Noise Control Regulations, no person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04).	DFFE DESTEA Mangaung District Municipality	Noise impacts are expected to be associated with the construction phase of the project. Considering the location of the development area in relation to residential areas and provided that appropriate mitigation measures are implemented, construction noise is unlikely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of the legislation.
National Water Act (No. 36 of 1998) (NWA)	A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1 of the NWA (i.e., is an existing lawful use), is permissible under a GA, or if a responsible authority waives the need for a licence. Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water,	Regional Department of Water and Sanitation	The Sannaspos Solar PV additional footprint is located within the regulated area of thre natural HGM units (unchannelled valley bottom, depression and seepage) present within the development area to the north-east. As a result, a water use authorisation for the project will be required from DWS; however, the process will only be completed

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)). Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks, or characteristics of a watercourse (Section 21(i)).		once a positive EA has been received. This is in line with the requirements from DWS.
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.	Department of Mineral Resources and Energy (DMRE)	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA in this regard is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.		In terms of Section 53 of the MPRDA approval is required from the Minister of Mineral Resources and Energy to ensure that the proposed development does not sterilise a mineral resource that might occur on site.
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM: AQA)	The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and provide a standard for acceptable dust fall rates for residential and non-residential areas.	Free State Department of Small Business Development, Tourism and Environmental Affairs (DESTEA)	In the event that the project results in the generation of excessive levels of dust the possibility could exist that a dust fall monitoring programme would be required for the project, in which case dust fall monitoring results from

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	In accordance with the Regulations (GNR 827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dust fall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dust fall monitoring programme. Any person who has exceeded the dust fall standard set out in Regulation 03 must, within three months after submission of the dust fall monitoring report, develop and submit a dust management plan to the air quality officer for approval.	Mangaung District Municipality	the dust fall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed.
National Heritage Resources Act (No. 25 of 1999) (NHRA)	Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites. Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority. Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from	South African Heritage Resources Agency (SAHRA) Free State Heritage Resource Authority	A Heritage Impact Assessment will be undertaken for the project as per the requirements of Section 38 of the NHRA. The Heritage Impact Assessment will be made available in the EIA Phase. Should a heritage resource be impacted upon, a permit may be required from SAHRA or FSHRA in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	SAHRA for the presentation of archaeological sites as part of tourism attraction.		
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable, and protected species (GNR 151). » TOPS Regulations (GNR 152). It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and 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 (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).	DFFE DESTEA	Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species. An Ecological Impact Assessment undertaken as part of the EIA Phase identified the presence of listed protected species present on site which will require a permit namely; » *Opuntia humifusa* (Low/Eastern/Large Flowered Prickly Pear), The species was widespread, particularly occurring within the central portions of the project area where it was observed forming dominant large clusters. *Opuntia humifusa* competes with and replaces indigenous species. Dense infestations reduce the grazing potential and hence the carrying capacity of the land and the very spiny cladodes adhere to passing animals, and the barbed spines can cause severe injuries. The Alien and Invasive Species Regulations were published in the Government Gazette No. 44182, 24th of February 2021 and the legislation calls for the removal and / or control of AIP species (Category 1 species). Category 1b species require compulsory control as part

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued (refer to **Appendix N**).
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).	DFFE Free State DESTEA	An Ecological Impact Assessment (walkthrough) has been undertaken as part of the EIA Phase to identify the presence of any alien and invasive species present on site. One species was identified (Opuntia humifusa) and as per the specialist recommendation should be removed. No permits were required (refer to **Appendix N**).
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)	Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GN R1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GN R1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.	Department of Agriculture, Land Reform and Rural Development (DALRD)	CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. In terms of Regulation 15E (GN R1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods: » Uprooting, felling, cutting, or burning. » Treatment with a weed killer that is registered for use in connection with such

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			plants in accordance with the directions for the use of such a weed killer. » Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation 4. » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
National Forests Act (No. 84 of 1998) (NFA)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734. 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".	Department of Agriculture, Land Reform and Rural Development (DALRD)	A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals. There are no protected trees present on site which will require a permit.
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association.	DFFE	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it. Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.		operation of Sannaspos Solar PV facility, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes.
Hazardous Substances Act (No. 15 of 1973) (HAS)	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,	Department of Health (DoH)	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored, or handled. If applicable, a license would be required to be obtained from the DoH.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	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 (No. 59 of 2008) (NEM: WA)	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. » 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 NEM:WA (GNR 912), a BA or EIA 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 unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away.	DFFE – Hazardous Waste DESTEA – General Waste	No waste listed activities are triggered by Sannaspos Solar PV facility, therefore, no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM: WA will need to be considered in this regard.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» Nuisances such as odour, visual impacts and breeding of vectors do not arise, and » Pollution of the environment and harm to health are prevented.		
National Road Traffic Act (No. 93 of 1996) (NRTA)	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 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.	South African National Roads Agency (SANRAL) – national roads Free State Department of Transport, Safety and Liaison	An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits required for vehicles carrying abnormally heavy or abnormally dimensioned loads and transport vehicles exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the on-site substation components may not meet specified dimensional limitations (height and width) which will require a permit.
Provincial Policies / Legislation			
Free State Nature Conservation Ordinance (Act No. 8 of 1969)	This Act provides for the sustainable utilisation of wild animals, aquatic biota, and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other	Free State Department of Small Business Development, Tourism and Environmental Affairs (DESTEA)	A collection/destruction permit must be obtained from Free State DAEARD&LR for the removal of any protected plant or animal species found on site.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	authorisations. Amongst other regulations, the following may apply to the current project: » Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; » Aquatic habitats may not be destroyed or damaged; » The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species; The Act provides lists of protected species for the province.		Should these species be confirmed within the additional footprint during any phase of the project, permits will be required. An Ecological Impact Assessment undertaken as part of the EIA Phase identified the presence of listed protected species present on site which will require a permit namely; » *Sagittarius serpentarius (the Secretarybird) (SCC)* – one individual » *Stigmochelys pardalis (the Leopard tortoise)* – one individual » *Ammocharis coranica Karoo Lily* – 25 specimens » *Boophone disticha Poison Bulb* – 60 specimens » *Eucomis autumnalis Pineapple Lily* – 13 specimens » *Olea europaea subsp. africana African Olive* – 3 specimens A General flora permit and General fauna permit has been obtained for the project from DESTEA.

4.8.1 IFC's Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (2015)

While no Industry Sector EHS Guidelines have been developed for PV Solar Power, the IFC has published a Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (IFC, 2015). Chapter 8 of the Project Developer's Guide pertains to Permits, Licensing and Environmental Considerations, and states that in order to deliver a project which will be acceptable to international lending institutions, environmental and social assessments should be carried out in accordance with the requirements of the key international standards and principles, namely the Equator Principles and IFC's Performance Standards (IFC PS).

Some of the key environmental considerations for solar PV power plants contained within the Project Developer's Guide include:

- Construction phase impacts (i.e. OHS, temporary air emissions from dust and vehicle emissions, noise related to excavation, construction and vehicle transit, solid waste generation and wastewater generation from temporary building sites and worker accommodation).
- Water usage (i.e. the cumulative water use requirements).
- Land matters (i.e. land acquisition procedures and the avoidance or proper mitigation of involuntary land acquisition / resettlement).
- Landscape and visual impacts (i.e. the visibility of the solar panels within the wider landscape and associated impacts on landscape designations, character types and surrounding communities).
- Ecology and natural resources (i.e. habitat loss / fragmentation, impacts on designated areas and disturbance or displacement of protected or vulnerable species).
- Cultural heritage (i.e. impacts on the setting of designated sites or direct impacts on below-ground archaeological deposits as a result of ground disturbance during construction).
- Transport and access (i.e. impacts of transportation of materials and personnel).
- Drainage / flooding (i.e. flood risk associated with the site).
- Consultation and disclosure (i.e. consulting with key authorities, statutory bodies, affected communities and other relevant stakeholders as early as possible).
- Environmental and Social Management Plan (ESMP) (i.e. compile an ESMP to ensure that mitigation measures for relevant impacts are identified and incorporated into project construction procedures and contracts).

CHAPTER 5 DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter provides a description of the local environment affected by the proposed additional footprint associated with the Sannaspos Solar PV Facility. This information is provided in order to assist the reader in understanding the possible effects of the project on the environment within which it is proposed to be developed. Aspects of the biophysical, social, and economic environment that could be directly or indirectly affected by, or could affect, the development of the Sannaspos Solar PV Facility on the additional footprint have been described. This information has been sourced from both existing information available for the area as well as collected field data by specialist consultants and aims to provide the context within which this EIA process is being conducted.

5.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of an Impact Assessment Report

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
(h)(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	The environmental attributes associated with the development on the additional footprint is included as a whole within this chapter. The environmental attributes that are assessed within this chapter includes the following: » The regional setting of the broader study area and the project site indicates the geographical aspects associated with the Sannaspos Solar PV additional footprint. This is included in Section 5.2. » The climatic conditions for the Sannaspos area have been included in Section 5.3. » The biophysical characteristics of the project site and the surrounding areas are included in Section 5.3. The characteristics considered are topography and terrain, geology, soils and agricultural potential and the ecological profile which includes the vegetation patterns, listed plant species, critical biodiversity areas and broad-scale processes, freshwater resources, terrestrial fauna, and avifauna. » The heritage and cultural aspects (including archaeology and palaeontology) has been included in Section 5.4. » The social and socio-economic characteristics associated with the broader study area and the project site has been included in Section 5.5

5.2. Regional Setting

The proposed additional footprint for the Sannaspos Solar PV Project is located approximately 5km north-west of the town of Sannaspos in the Mangaung Metropolitan Municipality, in the Free State Province. Sannaspos is the closest town to the study area. Other nearby towns include Bloemfontein (285km to the northwest) and Botshabelo (14.5km to the east). A regional map of the study area and the development area is provided in **Figure 5.1.**

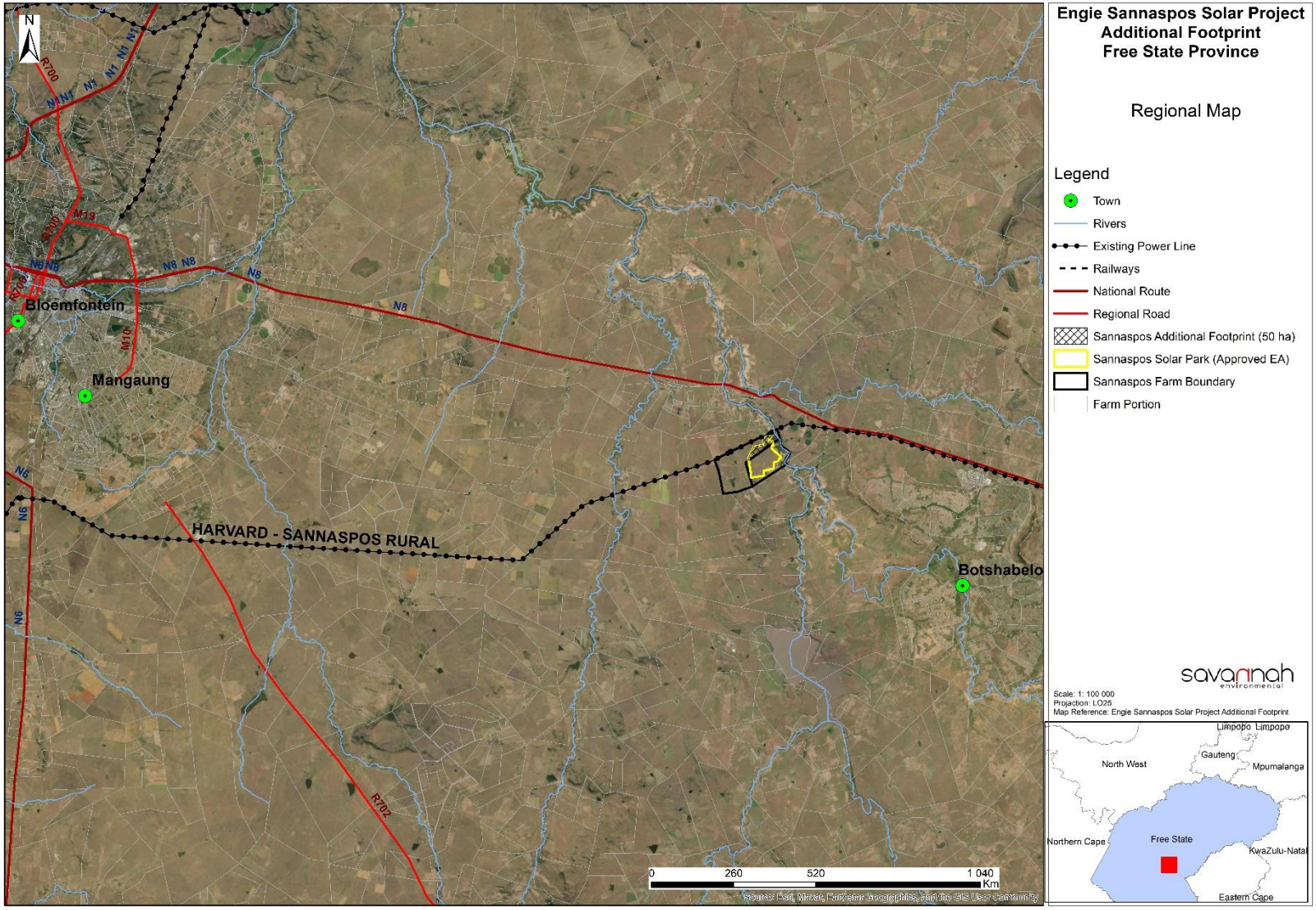


Figure 5.1: Regional map showing the location of the Sannaspos Solar PV additional footprint

The name Mangaung is a Sesotho name meaning 'place of Cheetahs'. It was previously known by the name of its Central Business District, Bloemfontein, which is Dutch for 'fountain of flowers'. Bloemfontein was established as a British Fort in 1846 and is currently the judicial capital of South Africa. Because of its central location and abundance of water it has served as the capital of several peoples including, the Boer, the Griqua (a sub-group of the Khoe-speaking nations) as well as the Barolong who are of Tswana descent.

The Metro is also the birth city of Africa's oldest liberation movement, the African National Congress, which was formed in 1912 at the Wesleyan Church. Two years later, in 1914, the National Party was founded in Bloemfontein. Mangaung, is one of the eight Metropolitan Municipalities in South Africa. It was founded as a Metro in 2011, prior to that it was a local municipality under the Motheo District Municipality. In 2016, the Metro was merged with Naledi Local Municipality to form the current municipal boundaries.

Mangaung Metropolitan Municipality is centrally located within the Free State Province, the central interior of South Africa. Mangaung shares its boundaries with the Districts of Lejweleputswa to its north, Thabo Mofutsanyane to its northeast and Xhariep to its south. To its southeast, Mangaung shares a border with Lesotho. The Mangaung Metropolitan Municipality is accessible via National infrastructure including the N1 (which links Bloemfontein to Gauteng to the north and Western Cape to the southwest), the N6 (which links Bloemfontein to the Eastern Cape), and the N8 (which links to Lesotho in the east and with the Northern Cape to the west).

Mangaung covers an area of 9 886 km² and has three urban centres (Bloemfontein, Botshabelo and Thaba Nchu) and a surrounding rural area with small towns namely, Dewetsdorp, Wepener, Van Stadensrus and Soutpan/Ikgomotseng. The rural area makes up the largest percentage (97.17%) of the entire municipal area and is characterised by extensive commercial farming in the west, mainly mixed crop production and cattle farming. The Metro is characterised by three different land use types including formalised stands in urban areas, small holdings, and farms.

The topography of Mangaung Metropolitan Municipality is relatively flat with altitudes varying between 1220m to 2120m above sea level. Mangaung is located partly in the Nama Karoo and the Grasslands Biome. The Nama Karoo biome is more to the west with less rainfall compared to grassland biome towards the east. This area is characterised by lime soil with most of the land suitable for grazing.

The eastern part is dominated by Grasslands Biome. Here, frost, fire and grazing maintain the grass dominance and inhibit the establishment of trees. Two types of grass plants are common here: sweet grasses and sour grasses. Sweet grasses have lower fibre content; maintain nutrients in the leaves during winter, and as a result palatable to stock. Sour grasses are the opposite of the sweet grasses and have higher fibre content, withdraw nutrients during winter and become unpalatable to stock. The Grassland Biome is good for dairy, beef, and wool production. Grass plants tolerate grazing, fire, and mowing. Overgrazing increases creeping grasses. Maize crop thrives in Grassland Biome. Sorghum, wheat, and sunflowers are farmed on a smaller scale.

The closest main access road to the proposed development site is the N8 which is a Regional Route between Bloemfontein and Ladybrand. The project development site is accessible from the N8 highway towards Botsabelo linking into a secondary road S417 (gravel) and an existing access road (gravel) on the proposed farm portion, this will be upgraded and used to access the facility site. Upgrade of access roads within the site and new access roads will be required. These are already authorised for the Sannaspos PV Facility.

The development area is situated south of the Harvard Sannaspos Rural 132kV power line (overhead servitude line). The site is characterised by open grassland to uneven surface bisected by a number of shallow drainage basins. Land use in the general area is dominated by low intensity cattle farming.

Three other Solar PV developments are located in the larger study area. The Terra Works PV facility and Sannaspos PV facility connect to the Harvard Sannaspos Rural servitude.

5.3. Climatic Conditions

The study area is characterised by a summer rainfall with a Mean Annual Precipitation (MAP) of 560 mm which peaks in December and January. The Mean Annual Temperature has been calculated at approximately 15°C with a relatively high frost occurrence (Mucina & Rutherford, 2006).

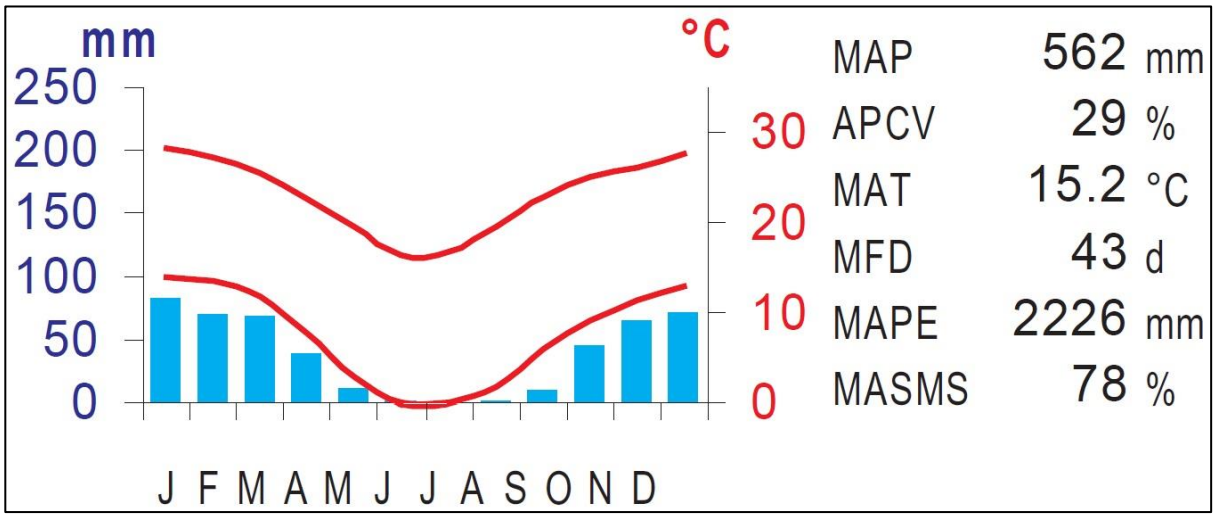


Figure 5.2: Climate Table of Sannaspos

5.4. Biophysical Characteristics of the Study Area and Development Area

5.4.2. Geology, Soils and Agricultural Potential

The project area is located 5km north-west of Sannaspos and is 1.3 km south of the N8 road. Presently, the project area is surrounded by the Modder River, agricultural fields, and some open natural areas. The agricultural potential of the soils underlying the development site is considered medium-low under dryland (650mm/y rainfall) and irrigation conditions. The site is predominantly underlain by mudstone and Dolerite formation **(refer to Figure 5.5)**

i. Soils and Geology

According to the land type database (Land Type Survey Staff, 1972 - 2006) the development falls within the Dc 17 land type. The Dc land type is characterised by prismacutanic and/or pedocutanic diagnostic horizons with the addition of one or more of the following; Vertic, melanic and red structured diagnostic horizons. The Fc 17 land type terrain units and expected soils are illustrated in Figure 5.3 and Table 5.1.

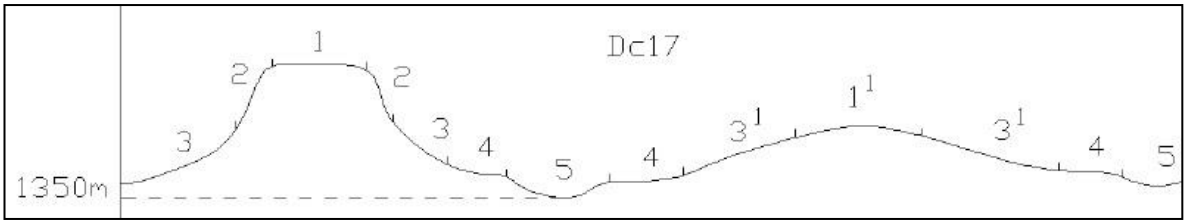


Figure 5.3: Illustration of land type Dc 17 terrain units (Land Type Survey Staff, 1972 - 2006

Table 5.1: Soils expected at the respective terrain units within the Dc 17 land type (Land Type Survey Staff, 1972 - 2006)

Terrain units							
1 (18%)		3 (52%)		4 (20%)		5 (9%)	
Swartland	50%	Bare Rock	65%	Swartland	35%	Milkwood	18%
Valsrivier	25%	Hutton	15%	Valsrivier	30%	Swartland	16%
Sterkspruit	20%	Shortlands	10%	Milkwood	20%	Valsrivier	16%
Glenrosa	5%	Sterkspruit	10%	Bonheim	7%	Oakleaf	16%
		Glenrosa	11%	Estcourt	5%	Streambeds	14%
		Bonheim	11%	Arcadia	3%	Bonheim	12%
		Valsrivier	6%			Arcadia	5%
		Westleigh	5%			Estcourt	3%

The Adelaide Subgroup's Sandstone and Sedimentary mudstone are found in the extreme northern section of this vegetation type together with that of the Ecca Group. This geology gives rise to Melanic, Vertic and red soils typically from the Dc land type (Mucina and Rutherford, 2006).

ii. Agricultural Potential

Land capability and agricultural potential are determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long-term sustainable use of land under rain-fed conditions. At the same time an indication is given about the permanent limitations associated with the different land use classes.

Land capability is divided into eight classes, and these may be divided into three capability groups. Table 5.2 shows how the land classes and groups are arranged in order of decreasing capability and ranges of use. The risk of use and sensitivity increases from class I to class VIII (Smith, 2006).

Table 5.2: Land capability class and intensity of use (Smith, 2006)

Land Capability Class	Increased Intensity of Use									Land Capability Groups
I	W	F	LG	MG	IG	LC	MC	IC	VIC	Arable Land
II	W	F	LG	MG	IG	LC	MC	IC		
III	W	F	LG	MG	IG	LC	MC			
IV	W	F	LG	MG	IG	LC				
V	W	F	LG	MG						Grazing Land
VI	W	F	LG	MG						
VII	W	F	LG							
VIII	W									Wildlife
W - Wildlife		MG - Moderate Grazing			MC - Moderate Cultivation					
F- Forestry		IG - Intensive Grazing			IC - Intensive Cultivation					
LG - Light Grazing		LC - Light Cultivation			VIC - Very Intensive Cultivation					

Land capability has been classified into 15 different categories by DAFF (2017) which indicates the national land capability category and associated sensitivity related to soil resources. Given the fact that ground truthing and DSM exercises have indicated anomalies in the form of high sensitivity soil resources (which was not indicated by the DAFF (2017) raster file), the ground-truthed baseline delineations and sensitivities were used for this assessment rather than that of DAFF (2017).

The land potential classes for the project site are determined by combining the land capability results and the climate capability of a region as shown in **Table 5.3.** land potential results are then described in **Table 5.4.** The site has been determined as land potential level 6. This land potential level is characterised by very restricted potential. Regular and/or severe limitations are expected due to soil, slope, temperatures or rainfall. This land potential is regarded as non-arable.

Table 5.3: The combination table for land potential classification for the project site

Land capability class	Climate capability class							
	C1	C2	C3	C4	C5	C6	C7	C8
I	L1	L1	L2	L2	L3	L3	L4	L4
II	L1	L2	L2	L3	L3	L4	L4	L5
III	L2	L2	L3	L3	L4	L4	L5	L6
IV	L2	L3	L3	L4	L4	L5	L5	L6
V	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei
VI	L4	L4	L5	L5	L5	L6	L6	L7
VII	L5	L5	L6	L6	L7	L7	L7	L8
VIII	L6	L6	L7	L7	L8	L8	L8	L8

Table 5.4: The Land Potential Classes

Land potential	Description of land potential class
L1	Very high potential: No limitations. Appropriate contour protection must be implemented and inspected.

Land potential	Description of land potential class
L2	High potential: Very infrequent and/or minor limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected.
L3	Good potential: Infrequent and/or moderate limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected.
L4	Moderate potential: Moderately regular and/or severe to moderate limitations due to soil, slope, temperatures or rainfall. Appropriate permission is required before ploughing virgin land.
L5	Restricted potential: Regular and/or severe to moderate limitations due to soil, slope, temperatures or rainfall.
L6	Very restricted potential: Regular and/or severe limitations due to soil, slope, temperatures or rainfall. Non-arable
L7	Low potential: Severe limitations due to soil, slope, temperatures or rainfall. Non-arable
L8	Very low potential: Very severe limitations due to soil, slope, temperatures or rainfall. Non-arable

Fifteen land capabilities have been digitised by (DAFF, 2017) across South Africa, of which eight potential land capability classes are located within the proposed footprint area's assessment corridor, including;

» Land Capability 1 to 5 (Very Low to Low Sensitivity); and
» Land Capability 6 to 8 (Low/Moderate to Moderate Sensitivity).

The baseline findings and the sensitivities as per the Department of Agriculture, Forestry and Fisheries (DAFF, 2017) national raster file concur with one another. It therefore is the specialist's opinion that the land capability and land potential of the resources in the regulated area is characterised by a maximum of "Moderate" sensitivities, which conforms to the requirements of an agricultural compliance statement only.

In addition, some crop boundary areas have been identified by means of the DEA Screening Tool (2021). These areas have been classified as having high sensitivity. It is worth noting that these sensitivities are not associated with the potential of soil resources but rather the presence of crop field land uses. It is therefore recommended that stakeholder engagement be undertaken to discuss potential compensation for the transformation of crop fields to PV associated infrastructure.

iii. Land use and carrying capacity

The current land-use is restricted to low intensity grazing. The natural grazing capacity of the larger farm is between 41 and 60 ha per stock unit. For the project development area, this figure is approximately 45 ha per stock unit (or 7.5 ha per Small Stock Unit (SSU) i.e. about 107 sheep for the total development area of the project). The low rainfall, high potential evaporation, high maximum and low minimum temperatures, coupled with shallow soils covering most of the site, limits any alternative land-use activities. A number of non-perennial drainage lines are present, but the dominant source of water for agricultural purposes is groundwater.

5.4.3. Ecological Profile of the Study Area and the Development Area

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features are summarised in **Table 5.5.**

Table 5.5 Summary of relevance of the proposed project to ecologically important landscape features.

Desktop Information Considered	Relevant/Irrelevant
Ecosystem Threat Status	Relevant – Overlaps with a Least Concern ecosystem
Ecosystem Protection Level	Relevant – Overlaps with a Poorly Protected Ecosystem
Protected Areas	Irrelevant – 6.2 km from the closest Protected Area (Rustfontein Nature Reserve)
Renewable Energy Development Zones	Irrelevant - The project area falls 66 km from the closest REDZ
National Protected Areas Expansion Strategy	Relevant – The project area overlaps with a NPAES
Important Bird and Biodiversity Areas	Irrelevant – Located 60 km from the Soetdoring Nature Reserve IBA
South African Inventory of Inland Aquatic Ecosystems	Relevant - The project area overlaps with a CR river.
National Freshwater Priority Area	Relevant – The project area overlaps with non FEPA wetlands and a non FEPA river.
Strategic Water Source Areas	Irrelevant- The project area is 86 km from the closest SWSA
South African Renewable Energy EIA Application (REEA)	Relevant – Overlaps with an application that has a status of "Amendment"

i. Ecosystem Threat Status

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset the proposed project overlaps with a LC ecosystem (**Figure 5.4**).

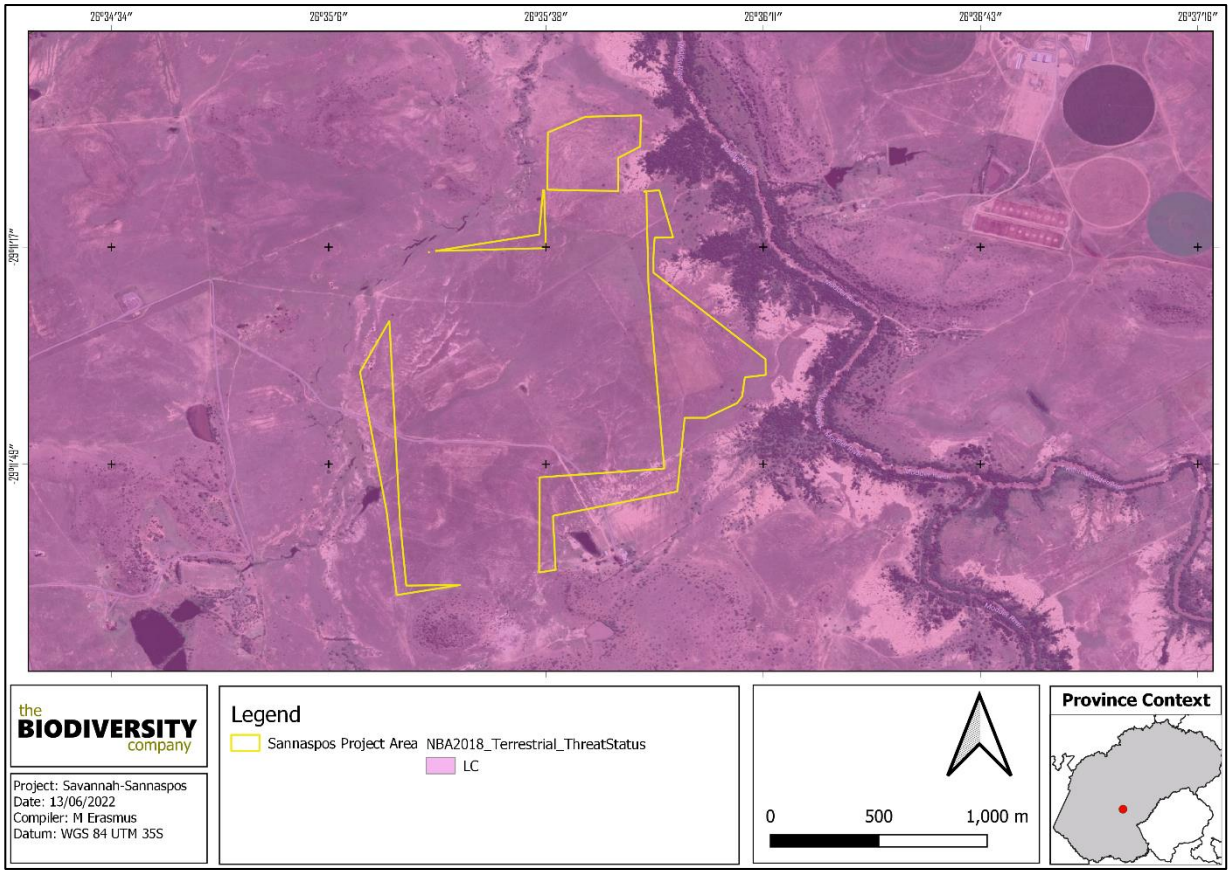


Figure 5.4 Map illustrating the ecosystem threat status associated with the project area.

ii. Ecosystem Protection Level

This is an indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The proposed project overlaps with a PP ecosystem (**Figure 5.5**).

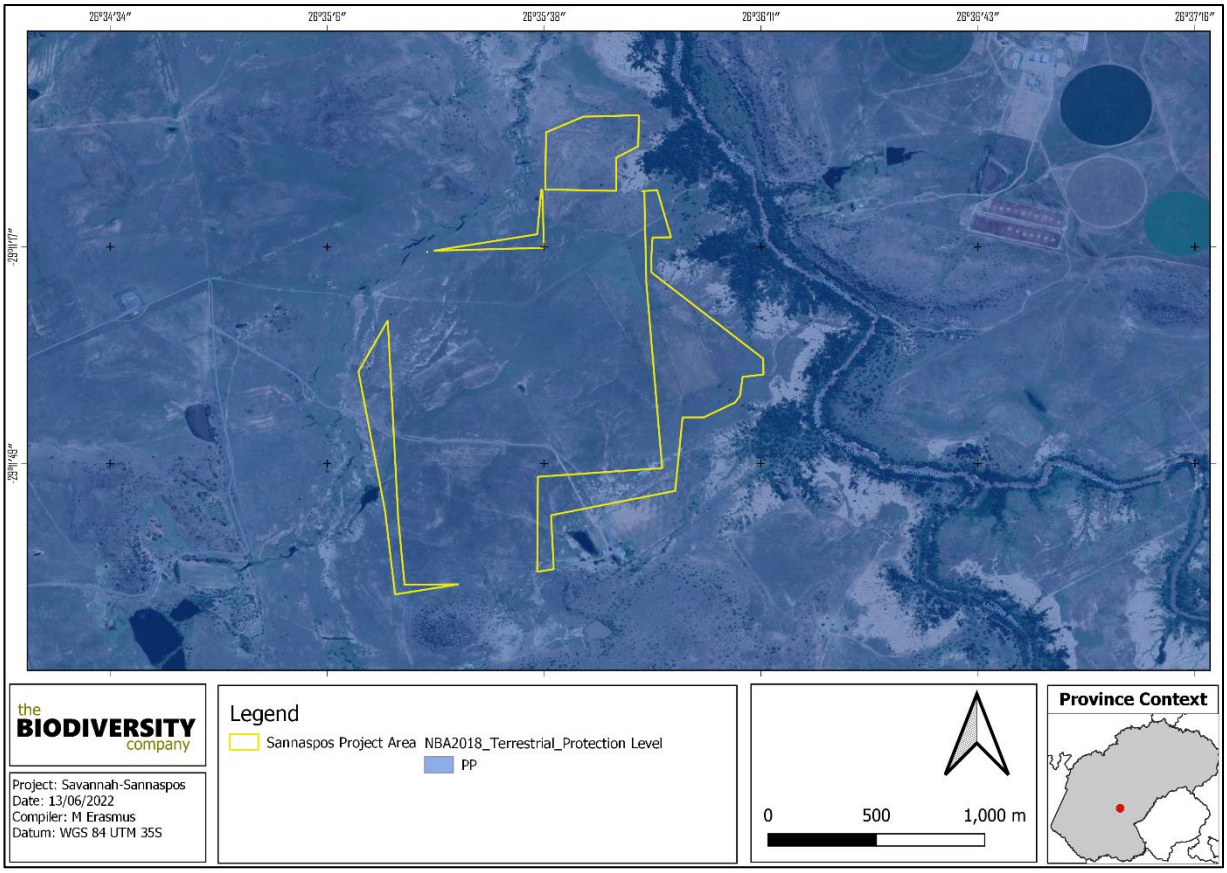


Figure 5.5 Map illustrating the ecosystem protection level associated with the project area

iii. Critical Biodiversity Areas and Ecological Support Areas

It is important to note that the Critical Biodiversity Areas (CBA) map accounts for terrestrial fauna and flora only. The inclusion of the aquatic component was limited to the Freshwater Ecosystem Priority Areas (FEPA) catchments (included in the cost layer and for the identification of Ecological Support Areas (ESAs)) and wetland clusters (included in the ESAs only).

A CBA is considered a significant and ecologically sensitive area and needs to be kept in a pristine or near-natural state to ensure the continued functioning of ecosystems (SANBI, 2017). A CBA represents the best choice for achieving biodiversity targets. ESAs are not essential for achieving targets, but they play a vital role in the continued functioning of ecosystems and often are essential for proper functioning of adjacent CBAs.

Figure 5.6 shows the project area superimposed on the Terrestrial CBA map. The project area overlaps with an ESA1 and an ESA2 area.

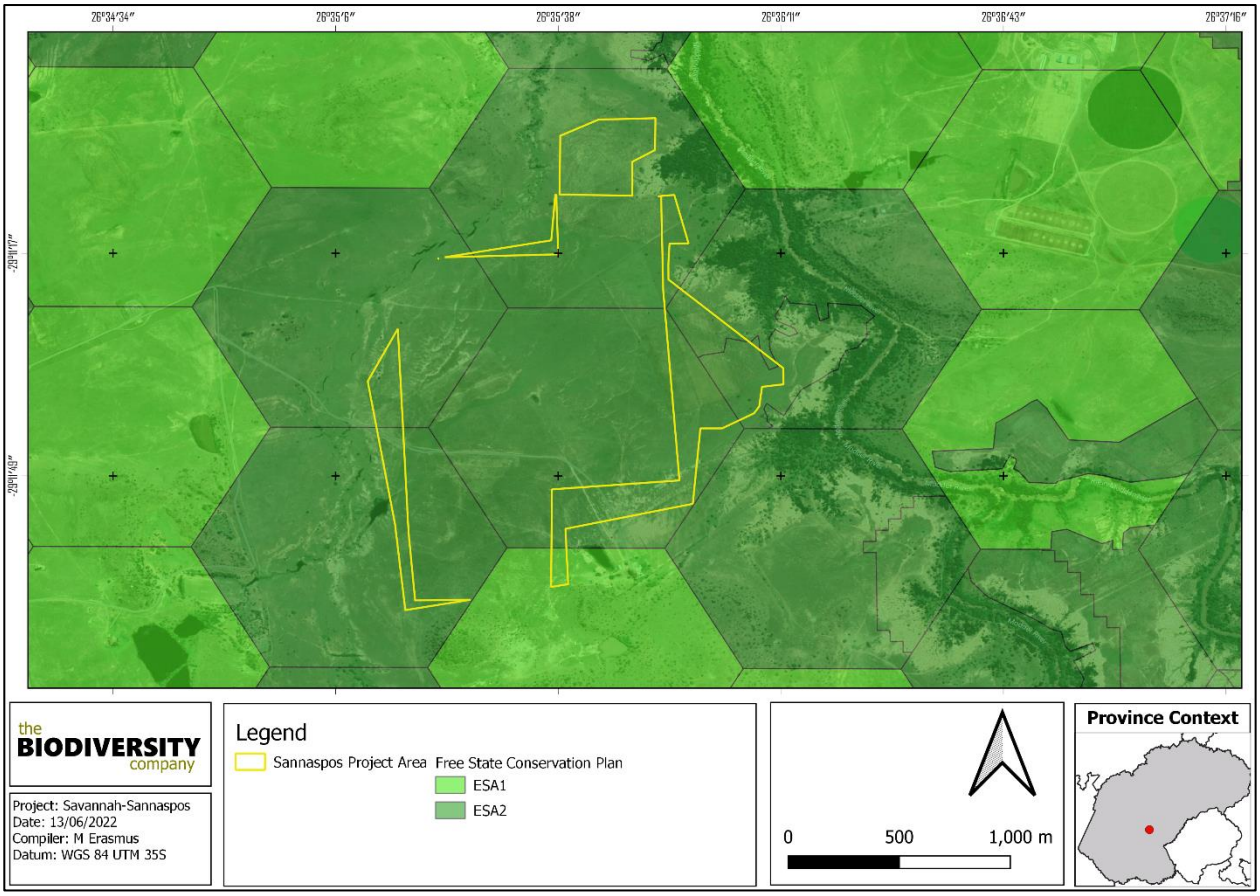


Figure 5.6 Map illustrating the locations of CBAs in the project area

iv. National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2010 (NPAES) were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for finescale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2010). The project area overlaps with a NPAES area as can be seen in Figure 5.7.

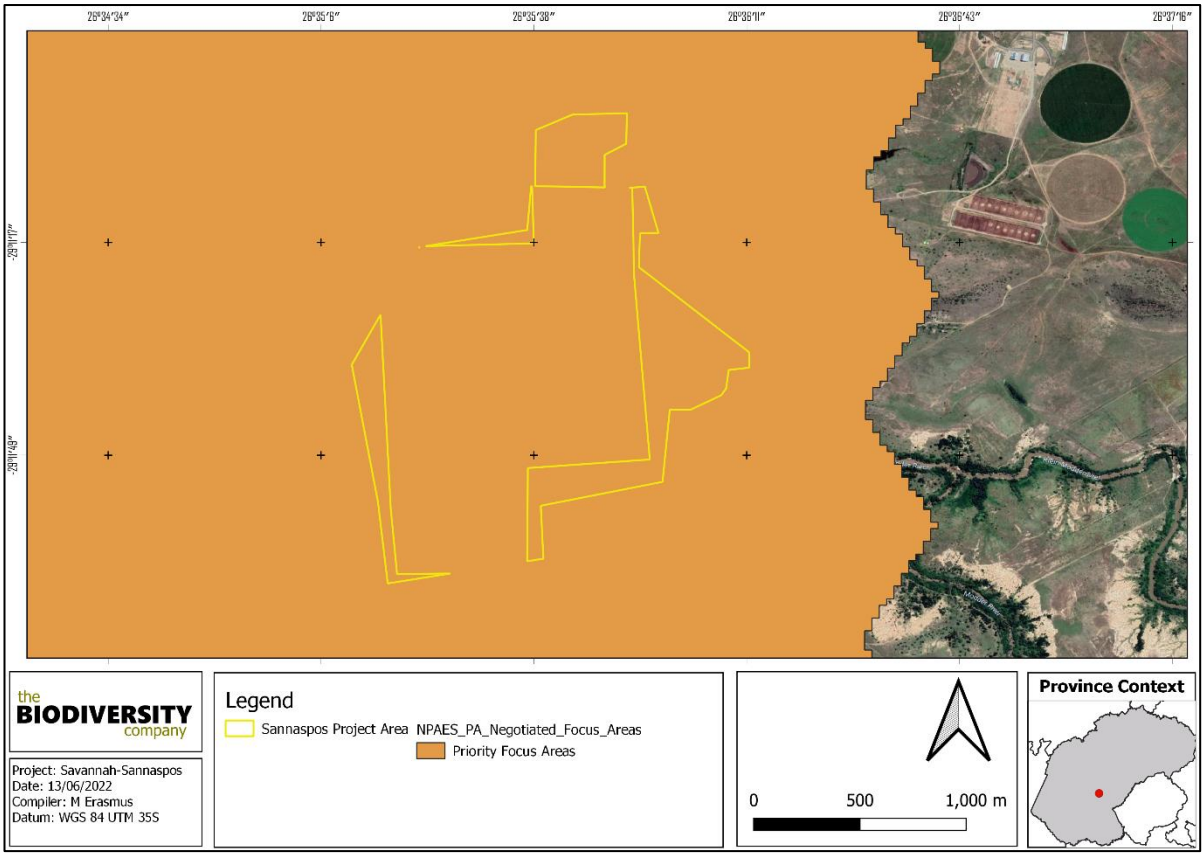


Figure 5.7 The project area in relation to the National Protected Area Expansion Strategy

v. Hydrological Setting

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.,* 2019; Skowno *et al.,* 2019). The project area does not overlap with a CR river, however it occurs within the 500 m regulated area of the Modder River (Figure 5.8).

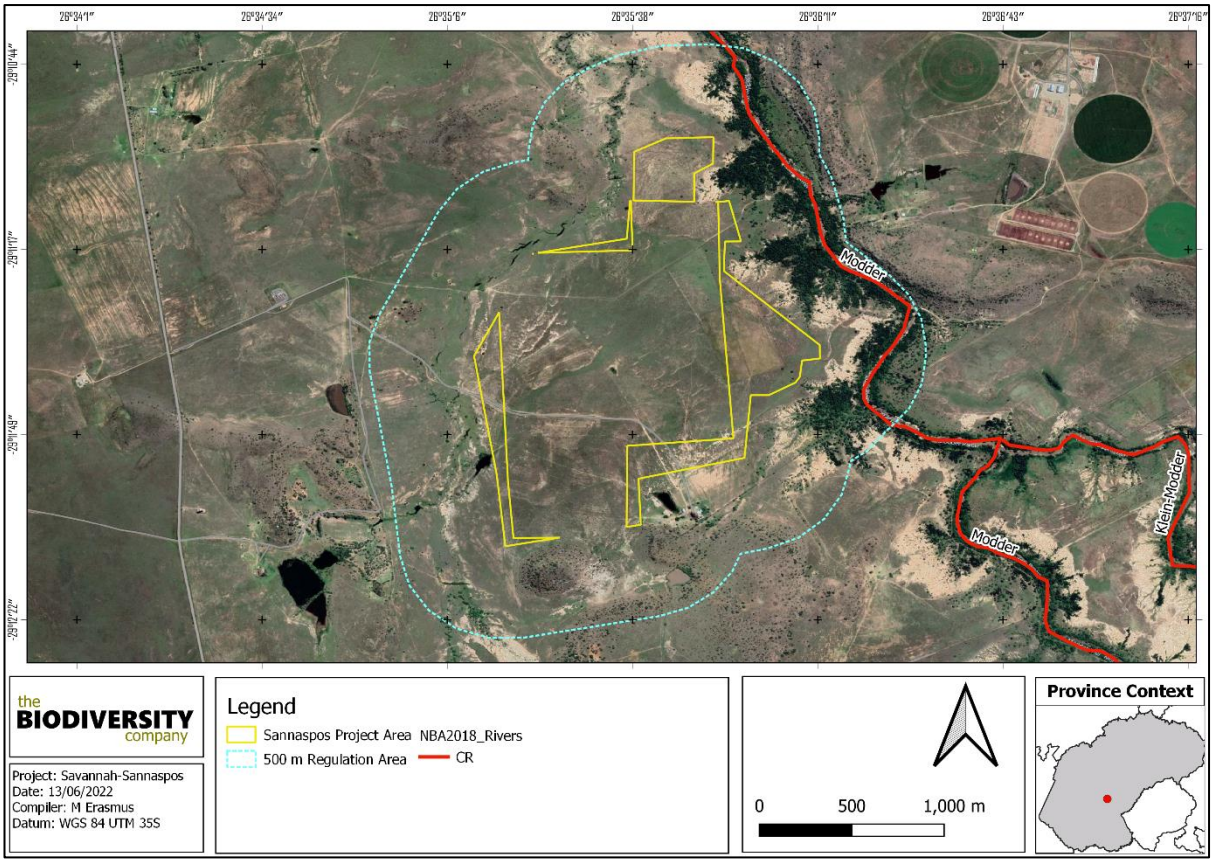


Figure 5.8 Map illustrating ecosystem threat status of rivers and protection level of wetland ecosystems in the project area

vi. National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.*, 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al.*, 2011). Figure 5.9 shows the 500 m regulated area overlaps with non-FEPA wetlands and a non-FEPA river.

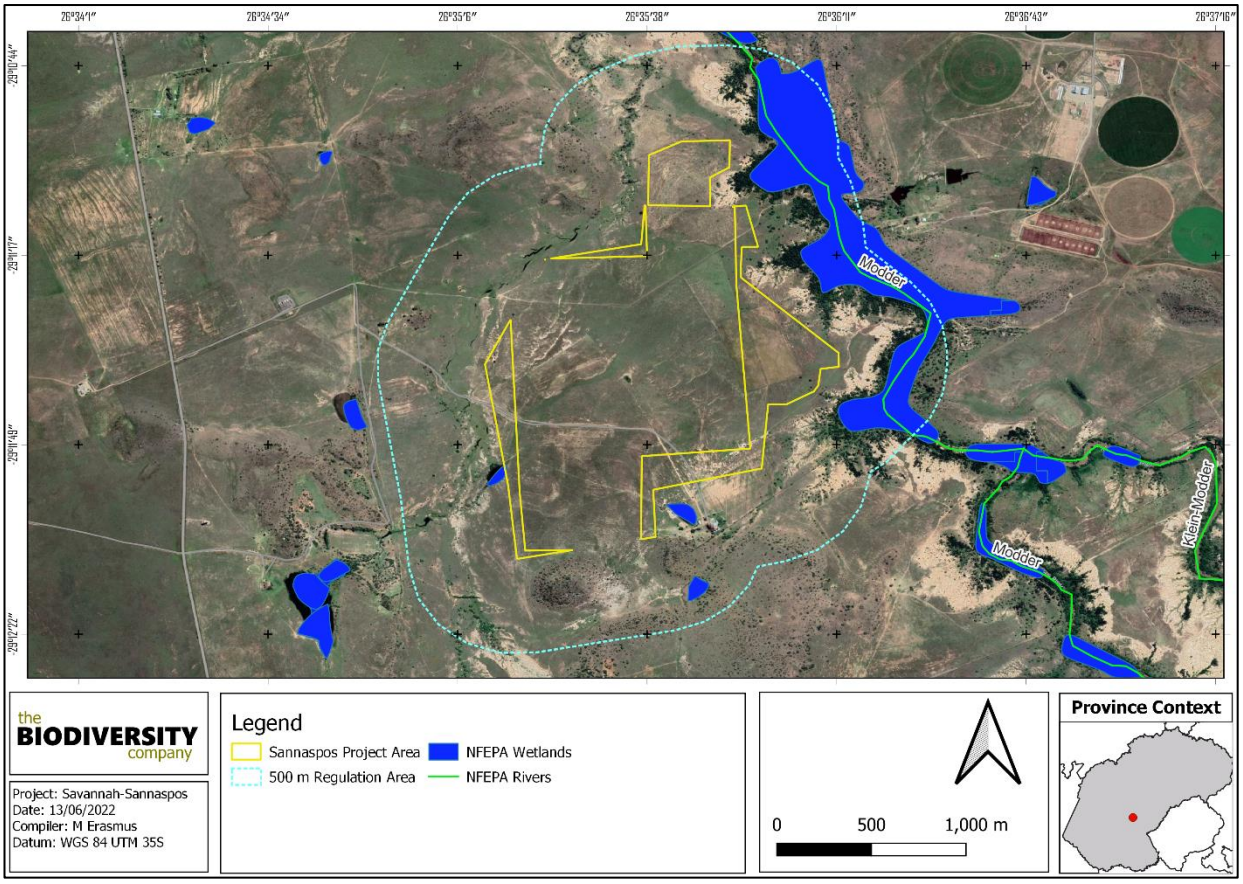


Figure 5.9 The project area in relation to the National Freshwater Ecosystem Priority Areas, River lines and Inland water areas

vii. Inland Water Features

A review of river lines and water bodies for quarter degree squared (QDS) 2926 indicated the presence of a number of drainage lines, a river line and inland water areas (dams) within the project area and 500m regulatory area (**Figure 5.10**).

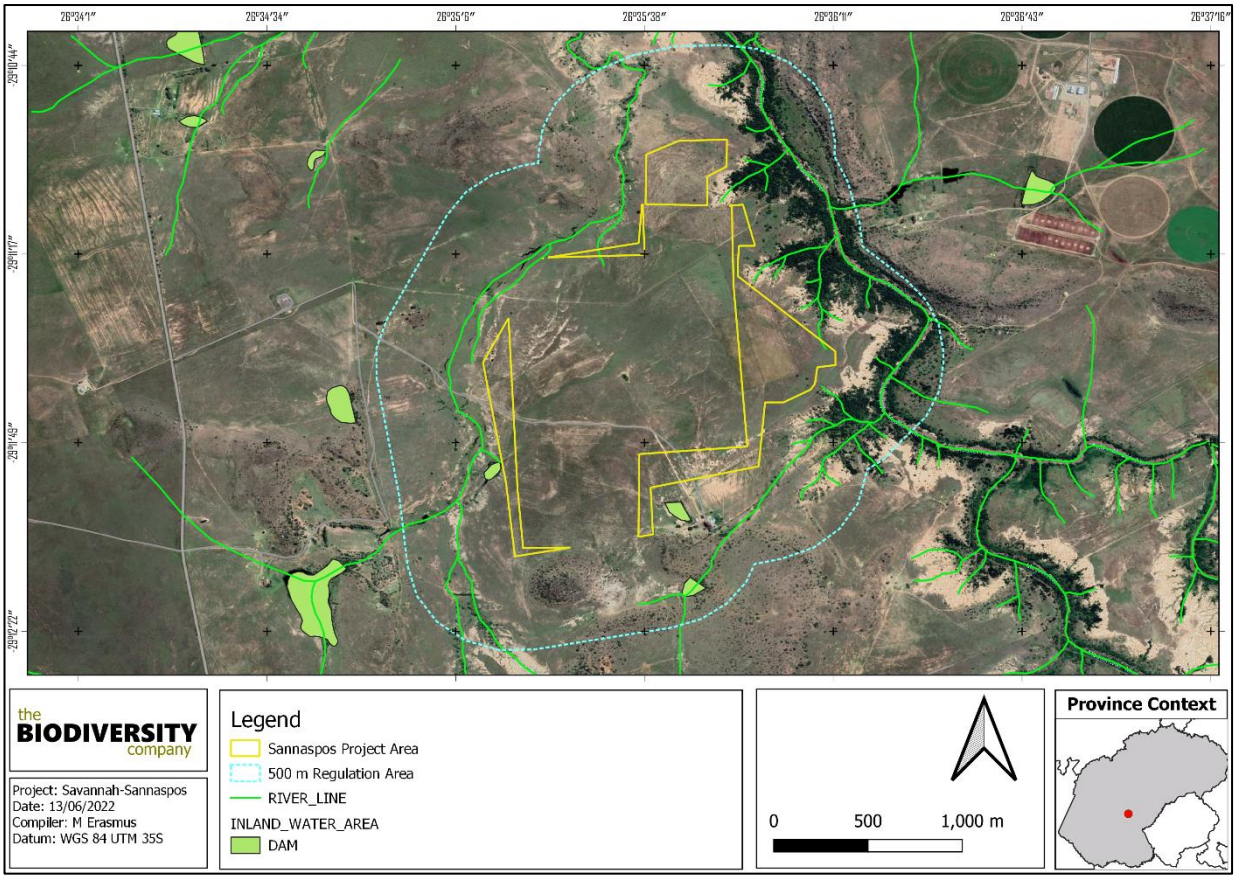


Figure 5.10 The inland water features associated with the project area

viii. Vegetation Type

The project area is situated within the Grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the grassland biome include:

a) Seasonal precipitation; and
b) The minimum temperatures in winter (Mucina & Rutherford, 2006).

The grassland biome is found chiefly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level.

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

On a fine-scale vegetation type, the project area overlaps with the Central Free State Grassland (**Figure 5.11**).

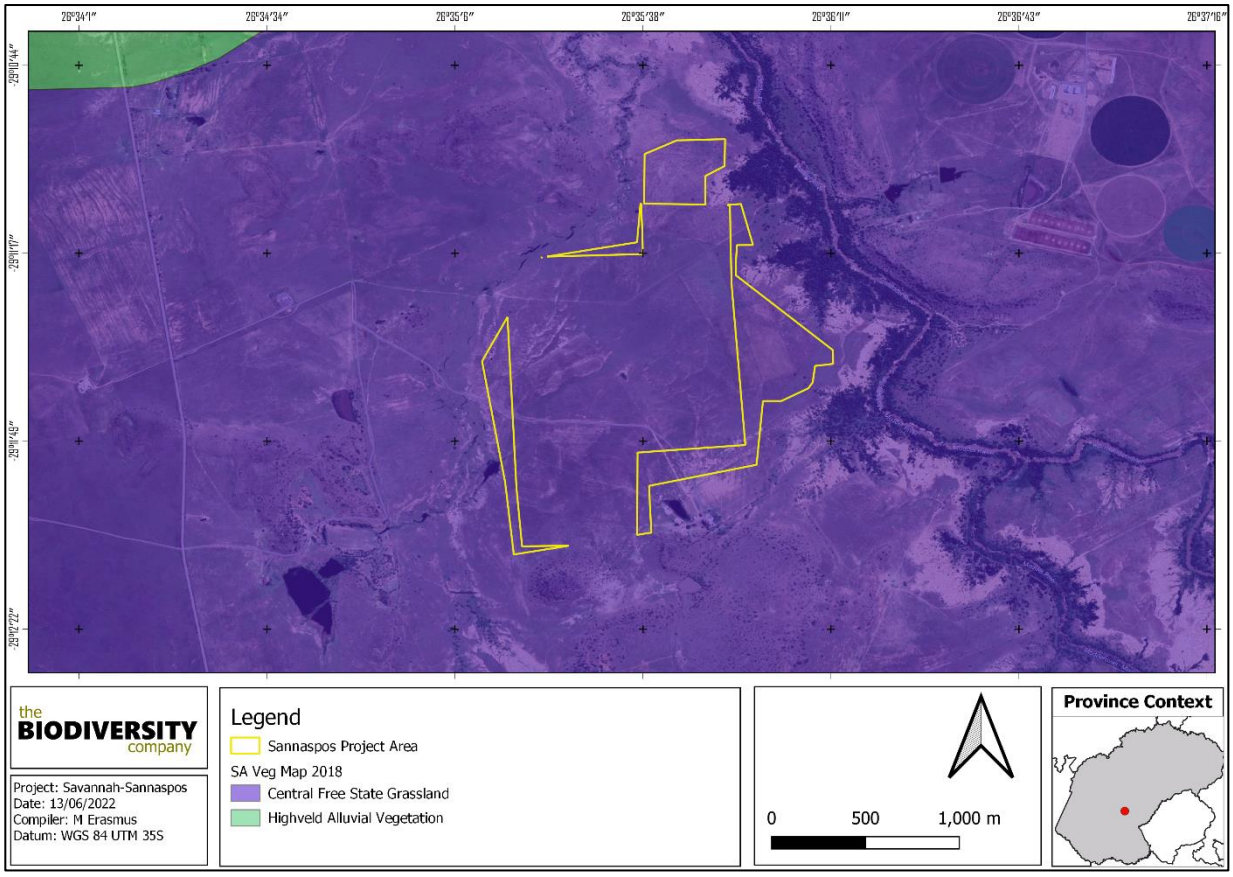


Figure 5.11 Map illustrating the vegetation type associated with the project area

Central Free State Grassland

Central Free State Grassland is undulating plains supporting short grassland, in natural condition dominated by *Themeda triandra* while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats.

The following species are important in the **Central Free State Grassland** vegetation type (d = dominant species):

- **Graminoids:** *Aristida adscensionis* (d), *A. congesta* (d), *Cynodon dactylon* (d), *Eragrostis chloromelas* (d), *E. curvula* (d), *E. plana* (d), *Panicum coloratum* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Tragus koelerioides* (d), *Agrostis lachnantha*, *Andropogon appendiculatus*, *Aristida bipartita*, *A. canescens*, *Cymbopogon pospischilii*, *Cynodon transvaalensis*, *Digitaria argyrograpta*, *Elionurus muticus*, *Eragrostis lehmanniana*, *E. micrantha*, *E. obtusa*, *E. racemosa*, *E. trichophora*, *Heteropogon contortus*, *Microchloa caffra*, *Setaria incrassata*, *Sporobolus discosporus*.
- **Herbs:** *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Conyza pinnata*, *Crabbea acaulis*, *Geigeria aspera* var. *aspera*, *Hermannia depressa*, *Hibiscus pusillus*, *Pseudognaphalium luteo-album*, *Salvia stenophylla*, *Selago densiflora*, *Sonchus dregeanus*.
- **Geophytic Herbs:** *Oxalis depressa*, *Raphionacme dyeri*.
- **Succulent Herb:** *Tripteris aghillana* var. *integrifolia*.
- **Low Shrubs:** *Felicia muricata* (d), *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *Melolobium candicans*, *Pentzia globosa*.

Conservation Status of the Vegetation Type

The national conservation target for the Central Free state Grassland is 24%. Only small portions are currently under protected under statutory conservation (Willem Pretorius, Rustfontein and Koppies Dam Nature Reserves) with some protection in private nature reserves. The conservation status of this vegetation community was listed by Mucina and Rutherford (2006) as Vulnerable.

Expected Flora Species

The POSA database indicates that 408 species of indigenous plants are expected to occur within the project area. Appendix A of the ecology report included in **Appendix I** provides the list of species and their respective conservation status and endemism. None of the species expected are species of conservation concern (SCC).

ix. Faunal Species

Amphibians
Based on the IUCN Red List Spatial Data and AmphibianMap, 17 amphibian species are expected to occur within the area (Appendix B). None of the species are SCCs. One of the species are SCCs (Table 5.5).

Table 0.6 Threatened amphibian species that are expected to occur within the project area

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Pyxicephalus adspersus	Giant Bullfrog	NT	LC	Moderate

The Giant Bull Frog (*Pyxicephalus adspersus*) is a species of conservation concern that may potentially occur in the project area. The Giant Bull Frog is listed as NT on a regional scale. It is a species of drier savannahs. It is fossorial for most of the year, remaining buried in cocoons. They emerge at the start of the rains, and breed in shallow, temporary waters in pools, pans and ditches (IUCN, 2017). This species may occur in this area, rated as moderate likelihood.

Reptiles
Based on the IUCN Red List Spatial Data and the ReptileMAP database, 51 reptile species are expected to occur within the area (refer to Appendix C of the ecology report included in **Appendix I**. One (1) is regarded as threatened (Table 5.7).

Table 0.7 Threatened reptile species that are expected to occur within the project area

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Homoroselaps dorsalis	Striped Harlequin Snake	NT	LC	Low

Homoroselaps dorsalis (Striped Harlequin Snake) is partially fossorial and known to inhabit old termitaria in grassland habitat (IUCN, 2017). Most of its range is at moderately high altitudes, reaching 1 800 m in Mpumalanga and Swaziland, but it is also found at elevations as low as about 100 m in KwaZulu-Natal. The likelihood of occurrence on the site is low.

Mammals

The IUCN Red List Spatial Data lists 65 mammal species that could be expected to occur within the area (refer to Appendix D of the ecology report included in **Appendix I.** This list excludes large mammal species that are limited to protected areas. Eleven (11) of these expected species are regarded as threatened (Table 5.8), eight of these have a low likelihood of occurrence based on the lack of suitable habitat and food sources in the project area.

Table 0.8 Threatened mammal species that are expected to occur within the project area.

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Aonyx capensis	Cape Clawless Otter	NT	NT	Moderate
Atelerix frontalis	South Africa Hedgehog	NT	LC	Low
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT	Low
Felis nigripes	Black-footed Cat	VU	VU	Moderate
Hydrictis maculicollis	Spotted-necked Otter	VU	NT	Low
Leptailurus serval	Serval	NT	LC	Moderate
Mystromys albicaudatus	White-tailed Rat	VU	EN	Low
Panthera pardus	Leopard	VU	VU	Low
Parahyaena brunnea	Brown Hyaena	NT	NT	Low
Poecilogale albinucha	African Striped Weasel	NT	LC	Low
Redunca fulvorufula	Mountain Reedbuck	EN	LC	Low

Aonyx capensis (Cape Clawless Otter) is the most widely distributed otter species in Africa (IUCN, 2017). This species is predominantly aquatic, and it is seldom found far from water. Based on the presence of the Modder Rivier on the edge of the project area which provides suitable habitat the species were given a moderate likelihood of occurrence.

Felis nigripes (Black-footed cat) is endemic to the arid regions of southern Africa. This species is naturally rare, has cryptic colouring is small in size and is nocturnal. These factors have contributed to a lack of information on this species. Given that the highest densities of this species have been recorded in the more arid Karoo region of South Africa, the habitat in the project area can be considered to be sub-optimal for the species and the likelihood of occurrence is rated as moderate.

Leptailurus serval (Serval) occurs widely through sub-Saharan Africa and is commonly recorded from most major national parks and reserves (IUCN, 2017). The Serval's status outside reserves is not certain, but they are inconspicuous and may be common in suitable habitat as they are tolerant of farming practices provided there is cover and food available. In sub-Saharan Africa, they are found in habitat with well-watered savanna long-grass environments and are particularly associated with reedbeds and other riparian vegetation types. Large areas of grasslands are present in the project area and as such the likelihood of occurrence is rated as moderate.

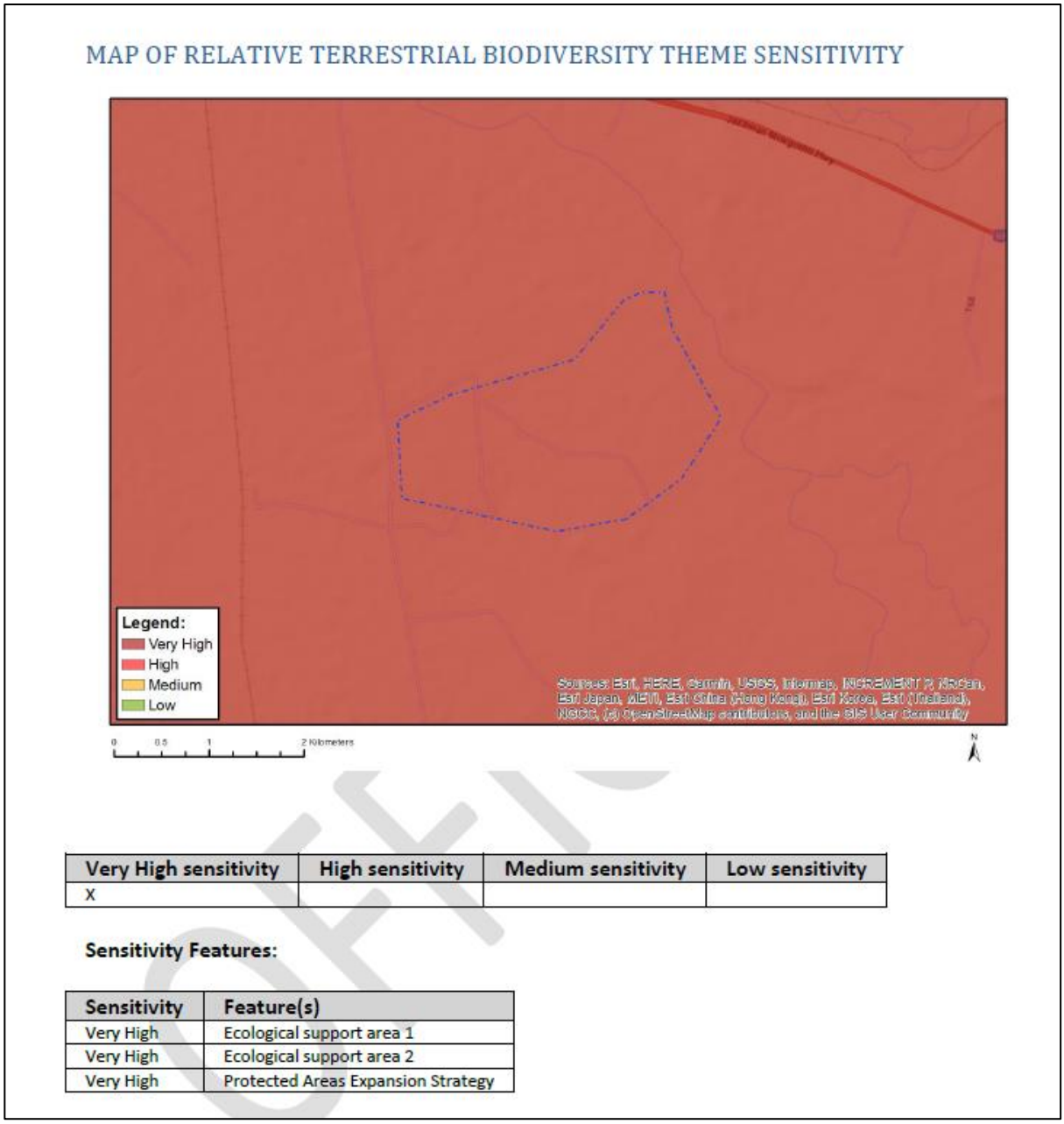
Avifauna

The SABAP2 Data lists 128 avifauna species that could be expected to occur within the area. During the field survey, twenty-nine (29) (22.6 % of expected) species were recorded in the project area during the survey based on either direct observation, vocalisations, or the presence of visual tracks & signs. One (1) species rated as threatened, whereas 20 were listed as protected provincially.

Sagittarius serpentarius (Secretarybird) inhibits open landscapes such as grasslands, open plains, and lightly wooded savanna. It is also found in agricultural areas and sub-desert (BirdLife International, 2020). The species breeds typically nesting in a flat-topped Acacia (Vachellia) or other thorny tree, where it constructs a flattened stick structure throughout the year. The species are susceptible to negative impacts from collisions with fence lines and electric cables (Whitecross et al. 2019) with 94 power-line fatalities have been recorded in 20 years by the Endangered Wildlife Trust (A. Botha in litt. 2020).

x. Site Ecological Importance

The biodiversity theme sensitivity, as indicated in the DFFE screening report, was derived to be Very High, mainly due to the project area being with an ESA (**Figure 5.12**).



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	Ecological support area 1
Very High	Ecological support area 2
Very High	Protected Areas Expansion Strategy

Figure 0.12 Terrestrial Biodiversity Theme Sensitivity, National Web based Environmental Screening Tool. The outside edges of the project area were used in the screening tool.

The location and extent of these habitats are illustrated in **Figure 5.13**. Based on the criteria all habitats within the assessment area of the proposed project were allocated a sensitivity category (Table 5.9). The sensitivities of the habitat types delineated are illustrated in Figure 5.13. 'High Sensitivity' areas are due to the following and the guidelines can be seen in **Table 5.10**:

- Unique and low resilience habitats; and
- Water resources.

Table 5.9 SEI Summary of habitat types delineated within field assessment area of project area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Water Resource	High	Medium	Medium	Low	High

Degraded Grassland	Medium	Medium	Medium	Medium	Medium
Old Agriculture	Low	Low	Low	High	Low

Table 5.10 Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities

Site Ecological Importance	Interpretation in relation to proposed development activities
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.

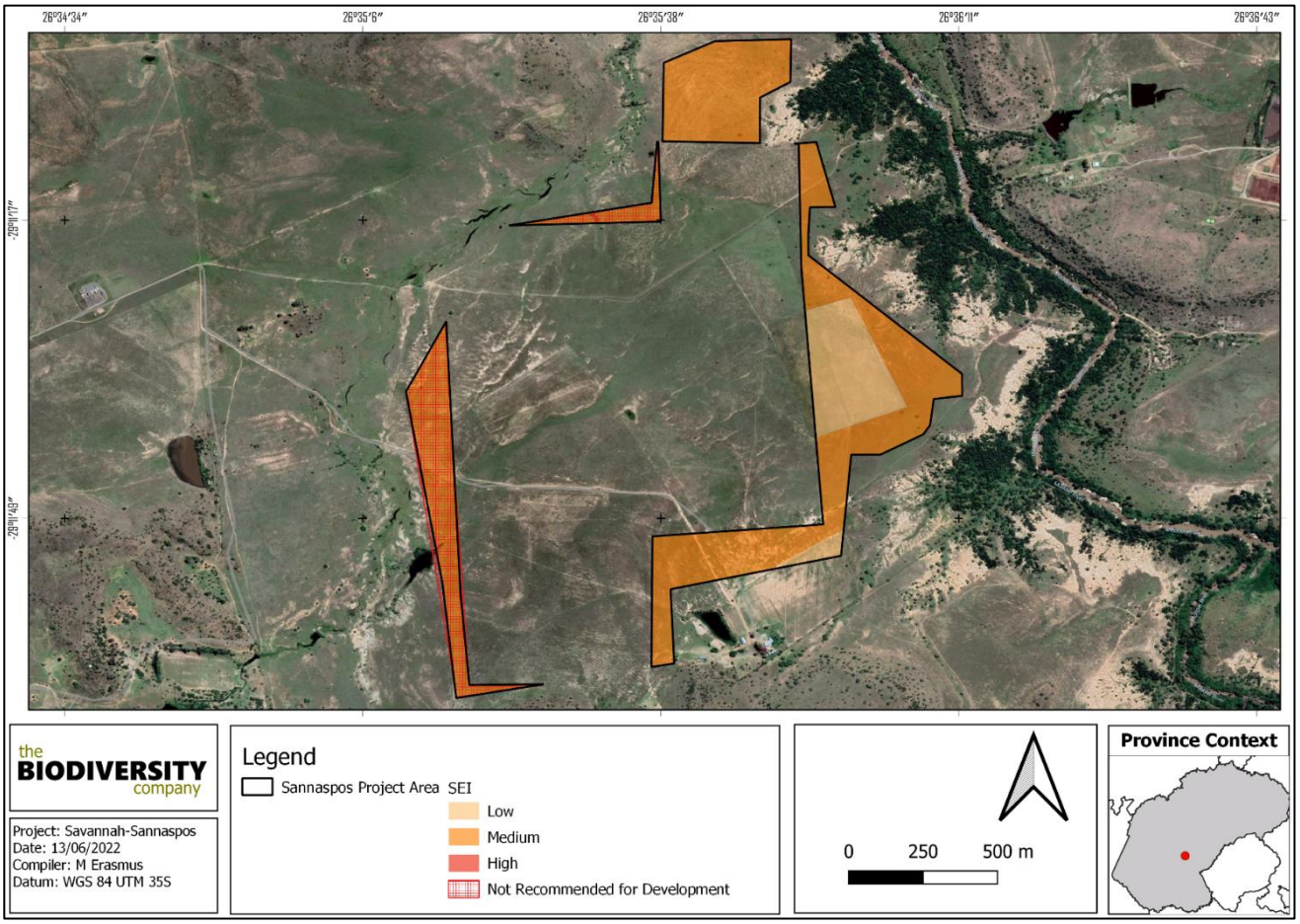


Figure 5.13 Sensitivity of the project area

5.4.1. Topographical profile

The majority of the project area is characterised by a slope percentage between 0 and 10%, with some smaller patches within the project area characterised by a slope percentage up to 43%. This indicates a non-uniform undulating topography. The elevation of the project area indicates an elevation of 1 337 to 1 405 Metres Above Sea Level (MASL).

5.5. Integrated Heritage including Archaeology, Palaeontology, and the Cultural Landscape

5.5.1. Historical and Archaeological Background

Scattered throughout the Karoo is evidence of historic and prehistoric occupation in the form of Early, Middle and Later Stone Age lithics and other material remains. The descendents of the historic and prehistoric occupants of the region are found in the indigenous Khoe and San, as well as modern inhabitants of the area. The development area of Sannaspos takes its name from an engagement fought during the Second Boer War (1899-1902). According to Tomose (2013), "*Using the new Commandos tactic, Chief Commandant De Wet defeated British forces under Brigadier General RG Broadwood in Sannaspos, some 28km east of Bloemfontein. This is in close proximity to the proposed development area. In this battle the British lost 159 men with the Boer Commandos only losing 13 – a huge and significant blow to the British. The defeated British garrison in Sannaspos had been protecting the Sannaspos water works, the main water supply to the newly captured Bloemfontein by the British forces*."

A monument commemorating this event has been established and it is currently used as one of the tour attractions of the Free State province battlefields tours and is located some 5km from the Sannaspos PV facility.

The Sannaspos PV facility development area has been thoroughly assessed by Tomose in his report dated July 2013. In his assessment, he identified 5 sites of heritage significance which needed to be considered for the development of the Sannaspos PV facility:

- ***Sannas-1 (Grade IIIA)*** SAHRIS ID 46720
  On the foot hill of one of the Koppies, an un-formalised and/or non-municipal cemetery i.e. not formalised in terms of bylaws regulating parks and cemeteries or being declared formal in terms of a traditional council, was located with approximately 13 graves. The graves are characterised by stone cairns or stone mound dressing. One grave out of the 13 has a cross to mark the headstone. The graves are all facing east-west in a typical burial orientation. The archaeologist was led to the site by farm workers after he asked about possible graves in the area.

- ***Sannas-2 (Grade IIIC) SAHRIS ID 46721***
  Two MSA stone scatters were found at the foothill of a hill in Besemkop in an exposed calcrete layer.

- ***Sannas-3 (Grade IIIC) SAHRIS ID 46722***
  Site number 3 is a historic stone shed located within Besemkop farmstead. The main farmhouse and its outbuildings are modernised, and the shed is the only remaining historical structure that exists in the farmstead. The shed has 3 north facing windows, 2 doors on either side, 1 door on its southern façade. The shed is built using stone and has a corrugated iron sheet roof which seems to have been recently added on or refurbished.

» ***Sannas-4 (NCW) SAHRIS ID 46723***
Graffiti inscription site located on the hill located south of Besemkop. The inscriptions show 1990s dates and are considered to be a form of graffiti as they are too young to meet the criteria for rock art consideration. The archaeologist was led to the site after he asked the farm workers about possible rock art sites on the hill.

» ***Sannas-5 (Grade IIIA) SAHRIS ID 46724***
The site is located along the road leading to the farmstead. It is a cemetery, possibly created by the first farm owners of the area, consisting of approximately 8 graves. The graves have granite dressing and headstones. The graves burial orientation is east west, a typical burial position. This burial site is located within the proposed expanded footprint These graves are clearly visible and are marked. It is required in the Heritage Management Plan that has been drafted for the Sannaspos PV Facility that these burials are fenced as per the recommendations of the HIA as follows:

"The burial sites at Sannas-1 (SAHRIS ID 46720) and Sannas-5 (SAHRIS ID 46724) must be fenced using clearview fencing to ensure visual permeability and continuity in terms of sense of place. A gate must be created for access purposes for relatives and relevant community members. The position of this gate must be such that it can be accessed without risk to the Sannaspos PV facility. This fencing must be placed 5m from the nearest identifiable burial."

As per the recommendations of Tomose (2013), a Heritage Management Plan has been developed for the PV Facility (CTS Heritage, 2021) that includes guidelines and protocols for the management of impacts to heritage resources. The proposed expanded layout does not impact any known structures directly. One structure of low significance was identified within the broader development area (Sannas-3, Site ID 46722); however, no impact to this structure is anticipated as it is associated with the farm werf. Should it be necessary that structures that have been graded or structures that are older than 60 years require alteration or demolition during this phase, HFS must be contacted regarding permission in terms of section 34 of the NHRA.

5.5.2. Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for the PV Facility is underlain by sediments of very high and zero palaeontological sensitivity. According to the extract from the CGS 2926 Bloemfontein Map, the development area is underlain by sediments of the Adelaide Subgroup and Jurassic Dolerite. Bamford (2021) completed a palaeontological field assessment of the development area. In the report, it is noted that the area proposed for development is underlain by geological sediments of the Adelaide Subgroup of the Beaufort Group (of very high paleontological sensitivity), and Jurassic Dolerite that has zero palaeontological sensitivity. According to the updated biostratigraphy (Smith et al., 2020), the whole of the Adelaide Subgroup has been divided into five Assemblage Zones based on the dominant or temporally exclusive vertebrate fossils.

If vertebrate fossils were common in this region and had been well mapped, then the specific Assemblage Zone would have been indicated in the literature. Common names for the fossils that could occur here are fish, amphibians, reptiles, therapsids, terrestrial and freshwater tetrapods, as well as freshwater bivalves, trace fossils including tetrapod trackways and burrows. Where the vertebrates do not occur, it is possible to find

sparse to rich assemblages of vascular plants of the late Glossopteris Flora, including some petrified logs), and insects are also prevalent at some sites.

From the updated Karoo Biozone map in Smith et al. (2020) the Sannaspos site is in the Daptocephalus Assemblage Zone and on the margin of the two subzones, the lower Dicynodon-Therignathus subzone and upper Lystrosaurus maccaigi—Moschinus subzone. Fossil plants also occur in the Adelaide Subgroup, and they are from the Glossopteris flora and include leaf impressions of Glossopteris, early gymnosperms, lycopods, sphenophytes, ferns and silicified wood. They are not common, however. The Sannaspos PV facility area was walked by a palaeontologist and no fossil material or significance palaoentological resources were identified (Bamford, 2021). Bamford (2021) notes that "Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the right age and type to contain fossils. No fossils were seen during the site visit. Furthermore, the material to be disturbed are the loose surface soils and sands and they do not preserve fossils."

Since there is a very small chance that fossils from the Adelaide Subgroup below the ground surface may be disturbed, Bamford (2021) recommended that a Fossil Chance Find Protocol be implemented during development. This recommendation has been included in this management plan.

5.6 Social Context

Mangaung Metropolitan Municipality covers an area of 9 886 km² and has three urban centres (Bloemfontein, Botshabelo and Thaba Nchu) and a surrounding rural area with small towns namely, Dewetsdorp, Wepener, Van Stadensrus and Soutpan/Ikgomotseng. The rural area makes up the largest percentage (97.17%) of the entire municipal area and is characterised by extensive commercial farming in the west, mainly mixed crop production and cattle farming. The Metro is characterised by three different land use types including formalised stands in urban areas, small holdings and farms. The Barolong Tribal Authority oversees 37 villages dispersed across the tribal area. 21 villages are located to the north and 16 villages are located to the south of the tribal area. The rural areas in between the villages are characterized by large stretches of communal grazing land and utilized for cattle.

A main road (i.e., the N8) services the study area. N8 highway towards Botsabelo linking into a secondary road S417 (gravel) and an existing access road (gravel) on the proposed farm portion, this will be upgraded and used to access the facility site. Other roads are secondary roads linking with one another and with the N8, giving access to the farmsteads and settlements.

There are no built-up areas, towns or mining land uses in close proximity to the study area. Infrastructure includes the Harvard Sannaspos Rural 132kV power line (overhead servitude line). The site is characterised by open grassland to uneven surface bisected by a number of shallow drainage basins. Land use in the general area is dominated by low intensity cattle farming.

5.5.1 Demographic Profile

Mangaung Metropolitan Municipality is centrally located within the Free State Province, the central interior of South Africa. Mangaung shares its boundaries with the Districts of Lejweleputswa to its north, Thabo Mofutsanyane to its north east and Xhariep to its south. To its south east, Mangaung shares a border with Lesotho. The Metro is accessible via National infrastructure including the N1 (which links Bloemfontein to

Gauteng to the north and Western Cape to the southwest), the N6 (which links Bloemfontein to the Eastern Cape), and the N8 (which links to Lesotho in the east and with the Northern Cape to the west).

According to Census 2011, the Mangaung Metropolitan Municipality's population has risen to 861 651 from 853 141 in 2018. The growth rate has been declining from 1.6% in 2011 to 1.0% in 2019. Over half of the population is concentrated in Bloemfontein (63%), followed by Botshabelo (24%), Thaba Nchu (9%), Dewetsdorp and Wepener (1.5%), Soutpan (0.8%) and Van Stadensrus at (0.2%) (StatsSA, 2016).

In Mangaung, the median age is 25 and is similar to South Africa's median age of 25 years. The largest share of population is within the young working age (25-44 years) PROFILE: MANGAUNG METRO 11 age category with a total number of 274 400 (31.8%) of the total population. The age category with the second largest number of people is the young children (0-14 years) age category with a total share of 25.6%, followed by the older working age (45-64 years) age category with 156 038 (18.1%) people. The age category with the least number of people is the retired / old age group (65 years and older) with only 64 378 (7.4%) people.

Mangaung's population consisted of 86% African, 11% White and 4% Coloured. With the African population group representing a majority of Mangaung's total population, the overall population pyramid for the region will mostly reflect that of the African population group.

5.5.2 Settlement and infrastructure

The additional footprint is to be developed on Portion 0 of Farm 2962 Lejwe. The nearest homestead is located on farm Portion 0 of Farm 1808 Besemkop in which most of the authorized area falls.

There are no built-up areas, towns or mining land uses within the immediate study area. Infrastructure includes the Harvard Sannaspos Rural 132Kv Powerline (overhead servitude line) to the north of the Project. The N8 road is to the east of the development area The project development site is accessible from the N8 highway towards Botsabelo linking into a secondary road S417 (gravel) and an existing access road (gravel) on the proposed farm portion, this will be upgraded and used to access the facility site.

Table 5.11 provides a baseline summary of the socio-economic profile of the Mangaung Metropolitan Municipality within which additional footprint for the Sannaspos Solar PV Facility is proposed. The data presented in this section has been derived from the 2011 Census, the Mangaung Metropolitan Municipality integrated development plan (2020/2021) and the M52 Profile and Analysis District Development Model of the Manguang Metropolitan of the Free state (2020).

Table 5.11: Baseline description of the socio-economic characteristics of the area proposed for the additional footprint

Location characteristics
» The project is proposed within the Free State Province, which is the third largest province at 129 825 square kilometres, and comprises more than 10% of South Africa's landmass, it is the second least densely populated province, with just 2.82 million (or 6.4%) of all inhabitants. The project is proposed within the Manguang District Municipality. » The Mangaung Metropolitan Municipality covers an area of land 9886km² in extent.
Population characteristics

- The Mangaung MM has a total population of 747 431 (Census, 2011). In 2019 Mangaung Metropolitan Municipality's population has risen to 861 651 from 853 141 in 2018. The growth rate has been declining from 1.6% in 2011 to 1.0% in 2019.
- The largest share of population is within the young working age (25-44 years) age category with a total number of 274 400 (31.8%) of the total population. The age category with the second largest number of people is the young children (0-14 years) age category with a total share of 25.6%, followed by the older working age (45-64 years) age category with 156 038 (18.1%) people. The age category with the least number of people is the retired / old age group (65 years and older) with only 64 378 (7.4%) people.
- Black African comprise the predominant population group within the Mangaung MM.
- Mangaung's population consists of 86% African, 11% White and 4% Coloured.
- The Mangaung Metropolitan Municipality, Free State provincial, and South African national population age structures are all youth dominated. A considerable proportion of the respective populations therefore comprise individuals within the economically active population between the ages of 15 and 64 years of age.

Economic, education and household characteristics

- The Mangaung MM has a dependency ratio of 47.4.
- 3.6% (20 684) of the population in Mangaung aged 20 years and older had no education. The number of people without any schooling decreased from 2009 to 2019 with an average annual rate of -1.65%, while the number of people within the 'matric only' category, increased from 136 000 to 172 055, which is a share of 31.83% of the province's total number of people that has obtained a matric. The school pass rate in Mangaung for 2019 was 87.8%.

  Of the 292 971 economically active (employed or unemployed but looking or work) people in Mangaung, 27,7% are unemployed. 37,2% of the 150 128 economically active youth (15 – 34 years) in the area are unemployed.
- 83.7% of the Mangaung MM population live in formal dwellings.
- The main economic sector in Mangaung is the tertiary sector with a share of 83.2% in 2017 and is mainly driven by community services (33%). The community service sector is comprised of the provincial government headquarters, the three tertiary institutions, healthcare and other facilities. The tertiary sector is the largest employer in the Metro with community services (32.4%) being the highest, followed by trade at 6.2% and finance at 15.1%.

Services

- The majority of households within the Mangaung MM are well serviced with regards to flush toilets connected to sewage, refuse removal, piped water and electricity.

CHAPTER 6: ASSESSMENT OF THE POTENTIAL IMPACTS

This chapter provides an assessment of the potential impacts (direct, indirect, and cumulative) associated with the proposed infrastructure on the additional footprint proposed for the Sannaspos Solar PV Facility. The project site considered for the proposed additional footprint comprises of an area of 50ha in extent located directly adjacent to the authorised Sannaspos Solar PV Facility (which is a Preferred Bidder project in terms of the REIPPPP). The following infrastructure is proposed within the additional footprint:

» A total of 28 325 bifacial solar panels with a combined capacity of 15 MW
» Internal Access roads

The full extent of the 50ha footprint has been investigated during this Environmental Impact Assessment to determine the environmental suitability of the site. This will provide an indication of the areas of sensitivity that the developer would need to take into consideration in the planning of the location of the facility infrastructure within the additional footprint.

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

» Impact on ecology, including flora and fauna and habitats.
» Impact on soils and agricultural potential.
» Impacts on freshwater features.
» Potential cumulative impacts

Environmental issues specific to the operation of the PV facility and associated infrastructure could include, among others:

» habitat loss and fragmentation;
» degradation of surrounding habitat;
» disturbance and displacement caused during the construction, operational and maintenance phases; and
» direct mortality during the construction phase.

The development of infrastructure within the additional footprint is not expected to alter the social or visual impacts associated with the authorised PV facility as already assessed during the authorised EA. Through the Scoping Study, it was concluded that no impacts on heritage resources are expected as a result of the proposed development.

The sections which follow provide a summary of the specialist input for each field of study in terms of the impacts which are expected to occur, the significance of the impacts, the opportunity for mitigation of the impacts to an acceptable level and the appropriate mitigation measures recommended for the reduction of the impact significance. This section of the report must be read together with the detailed specialist studies contained in **Appendix G to I**.

6.1. Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
(j) an assessment of each identified potentially significant risk, including – (i) cumulative impacts (ii) the nature, significance, and consequences of the impact and risk; (iii) The extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated.	The impacts and risks identified to be associated with the construction and operation phase of Sannaspos Solar PV facility have been included in **Section 6.4, Section 6.5, Section 6.6, Section 6.7** and **Section 6.8.** Impact tables have been included for each field of study which considers the nature, significance, consequence, extent, duration, and probability of the impacts, as well the reversibility of the impacts, the loss of resources and avoidance, management, or mitigation.
(I)(iii) a summary of the positive and negative impacts that the proposed activity and identified alternatives;	The positive and negative impacts associated with the development on the additional footprint have been included in each section as well as an assessment of the "do-nothing" alternative included in **Section 6.7.**
(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for the inclusion in the EMPr as well as for inclusion as conditions of authorisation;	Possible mitigation (specifically relating to the avoidance of sensitive areas) has been included in each section as detailed in requirement (j)(v) above.

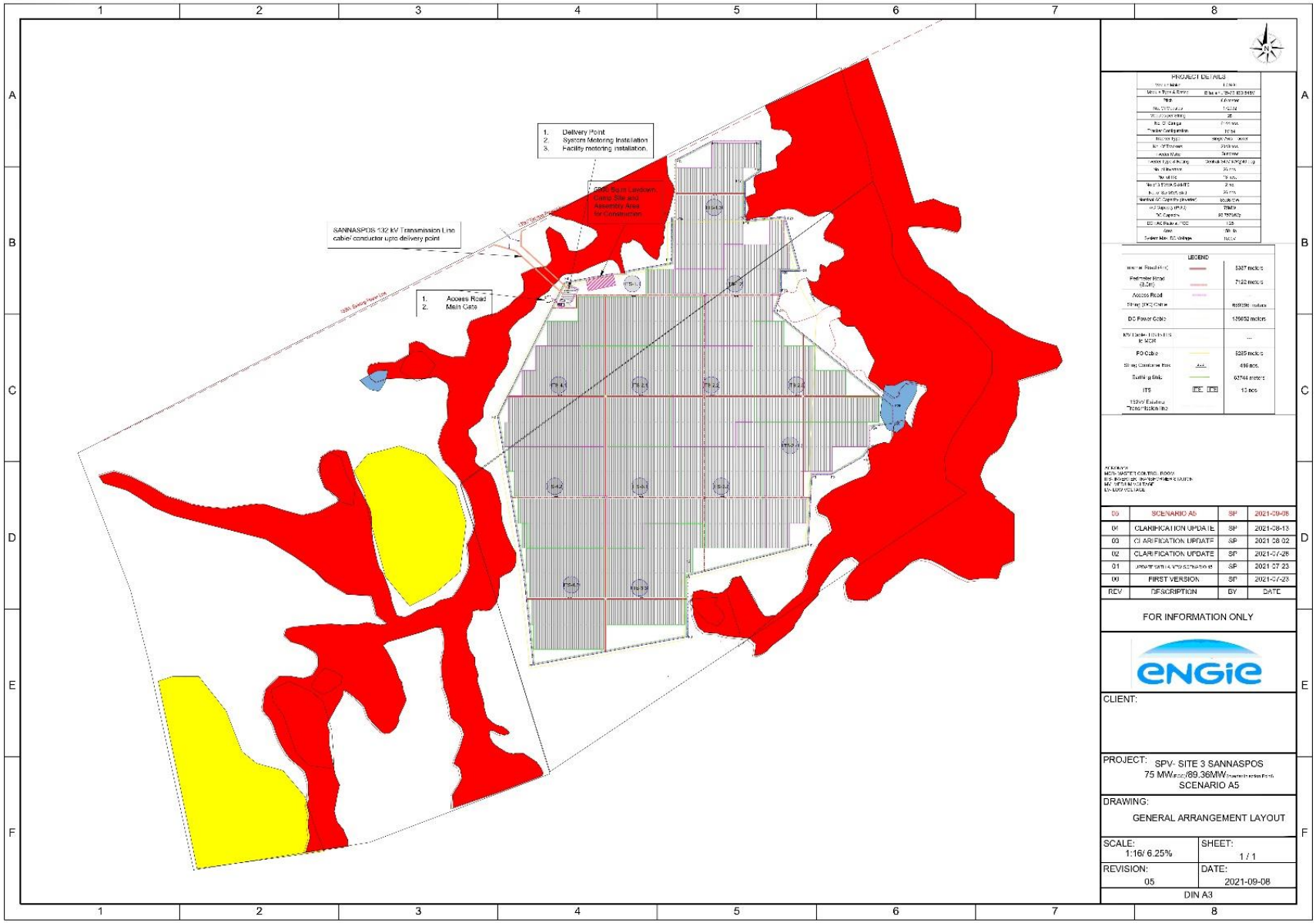


Figure 6.2: Layout considered for the Sannaspos Solar PV Project

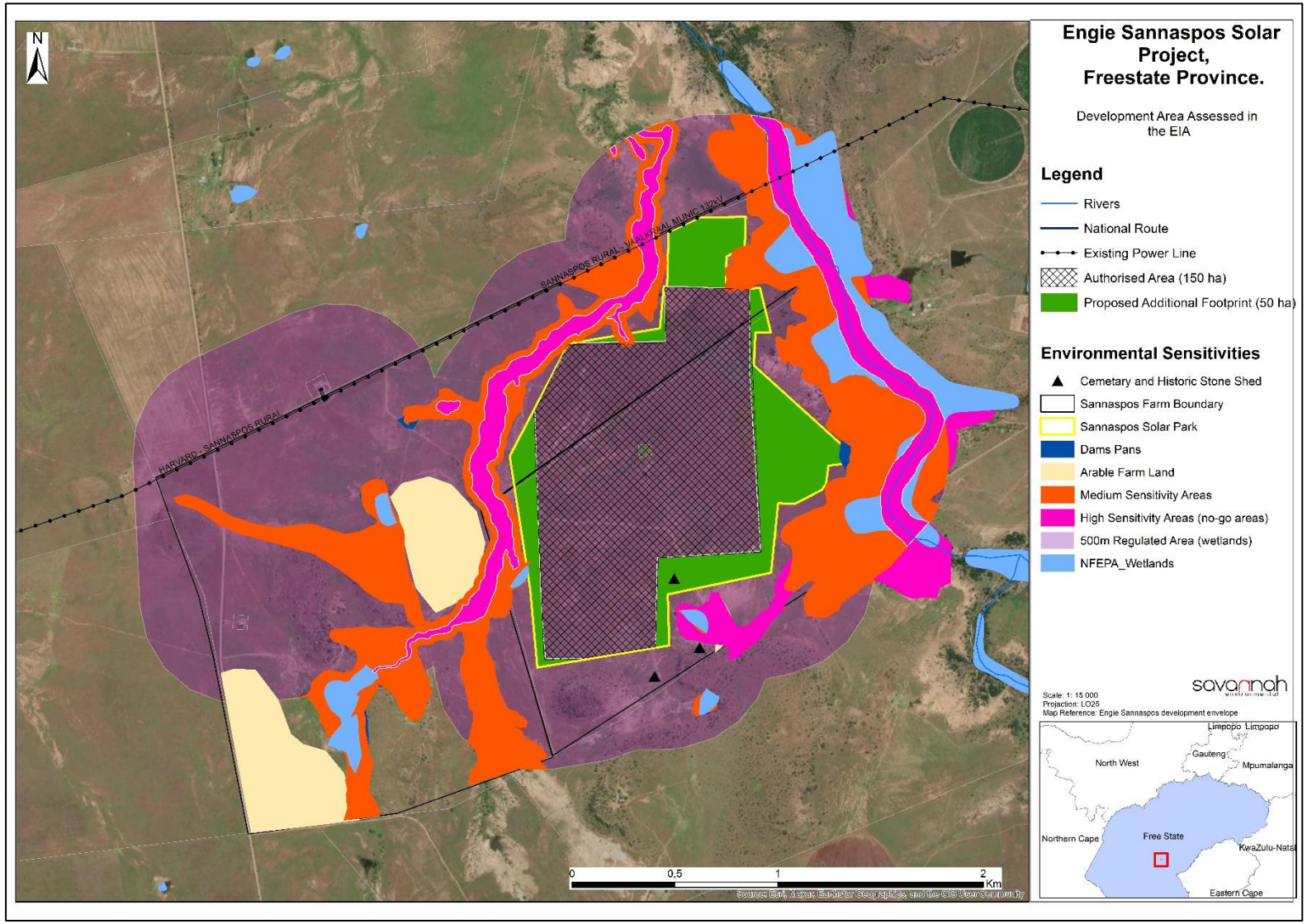


Figure 6.2: Layout Map showing the location of the authorised area and proposed additional footprint as assessed in this report

6.2. Aspects not requiring further investigation as contemplated in the Scoping Phase

Impacts on Heritage Resources

As detailed in the Scoping Report, potential impacts on heritage sites could occur during the construction phase, and could include:

- Damage or destruction of fossil materials
- Damage or destruction of unmarked graves
- Direct impact to archaeological sites, historical sites, and burial sites

One burial site with approximately 8 marked graves is located within the additional footprint. No other significant archaeological or other heritage resources will be impacted by the proposed development on the additional footprint. As per the recommendations of Tomose (2013), a Heritage Management Plan has been developed for the PV Facility (CTS Heritage, 2021) that includes guidelines and protocols for the management of impacts to heritage resources. The proposed expanded layout does not impact any known structures directly. One structure of low significance was identified within the broader development area (Sannas-3, Site ID 46722); however, no impact to this structure is anticipated as it is associated with the farm werf. Should it be necessary that structures that have been graded or structures that are older than 60 years require alteration or demolition during this phase, HFS must be contacted regarding permission in terms of section 34 of the NHRA.

The sediments underlying the proposed development have very high palaeontological sensitivity. Bamford (2021) notes that "Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the right age and type to contain fossils. No fossils were seen during the site visit. Furthermore, the material to be disturbed are the loose surface soils and sands and they do not preserve fossils." Since there is a very small chance that fossils from the Adelaide Subgroup below the ground surface may be disturbed, Bamford (2021) recommended that a Fossil Chance Find Protocol be implemented during development. This recommendation has been included in the management plan (EMPr).

In conclusion, on condition that the protocols outlined in the HIA and the Heritage Management Plan are followed, it is not likely that the proposed development on the additional footprint will negatively impact on significant resources and as such, it was the specialist's opinion that no further assessment of impacts to heritage resources is recommended. There is no objection to the proposed development of infrastrcucture associated with the Sannaspos PV Facility within the additional footprint on heritage grounds within the additional footprint.

6.3. Impacts on Terrestrial Ecology

The section below and associated tables serve to indicate and summarise the significance of potential impacts on the terrestrial ecology of the project area. Potential impacts were evaluated against the data captured during the desktop and field assessment to identify relevance to the project area and assessed in terms of the requirements of the EIA Regulations.

6.3.1. Findings of the Terrestrial Ecology Assessment

Based on the ecological assessment undertaken and consideration of the Site Ecological Importance as detailed in the specialist impact assessment (refer to Appendix I all habitats within the assessment area of the proposed project were allocated a sensitivity category (refer to Table 6.1 and Figure 6.2).

'High Sensitivity' areas are due to the following:

- Unique and low resilience habitats; and
- Water resources.

Table 6.1: SEI Summary of habitat types delineated within field assessment area of project area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Water Resource	High	Medium	Medium	Low	High
Degraded Grassland	Medium	Medium	Medium	Medium	Medium
Old Agriculture	Low	Low	Low	High	Low

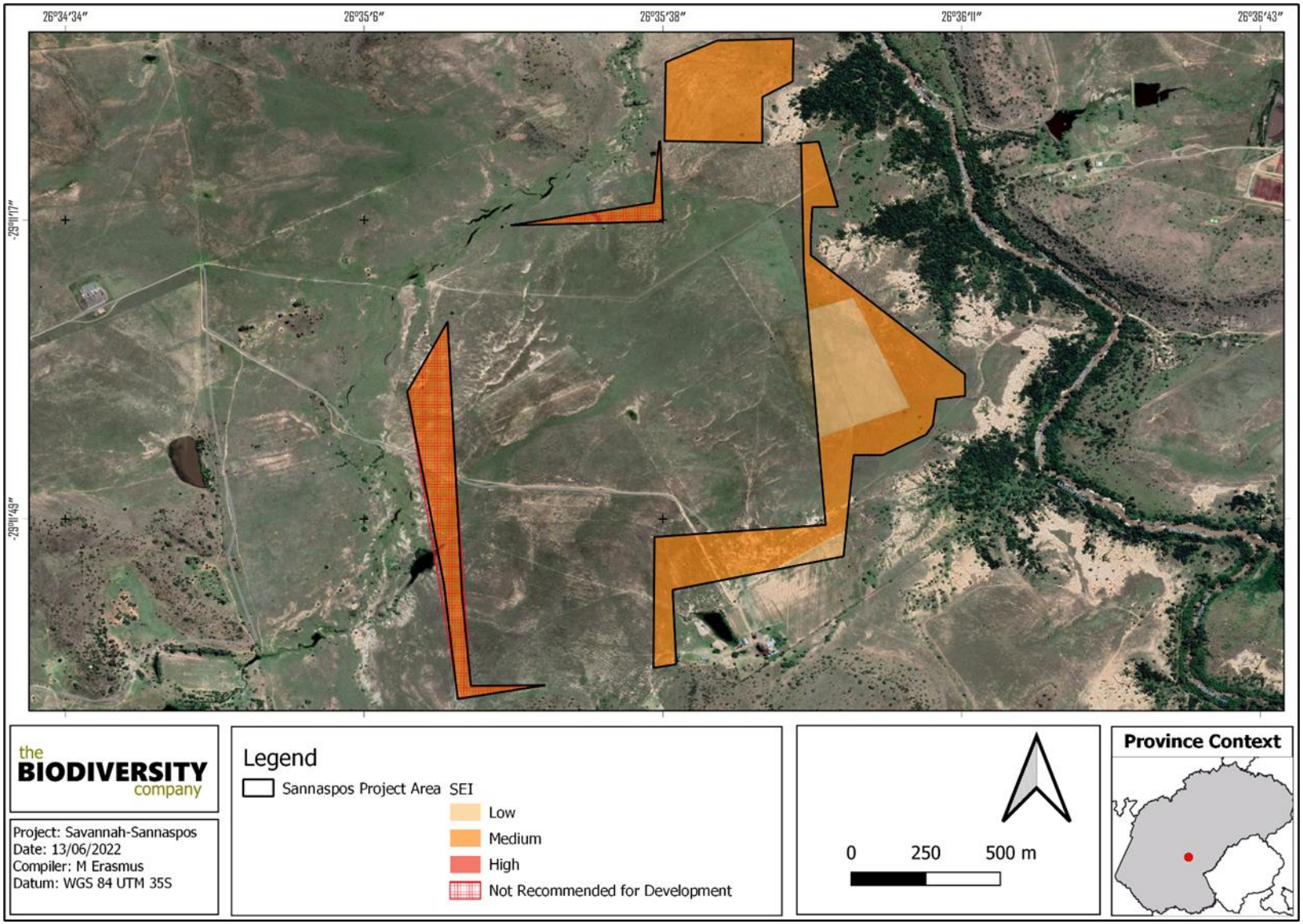


Figure 6.2: Ecological sensitivity of the project area

6.3.2. Description of Ecological Impacts

Anthropogenic activities drive habitat destruction causing displacement of fauna and flora and possibly direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area resulting in a loss of Irreplaceable resources. The current layout, the project area overlaps within sensitive habitats and other areas of high biodiversity potential. The main expected impacts expected to be associated with the proposed project will include the following:

» habitat loss and fragmentation;
» degradation of surrounding habitat;
» disturbance and displacement caused during the construction, operational and maintenance phases; and
» direct mortality during the construction phase.

6.3.3. Impact tables summarising the significance of impacts on ecology during construction, operation and decommissioning

The assessment of impact significance considers pre-mitigation as well as post-mitigation scenarios. The mitigation actions required to lower the risk of the impact are provided in the Biodiversity Management Plan included in Section 6.3.4.

The following potential main impacts on the biodiversity (based on the framework above) were considered for the construction and operational phases of the proposed development:

Construction Phase

» Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community
» Introduction of alien species, especially plants
» Destruction of protected plant species; and
» Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching).

Operation Phase
» Continued fragmentation and degradation of habitats and ecosystems;
» Spread of alien and/or invasive species;
» Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration).

Construction Phase Impacts

Impact Nature: Loss of vegetation within development footprint **Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community**		
	Without mitigation	**With mitigation**
Extent	Moderate (3)	Very low (1)

Duration	Permanent (5)	Long term (4)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (56)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, although this impact cannot be well mitigated as the loss of vegetation is unavoidable.	
Mitigation: Refer to Biodiversity Management Plan included in Section 6.3.4.		
Residual Impacts: The loss of currently intact vegetation is an unavoidable consequence of the project and cannot be entirely mitigated. The residual impact would however be low.		

Impact Nature: Introduction of alien species, especially plants **Degradation and loss of surrounding natural vegetation**		
	Without mitigation	**With mitigation**
Extent	High (4)	Low (2)
Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (56)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Refer to Biodiversity Management Plan included in Section 6.3.4.		
Residual Impacts: Long-term broad scale. IAP infestation if not mitigated.		

Impact Nature: Destruction of protected plant species **Construction activity will likely lead to direct loss of protected tree species**		
	Without mitigation	**With mitigation**
Extent	Low (2)	Very low (1)
Duration	Permanent (5)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (52)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Refer to Biodiversity Management Plan included in Section 6.3.4.		
Residual Impacts: None		

Impact Nature: Displacement of faunal community due to habitat loss, direct mortalities and disturbance **Construction activity will likely lead to direct mortality of fauna due to earthworks, vehicle collisions, accidental hazardous chemical spills and persecution. Disturbance due to dust and noise pollution and vibration may disrupt behaviour.**		
	Without mitigation	**With mitigation**
Extent	Moderate (3)	Very low (1)
Duration	Short term (2)	Very short term (1)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Probable (3)
Significance	**Medium (44)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, to some extent. Noise and disturbance cannot be well mitigated, impacts on fauna due to human presence, such as vehicle collisions, poaching, and persecution can be mitigated.	
Mitigation: Refer to Biodiversity Management Plan included in Section 6.3.4.		
Residual Impacts: It is probable that some individuals of susceptible species will be lost to construction-related activities despite mitigation. However, this is not likely to impact the viability of the local population of any fauna species.		

Operational Phase Impacts

Impact Nature: Continued fragmentation and degradation of habitats and ecosystems		
Disturbance created during the construction phase will leave the project area vulnerable to erosion and IAP encroachment.		
	Without Mitigation	**With Mitigation**
Extent	Low (2)	Low (2)
Duration	Permanent (5)	Very short term (1)
Magnitude	High (8)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (60)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	
Mitigation: Refer to Biodiversity Management Plan included in Section 6.3.4.		
Residual Impacts There is still the potential some potential for erosion and IAP encroachment even with the implementation of control measures but would have a low impact.		

Impact Nature: Spread of alien and/or invasive species Degradation and loss of surrounding natural vegetation		
	Without mitigation	**With mitigation**

Extent	High (4)	Low (2)
Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (56)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Refer to Biodiversity Management Plan included in Section 6.3.4.		
Residual Impacts: Long term broad scale IAP infestation if not mitigated.		

Impact Nature: Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration The operation and maintenance of the proposed development may lead to disturbance or persecution of fauna in the vicinity of the development.		
	Without Mitigation	**With Mitigation**
Extent	Low (2)	Very low (1)
Duration	Long term (4)	Short term (2)
Magnitude	High (8)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (42)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Refer to Biodiversity Management Plan included in Section 6.3.4.		
Residual Impacts Disturbance from maintenance activities will occur albeit at a low and infrequent level.		

6.3.4. Biodiversity Management Plan

The aim of the management outcomes is to present the mitigations in such a way that the can be incorporated into the Environmental Management Programme (EMPr), allowing for more successful implementation and auditing of the mitigations and monitoring guidelines **Table 6.2** presents the recommended mitigation measures and the respective timeframes, targets and performance indicators for the terrestrial ecology study.

The focus of mitigation measures is to reduce the significance of potential impacts associated with the development and thereby to:

- Prevent the further loss and fragmentation of vegetation communities and the ESA areas in the vicinity of the project area;
- As far as possible, reduce the negative fragmentation effects of the development and enable safe movement of faunal species;

- Prevent the direct and indirect loss and disturbance of faunal species and community (including occurring and potentially occurring species of conservation concern); and
- Follow the guidelines for interpreting Site Ecological Importance (SEI).

Table 6.2: Mitigation measures including requirements for timeframes, roles and responsibilities for the terrestrial study

Impact Management Actions	Implementation		Monitoring	
	Phase	**Responsible Party**	**Aspect**	**Frequency**
Management outcome: Vegetation and Habitats				
Areas rated as High sensitivity in proximity to the development areas, should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to this area from construction workers, machinery. The infrastructure should be realigned to prioritise development within low sensitivity areas. Mitigated development in medium sensitivity areas is permissible. High sensitivity areas are to be avoided.	Life of operation	Project manager, Environmental Officer	Development footprint	Ongoing
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further than that proposed for the project. Clearing of vegetation should be minimized and avoided where possible.	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation	Ongoing
Where possible, existing access routes and walking paths must be made use of.	Construction/Operational Phase	Environmental Officer & Design Engineer	Roads and paths used	Ongoing
All laydown, chemical toilets etc. should be restricted to low sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas.	Construction/Operational Phase	Environmental Officer & Design Engineer	Laydown areas	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Operational phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.	Operational and Decommissioning phase	Environmental Officer & Contractor	Woody material under powerline and in SS footprint	During Phase

Impact Management Actions	Implementation		Monitoring	
	Phase	**Responsible Party**	**Aspect**	**Frequency**
A hydrocarbon spill management plan must be put in place, to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment may occur on site, unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.	Life of operation	Environmental Officer & Contractor	Spill events, Vehicles dripping.	Ongoing
Storm Water run-off & Discharge Water Quality monitoring	Life of operation	Environmental Officer & Design Engineer	Water Quality and presence of erosion	Ongoing
It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.	Life of operation	Project manager, Environmental Officer	Any instances	Ongoing
A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.	Life of operation	Environmental Officer & Contractor	Fire Management	During Phase
Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. Hi visibility flags must be placed near any protected plants in order to avoid any damage or destruction of the species. If left undisturbed the sensitivity and importance of these species needs to be part of the	Life of operation	Project manager, Environmental Officer	Protected Plant species	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
environmental awareness program. PV infrastructure, development areas and routes where protected plants cannot be avoided, these plants many being geophytes or small succulents should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again. All protected and red-data plants should be relocated, and as many other geophytic species as possible.				
Management outcome: Fauna				
The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments, • Signs must be put up to enforce this	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into these areas	Ongoing
Noise must be kept to an absolute minimum during the evenings and at night, to minimize all possible disturbances to amphibian species and nocturnal mammals	Construction/Operational Phase	Environmental Officer	Noise levels	Ongoing
No trapping, killing, or poisoning of any wildlife is to be allowed. • Signs must be put up to enforce this;	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (green/red) lights should be used wherever possible.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Light pollution and period of light.	Ongoing
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	**Responsible Party**	**Aspect**	**Frequency**
Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons.	Life of operation	Project manager, Environmental Officer & Design Engineer	Activities should take place during the day in the case.	Ongoing
Any excavations or holes must be conducted in a progressive manner. • Should the holes/excavations stay open overnight they must be covered temporarily, to ensure no small fauna species fall in.	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of trapped animals and open holes	Ongoing
A qualified environmental control officer must be on site when construction begins. The area must be walked though prior to construction, to ensure no faunal species remain in the habitat and get killed. Should animals not move out of the area on their own, relevant specialists must be contacted to advise on how the species can be relocated.	Construction Phase	Environmental Officer, Contractor	Presence of any floral or faunal species.	During phase
Heat generated from substation, if any, must be monitored to ensure it does not negatively affect the local fauna	Life of operation	Environmental Officer & Contractor	Heat generated by substations	Ongoing
All areas to be developed must be walked through prior to any activity to ensure no nests or fauna species are found in the area. Should any SCC not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.	Construction and Operational phase	Project manager, Environmental Officer	Presence of Nests and faunal species	Planning, Construction and Rehabilitation
Ensure that any cables and connections are insulated successfully to reduce electrocution risk.	Life of project	Environmental Officer & Contractor, Engineer	Presence of electrocuted fauna	Ongoing
Any exposed parts must be covered (insulated) to reduce electrocution risk.	Life of project	Environmental Officer & Contractor, Engineer	Presence of electrocuted fauna	Ongoing
Monitoring of all OHL route must be undertaken to detect bird carcasses, to enable the identification of any potential areas of high impact to be marked with bird flappers if not	Life of project	Environmental Officer & Contractor,	Monitoring of the OHL route	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
already done so. Monitoring should be undertaken at least once a month for the first year of operation.				
Management outcome: Alien Vegetation and fauna				
Compilation of and implementation of an alien vegetation management plan.	Life of operation	Project manager, Environmental Officer & Contractor	Assess presence and encroachment of alien vegetation	Twice a year
The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas	Construction/Operational Phase	Project manager, Environmental Officer & Contractor	Footprint Area	Life of operation
Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site	Life of operation	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation
A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the likely presence of SCCs	Life of operation	Environmental Officer & Health and Safety Officer	Evidence or presence of pests	Life of operation
Management outcome: Dust				
Dust-reducing mitigation measures must be put in place and strictly adhered to. This includes wetting of exposed soft soil surfaces. • No non environmentally friendly suppressants may be used, as this could result in pollution of water sources	Life of operation	Contractor	Dustfall	Dust monitoring program.
Management outcome: Waste management				
Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. • Refuse bins will be emptied and secured; • Temporary storage of domestic waste shall be in covered waste skips; and	Construction Phase	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation

Impact Management Actions	Implementation		Monitoring	
	Phase	**Responsible Party**	**Aspect**	**Frequency**
• Maximum domestic waste storage period will be 10 days.				
Toilets at the recommended Health and Safety standards must be provided. These should be emptied twice a day, to prevent staff from using the surrounding vegetation.	Construction Phase	Environmental Officer & Health and Safety Officer	Number of toilets per staff member. Waste levels	Daily
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. Under no circumstances may domestic waste be burned on site	Construction Phase	Environmental Officer & Health and Safety Officer	Availability of bins and the collection of the waste.	Ongoing
Refuse bins will be emptied and secured. Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.	Construction Phase	Environmental Officer, Contractor & Health and Safety Officer	Management of bins and collection of waste	Ongoing
Suitable temporary solid waste facilities are to be incorporated into the design to prevent unsanitary conditions. These are to be cleared weekly and waste collected by the local waste management department. The residents must be encouraged to recycle.	Operational Phase	Project manager	Management of bins and collection of waste	Ongoing
Management outcome: Environmental awareness training				
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance; and biology, habitat requirements and management requirements in the EA and EMPr. The avoidance and protection of the wetland areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Erosion				
Speed limits must be put in place to reduce erosion. • Reducing the dust generated by the listed activities above, especially the earthmoving machinery, through wetting the soil surface; putting up signs to enforce speed limit; and speed bumps built to force slow speeds; • Signs must be put up to enforce this.	Life of operation	Project manager, Environmental Officer	Water Runoff from road surfaces	Ongoing
Where possible, existing access routes and walking paths must be made use of.	Life of operation	Project manager, Environmental Officer	Routes used within the area	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation, to prevent erosion during flood events and strong winds.	Life of operation	Project manager, Environmental Officer	Re-establishment of indigenous vegetation	Progressively
A stormwater management plan must be compiled and implemented.	Life of operation	Project manager, Environmental Officer	Management plan	Before construction phase: Ongoing

6.3.5. Implications for project implementation

The completion of a comprehensive desktop study, in conjunction with the results from the field survey, suggest there is a good confidence in the information provided. The survey ensured that there was a suitable ground truth coverage of the assessment area and most habitats and ecosystems were assessed to obtain a general species (fauna and flora) overview and the major current impacts were observed. The conservation status is classified as Least Concern albeit the protection level is regarded as 'Not Protected and Poorly Protected' Ecosystem. Moreover, the proposed activity overlaps with an ESA1, ESA2 and NPAES.

The current layout, the project area overlaps with sensitive habitats and other areas of high biodiversity potential. Portions of the current layout as well as the expected access and service road of the development would be considered to have a significant and high negative impact as it would directly affect the habitat of threatened plant species and expected listed avifaunal species that use these ecosystems;

» The assessment area possesses a protected flora species. Moreover, protected fauna are ubiquitous within the assessment area and surrounding landscape was ubiquitous within the assessment area and surrounding landscape; and
» One threatened species of avifauna were observed to occur and utilise the habitats within the assessment area during the survey period. Sagittarius serpentarius (Secretarybird) possess high priority scores indicating that they are particularly susceptible to collisions with powerlines. Excessive noise will lead to displacement of the species and the vehicle traffic potentially will lead to direct mortality.

The developer is urged to alter the layout or design which represents a compromise between the needs of the development and the environmental concerns at the site, especially in regard to the high sensitivity areas. Historically, overgrazing from livestock (Sheep, goats and cattle) and mismanagement has led to the deterioration these habits. However, the high sensitivity areas can be regarded as important, not only within the local landscape, but also regionally; as they are used for habitat, foraging, water resource and movement corridors for fauna within the landscape.

The habitat existence and importance of these habitats is regarded as crucial, due to the species recorded as well as the role of this intact unique habitat to biodiversity within a very fragmented disturbed local landscape, not to mention the sensitivity according to various ecological datasets.

The very high and sensitivity terrestrial areas still:

- Serve as and represent ESA as per the Conservation Plan;
- Supports and protects fauna and flora; and
- Support various organisms and may play a more important role in the ecosystem if left to recover from the superficial impacts.

The ecological integrity, importance and functioning of these terrestrial biodiversity areas provide a variety of ecological services considered beneficial, with one key service being the maintenance of biodiversity. The preservation of these systems is the most important aspect to consider for the proposed project.

Any development on the high sensitivity areas will lead the direct destruction and loss of portions of functional ESA, and also the floral and faunal species that are expected to utilise this habitat. Thus, if these areas are not maintained in a natural or near natural state, destroyed or fragmented, then meeting targets for biodiversity features will not be achieved. The mitigations, management and associated monitoring

regarding these operational impacts will be the most important factor of this project and must be considered by the issuing authority.

The main expected impacts of the proposed project will include the following:

» habitat loss and fragmentation;
» degradation of surrounding habitat;
» disturbance and displacement caused during the construction, operational and maintenance phases; and
» direct mortality during the construction phase.

Mitigation measures as described in this report can be implemented to reduce the significance of the risk but there is still a possibility of impacts. Considering that this area that has been identified as being of significance for biodiversity maintenance and ecological processes (ESAs), development may proceed but with caution and only with the implementation of mitigation measures.

Considering the above-mentioned information, no fatal flaws are evident for the proposed project. It is the opinion of the specialists that the project, may be favourably considered, on condition all prescribed mitigation measures and supporting recommendations are implemented.

6.4. Impacts on Freshwater Resources

6.4.1. Findings of the Freshwater Assessment

In total four (4) water resources were identified and delineated for the project. These included both natural and artificial systems, with the artificial systems comprising of impoundments and drainage features. Three (3) natural wetland hydrogeomorphic (HGM) units belonging to three HGM types (unchannelled valley bottom, depression, and seepage) were identified within the 500 m regulated area.

The unchanneled valley bottom (HGM 1) is traversed by a portion of the project area and was determined to be the only system at an appreciable level of risk and was the focus for the functional assessment. No functional assessment was completed for the artificial systems.

Overall, HGM 1 scored Moderately Low in terms of the wetland ecosystem services. The wetland was considered relatively important for regulating and supporting benefits. The integrity (or health) for HGM 1 was rated as being in a Largely Modified state (class D). The unchanneled valley bottom wetland type is classified as Critically Endangered, and the ecological importance and sensitivity is Moderate.

A 30 m buffer width was recommended for the project. All identified natural wetland units and the Modder River were classified as having a High sensitivity, while the artificial systems and the associated 30 m buffer was assigned a Medium sensitivity. The remaining extent of the project area was assigned a Low sensitivity from a water resource perspective.

6.4.2. Wetland Risk Assessment

A risk assessment was conducted in accordance with Section 21 (c) and (i) of the National Water Act, 1998, (Act 36 of 1998) to investigate the level of risk posed by proposed project, namely the installation of

infrastructure associated with a solar PV facility within the additional footprint. The risks posed by the proposed development to wetlands within the project areas are provided in **Table 6.3** for scenarios with and without mitigation. Three levels of risk have been identified and determined for the overall risk assessment, these include low, medium, and high risk. High risks are not applicable based on the fact that wetlands will not be directly impacted on by the proposed development. Medium risk refers to wetland areas that are either on the periphery of the infrastructure or at an indirect risk. Low risks are wetland systems beyond the 30 m buffer area that would be avoided, or wetland areas that could be avoided if feasible. The medium risks were the priority for the risk assessment, focussing on the expected potential for these indirect risks. **The significance of all post-mitigation risks was determined to be low**. Areas not recommended for development due to the proximity to HGM 1 are presented in **Figure 6.3** but development in this area is permissible but all recommendations and mitigation measures remains applicable.

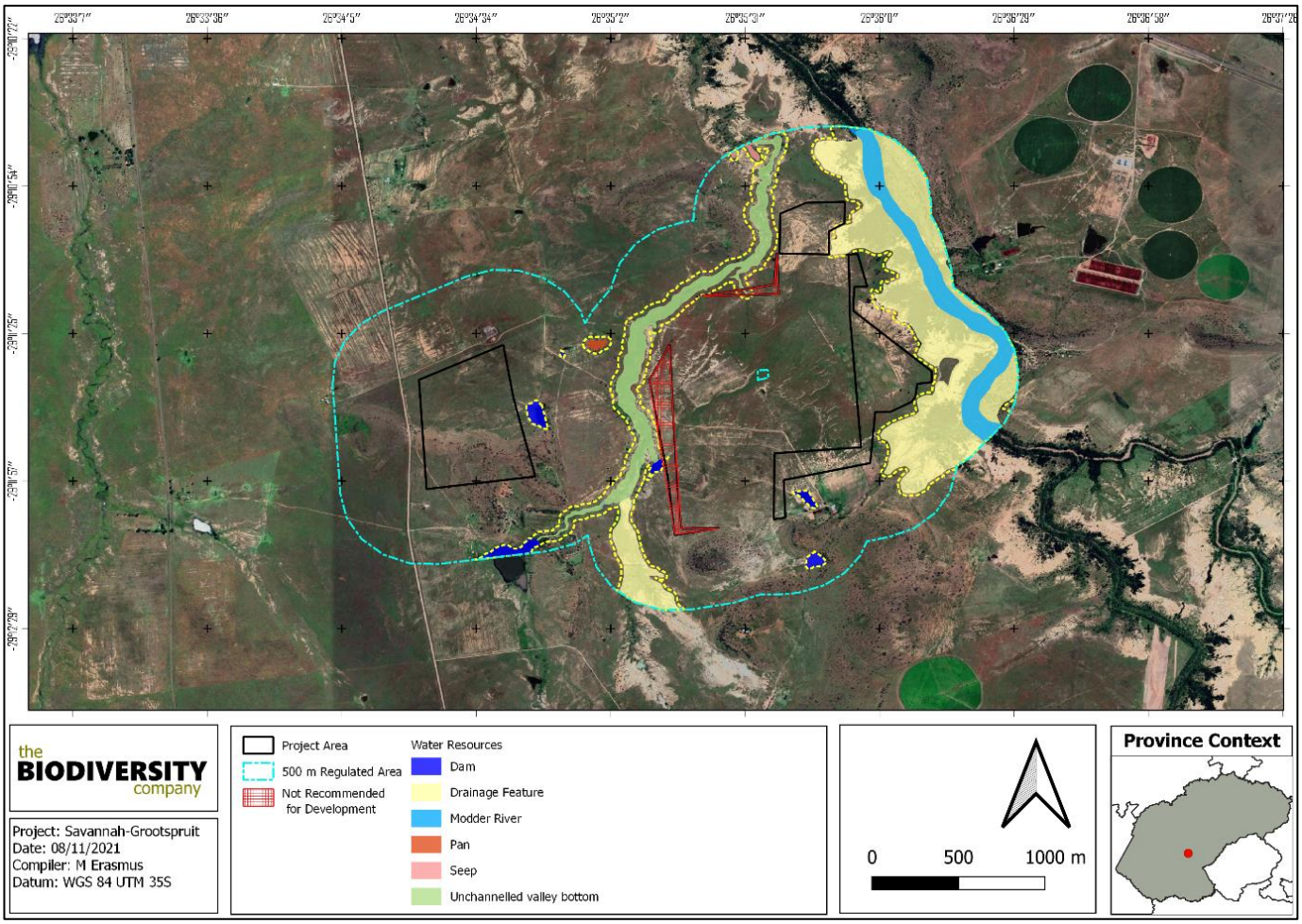


Figure 6.3 Recommended areas for PV development

Table 6.2 DWS Risk Impact Matrix for the proposed development (Andrew Husted Pr Sci Nat 400213/11)

Activity	Aspect	Impact	Severity															Control Measures
			Mitigation	Flow Regime	Water Quality	Habitat	Biota	Total	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	
Construction																			
Site clearing and preparation.	Wetland disturbance / loss.	Direct disturbance / degradation / loss to wetland soils or vegetation due to the construction of the solar facility.	Without	3	2	3	2	2.5	2	3	7.5	3	4	1	1	9	68	**M**	• Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area. • When clearing vegetation, allow for some vegetation cover as opposed to bare areas beneath the panels. • Minimize the disturbance footprint and the unnecessary clearing of vegetation outside of this area. • Use the wetland shapefiles to signpost the edge of the wetlands closest to site. Place the sign 20 m from the edge (this is the buffer zone). Label these areas as environmentally sensitive areas, keep out. • Educate staff and relevant contractors on the location and importance of the identified wetlands through toolbox talks and by including them in site inductions as well as the overall master plan. • All activities (including driving) must adhere to the 30 m buffer area. • Promptly remove / control all alien and invasive plant species
			With	2	1	2	1	1.5	2	3	6.5	3	3	1	1	8	52	**L**	

Activity	Aspect	Impact	Severity															Control Measures
			Mitigation	Flow Regime	Water Quality	Habitat	Biota	Total	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	
																			that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed. • All alien vegetation along the transmission servitude should be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. By this Eskom is obliged to control. • Landscape and re-vegetate all denuded areas as soon as possible.
	Water runoff from construction site.	Increased erosion and sedimentation.	Without	3	3	2	2	2.5	2	3	7.5	3	3	1	2	9	68	M	• Limit construction activities near (< 30 m) of wetlands and drainage features to winter (as much as possible) when rain is least likely to wash concrete and sand into the wetland. Activities in black turf soils can become messy • Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash. • No activities are permitted within the wetland and associated buffer area. • Landscape and re-vegetate all unnecessarily denuded areas as soon as possible.
			With	2	2	1	1	1.5	2	2	5.5	3	2	1	1	7	39	L	

Activity	Aspect	Impact	Severity															Control Measures
			Mitigation	Flow Regime	Water Quality	Habitat	Biota	Total	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	
		Potential contamination of wetlands with machine oils and construction materials.	Without	1	3	2	2	2	1	2	5	3	3	1	2	9	45	L	• Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility. • Appropriately stockpile topsoil cleared from the project area. • Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering the wetlands. • No activities are permitted within the wetland and associated buffer area.
			With	1	1	1	1	1	1	2	4	1	2	1	2	6	24	L	
Operation																			
Operation of the solar facility.	Hardened surfaces.	Potential for increased stormwater runoff leading to Increased erosion and sedimentation.	Without	2	2	2	2	2	3	2	7	3	3	1	2	9	63	M	• Design and Implement an effective stormwater management plan. • Allow for some vegetation cover as opposed to bare areas beneath the panels. • Promote water infiltration into the ground beneath the solar panels. • Release only clean water into the environment. • Stormwater leaving the site should not be concentrated in a single exit drain but spread across multiple drains around the site each fitted with energy dissipaters
			With	1	1	1	1	1	2	2	5	1	2	1	1	5	25	L	

Activity	Aspect	Impact	Severity															Control Measures
			Mitigation	Flow Regime	Water Quality	Habitat	Biota	Total	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	
																			(e.g. slabs of concrete with rocks cemented in). • Re-vegetate denuded areas as soon as possible. • Regularly clear drains. • Minimise the extent of concreted / paved / gravel areas. • A covering of grass (regularly cut and maintained) below the solar panels is ideal for infiltration. If not feasible then gravel is preferable over concrete or paving. • Avoid excessively compacting the ground beneath the solar panels.
	Contamination.	Potential for increased contaminants entering the wetland systems.	Without	2	3	2	2	2.3	3	2	7.3	3	3	1	2	9	65	M	• Where possible minimise the use surfactants to clean solar panels and herbicides to control vegetation beneath the panels. If surfactants and herbicides must be used do so well prior to any significant predicted rainfall events.
			With	1	1	1	1	1	2	2	5	1	2	1	1	5	25	L	
Closure																			
Decommissioning of the solar facility.	Rehabilitation.	Potential loss or degradation of nearby wetlands through inappropriate closure.	Without	2	2	3	2	2.3	2	3	7.3	3	3	1	1	8	58	M	• Develop and implement a rehabilitation and closure plan. • Appropriately rehabilitate the project area by ripping, landscaping and re-vegetating with locally indigenous species.
			With	1	1	1	1	1	2	2	5	1	2	1	1	5	25	L	

6.4.3. Implications for project implementation

In total four (4) water resources were identified and delineated for the project. These included both natural and artificial systems, with the artificial systems comprising of impoundments and drainage features. Three (3) natural wetland hydrogeomorphic (HGM) units belonging to three HGM types (unchannelled valley bottom, depression and seepage) were identified within the 500 m regulated area. The unchannelled valley bottom (HGM 1) is traversed by a portion of the project area and was determined to be the only system at an appreciable level of risk and was the focus for the functional assessment. No functional assessment was completed for the artificial systems.

Overall, HGM 1 scored Moderately Low in terms of the wetland ecosystem services. The wetland was considered relatively important for regulating and supporting benefits. The integrity (or health) for HGM 1 was rated as being in a Largely Modified state (class D). The unchanneled valley bottom wetland type is classified as Critically Endangered and the ecological importance and sensitivity is Moderate.

A 30 m buffer width was recommended for the project. All identified natural wetland units and the Modder River were classified as having a High sensitivity, while the artificial systems and the associated 30 m buffer was assigned a Medium sensitivity. The remaining extent of the project area was assigned a Low sensitivity from a water resource perspective.

A risk assessment was conducted in line with Section 21 (c) and (i) of the National Water Act, 1998, (Act 36 of 1998). High risks are applicable based on the fact that wetlands may be be directly impacted on by the proposed development. Medium risk refers to wetland areas that are either on the periphery of the infrastructure and at an indirect risk. Low risks are wetland systems beyond the project area that would be avoided, or wetland areas that could be avoided if feasible. Development in all the 'segments' of the project area is permissible, and the significance of all post-mitigation risks was determined to be low. All recommendations and mitigation measures are applicable to these areas, in order to achieve a low residual risk significance.

In terms of Water Use Authorisation, owing to the expected post-mitigation Low risks, a General Authorisation is permissible for the development. A General Authorisation has been issued for one of the affected farm portions, namely the farm Basemkop 1808 (reference number: WU23983). An application for the other affected farm (Portion 0 of Farm 2962 Lejwe) is in process (reference number: WU25438). A pre-application has been submitted for the other affected farm (Portion 0 of Farm 2962 Lejwe (reference number: WU25438)).

6.5. Impacts to Soil and Agricultural Potential

The impact assessment will consider the calculated sensitivities associated with the soil resources expected to be impacted upon by the relevant components. This impact assessment will purely focus on the impacts expected towards natural resources (in specific, the soil and associated land capability).

6.5.1. Findings of the soil and agricultural potential Assessment

One main soil form was identified throughout the 50 m regulated area, namely the Swartland soil form. The Swartland soil form consists of an orthic topsoil on top of a pedocutanic horizon, which in turn is underlain by a lithic horizon.

The land capability of the abovementioned soil has been determined to be class "III" and a climate capability level 8 given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capabilities and climate capabilities results in a land potential "L6". The "L6" land potential level is characterised by very restricted potential. Regular and/or severe limitations are expected due to soil, slope, temperatures or rainfall. This land potential is regarded as non-arable.

6.5.2. Potential Impacts to soil and agricultural potential

During the construction phase heavy vehicles (trucks) will be used to transport PV structures throughout the footprint area with reliance on manual labour for finer refinement. Potential erosion is possible during the construction phase. The main expected impacts of the proposed project will include the following;

» Potential erosion is possible during the construction phase
» Overland flow dynamics are expected to be affected during the operational phase due to access and maintenance routes.

It is evident from the impact calculations below that in a pre-mitigation state, moderate impacts are expected. The main mitigation objective would be to limit the area to be impacted upon by means of not using concrete pylons but rather installing pylons directly into the soil surface. In the event that this recommendation be adhered to, lower impacts are foreseen which ultimately results in a post-mitigation significance rating of "Low".

6.5.3. Impact tables summarising the significance of impacts on soil and agricultural capability during construction, operation and decommissioning

Construction Phase Impacts

Nature: Loss of land capability		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium (30)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Refer to Section 6.5.4		
Residual Impacts: Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.		

Operational Phase Impacts

Nature: Loss of land capability		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Long Term (4)	Long Term (4)
Magnitude	Moderate (6)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Refer to Section 6.5.4		
Residual Impacts: Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.		

6.5.4. Recommendations and Mitigation Measures

General Mitigation

General mitigations will ensure the conservation of all soil resources, regardless of the sensitivity of resources and the intensity of impacts.

- Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks;
- Proper invasive plant control must be undertaken quarterly; and
- All excess soil (soil that are stripped and stockpiled to make way for foundations) must be stored, continuously rehabilitated to be used for rehabilitation of eroded areas.

Restoration of Vegetation Cover

Restoring vegetation cover is the first step to successful rehabilitation. Vegetation cover decreases flow velocities and minimises erosion.

Ripping Compacted Areas

All areas outside of the footprint areas that will be degraded (by means of vehicles, laydown yards etc.) must be ripped where compaction has taken place. According to the Department of Primary Industries and Regional Development (Agriculture and Food) (2017), ripping tines must penetrate to just below the compacted horizons (approximately 300 – 400 mm) with soil moisture being imminent to the success of ripping. Ripping must take place within 1-3 days after seeding, and also following a rain event to ensure a higher moisture content. To summarise;

- Rip all compacted areas outside of the developed areas that have been compacted;
- This must be done by means of a commercial ripper that has at least two rows of tines; and
- Ripping must take place between 1 and 3 days after seeding and following a rainfall event (seeding must therefore be carried out directly after a rainfall event).

Revegetate Degraded Areas

Vegetation within the footprint areas will be cleared to accommodate the excavation activities coupled with the proposed footprint areas' foundations. This impact will degrade soil resources, ultimately decreasing the land capability of resources and increasing erosion. According to Russell (2009), areas characterised by a loss of soil resources should be revegetated by means of vegetation with vigorous growth, stolons or rhizomes that more or less resembles the natural vegetation in the area.

It is recommended that all areas surrounding the development footprint areas that have been degraded by traffic, laydown yards etc. must be ripped and revegetated by means of indigenous grass species. Mixed stands or monocultures will work sufficiently for revegetation purposes. Mixed stands tend to blend in with indigenous vegetation species and are more natural. Monocultures however could achieve high productivity. In general, indigenous vegetation should always be preferred due to various reasons including the aesthetical presence thereof as well as the ability of the species to adapt to its surroundings.

Plant phase plants which are characterised by fast growing and rapid spreading conditions. Seed germination, seed density and seed size are key aspects to consider before implementing revegetation activities. The number of seed should be limited to ensure that competition between plants are kept to a minimum. During the establishment of seed density, the percentage of seed germination should be taken into consideration. *E curvula* is one of the species recommended due to the ease of which it germinates. This species is also easily sown by means of hand propagation and hydro seeding.

The following species are recommended for rehabilitation purposes;

- *Eragrostis teff;*
- *Cynodon species (Indigenous and altered types);*
- *Chloris gayana;*
- *Panicum maximum;*
- *Digitaria eriantha;*
- *Anthephora pubescens; and*
- *Cenchrus ciliaris.*

6.5.5. Implications for project implementation

One soil form was identified within the project area, namely the Swartland soil form. The land capability of the abovementioned soil has been determined to be class "III" and a climate capability level 8 given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capabilities and climate capabilities results in a land potential "L6". The "L6" land potential level is characterised by very restricted potential. Regular and/or severe limitations are expected due to soil, slope, temperatures or rainfall. This land potential is regarded as non-arable.

This land potential level was used to determine the sensitivities of soil resources. Only "Low" sensitivities were determined throughout the project area by means of baseline findings. Considering the low sensitivities associated with land potential resources, it is the specialist's opinion that the proposed activities will have an acceptable impact on soil resources and that the proposed activities should proceed as have been planned. The proposed activities may proceed as have been planned without the concern of loss of high sensitivity land capabilities or agricultural productivity.

6.6. Assessment of Potential Cumulative Impacts Associated with the project

Impacts of a cumulative nature place the direct and indirect impacts of the proposed project into a regional and national context, particularly in view of similar or resultant developments and activities in the region. Potential cumulative impacts associated with the Sannaspos Solar PV Project were addressed during the EIA conducted in 2013. However, a significant amount of development in the renewable energy sector has occurred since this original EIA was undertaken and it is therefore considered prudent to include consideration of cumulative impacts regarding the proposed additional footprint. The cumulative impacts for the additional footprint are described below.

The cumulative impacts associated with the additional footprint have been viewed from two perspectives within this EIA Report:

- Cumulative impacts associated with the scale of the project (one 90 MW PV Facility on the project site (authorised facility and proposed additional footprint)); and
- Cumulative impacts associated with other relevant planned, approved, or existing solar developments within a 30km radius of the project site (multiple PV facilities in the proximity of the site).

The site for the proposed development (Portion 0 of Farm 2962 Lejwe and Portion 0 of Farm 1808 Besemkop) is located adjacent to the authorised 150 ha area for the Engie Sannaspos Solar PV facility. The facility is also located within 30km from one existing and several other authorised solar PV facilities. These projects include the following:

Project Name	Distance from the proposed site	Project Status
Sannaspos Solar PV (Pty) Ltd PV Phase 1 (DFFE reference number (DFFE Reference No.: 14/12/16/3/3/2/360/1).	Located within the project site and adjacent to the additional footprint	Environmental Authorisation issued
Pulida Solar Farm (Pty) Ltd on The Remainder of The Farm Klipdrift 20, Letsemeng Local Municipality, Xhariep District Municipality, Free State Province (DFFE reference No. 14/12/16/3/3/2/391)	12 km South	Project operational
Terra Works Proposed Establishment of a Photovoltaic Solar Plant in Batshabelo, Mangaung Local Municipality, Free State. (DFFE reference number: 12/12/20/2514)	8.44 Km East	Environmental Authorisation issued
Serurubele Solar Power Plant (Pty) Ltd proposed Serurubele Photovoltaic Solar Energy Facility Near Bloemfontein within Mangaung Metropolitan in Free State Province. (DFFE reference number: 14/12/16/3/3/2/675)	23.68 km West	Environmental Authorisation issued

These projects were identified using the Department of Forestry, Fisheries and the Environment's latest release of the South African Renewable Energy EIA Application Database (REEA_OR_2021_Q1, 2022)[8] as well as from knowledge of the project team. A map showing other relevant solar projects in the study area is provided in **Figure 6.4**.

[8] Source: The DEA's Environment Geographic Information Systems (EGIS) website (https://egis.environment.gov.za/).

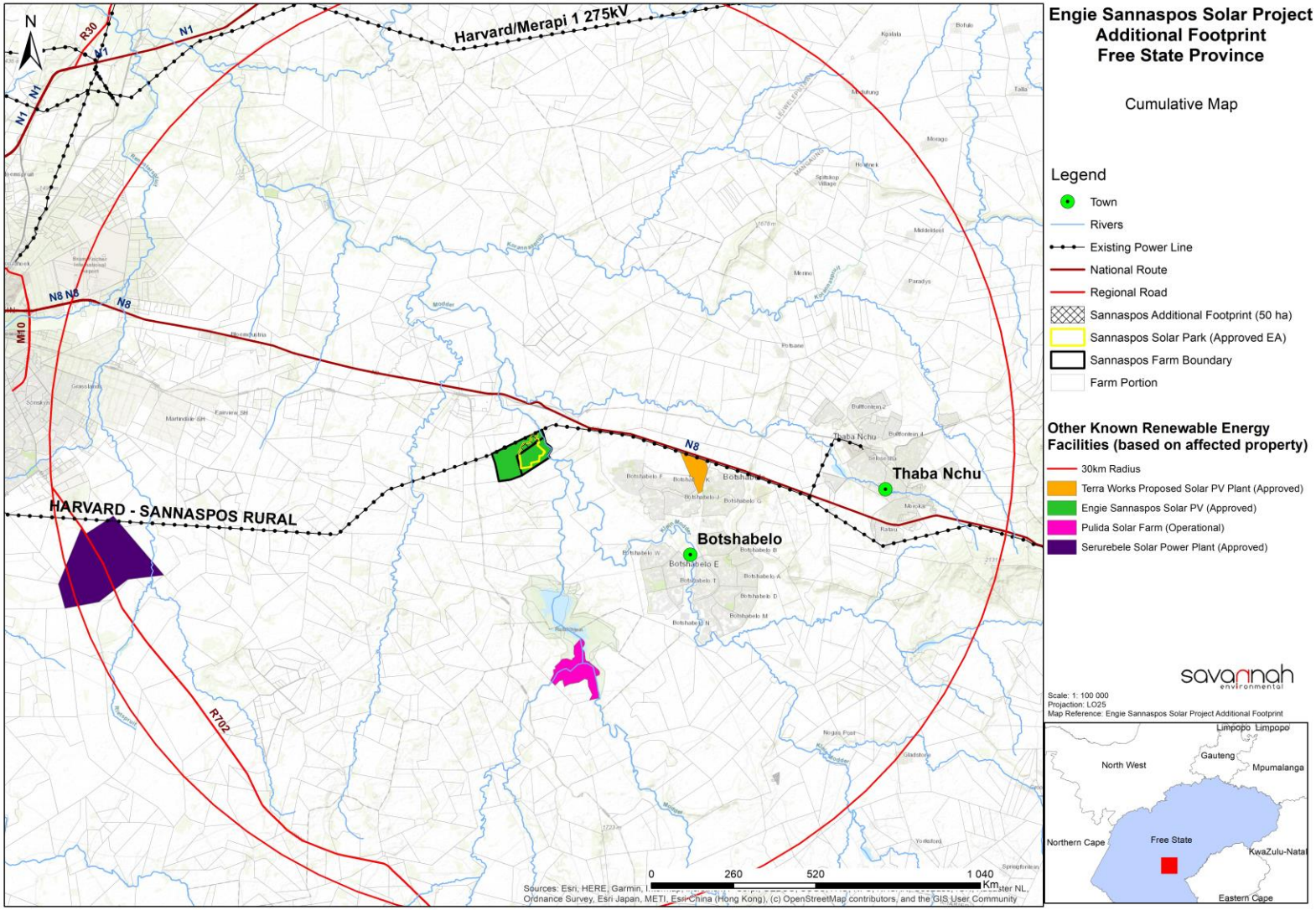


Figure 6.2: Cumulative map illustrating other approved and/or constructed PV facilities located within the vicinity of the additional footprint (**Appendix D**)

6.6.1. Cumulative Impacts on Biodiversity

Impact Nature: Cumulative habitat loss within the region The development of the proposed infrastructure will contribute to cumulative habitat loss within ESAs and thereby impact the ecological processes in the region.		
	Overall impact of the proposed development considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Low (2)	Moderate (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Highly probable (4)
Significance	**Medium (30)**	**Medium (52)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated	To some degree, but most of the impact results from the presence of the various facilities which cannot be well mitigated.	
Mitigation: Ensure that a rehabilitation plan and IAP management plan be compiled for each development and are effectively implemented.		

6.6.2. Cumulative Impacts on Land Capability

Cumulative impacts within the proposed PV area and its surroundings have been determined to be low. Soil resources in the area has been impacted upon predominantly by means of erosion although to a lesser extent.

Nature: Loss of land capability		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Implement project-specific mitigation measures recommended.		
Residual Impacts: Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.		

6.6.3. Conclusion

A total of 3067 ha of cumulatively transformed land comprising of other renewable energy developments is located within the 30 km (282 700 ha) radius of the additional footprint for the Sannaspos Solar Project. With

the development of solar energy facilities in the Free State Province it is expected that the landscape will be altered by renewable energy development (Lavin, 2021). However, the facilities surrounding the additional footprint are scarcely located throughout the greater project area and comprise of a small fraction of the total land area which is predominantly agricultural fields and open natural areas. There are no other renewable energy facilities to the north of the project site. Furthermore, existing facilities are evenly distributed throughout the landscape imposing no major aesthetic alteration to the landscape or impacts regarding species fragmentation.

The following conclusions can be drawn regarding the cumulative impacts associated with the project:

- There will be no unacceptable loss or impact on ecological aspects (vegetation types, species and ecological processes) due to the development of the PV facility within the additional footprint and other renewable energy projects within the surrounding area, provided the recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.
- There will be no significant loss of sensitive and significant aquatic features. The cumulative impact is therefore acceptable.
- There will be no unacceptable loss of land capability due to the development of the PV facility within the additional footprint and other renewable energy projects within the surrounding area, provided recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.

All cumulative impacts associated with the development of the PV facility within the additional footprint will be of a medium or low significance. A summary of the cumulative impacts is included in the table below.

Issue	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Ecology	Medium	Medium
Soils and land Capability	Low	Low

6.7. Assessment of the "do- nothing" Alternative

The 'Do-Nothing' alternative is the option of not utilising the additional footprint for the Sannaspos Solar PV Facility. This means utilising only the authorised 150 ha area. Should this alternative be selected, there would be no environmental impacts on the additional footprint.

The" do-nothing" alternative was assessed during the 2013 EA of the authorised 150 ha area and is considered to be relevant to the development of the Sannaspos Solar PV Project on the additional area which is located directly adjacent to the authorised area. The following paragraphs summarise the findings of the "do-nothing" alternative as assessed in the 2013 EA which are considered relevant to the proposed additional footprint.

The no-go is the continuation of the existing land use, i.e., maintain the status quo. As detailed in the sections above, there would be no environmental impacts on the site or to the surrounding local area due to the construction and operation activities of a solar energy facility with the implementation of this alternative. All negative impacts, specifically related to the development of the solar facility, discussed in this report will not materialise.

The 'do-nothing' alternative will do little to influence the renewable energy targets set by government. However, as the project site experiences ample solar resource and optimal grid connection opportunities are available, not developing the Sannaspos Solar PV Project would see such an opportunity being lost. As current land use activities can continue on the site once the project is operational, the loss of the land to this project during the operation phase is not considered significant. In addition, the Free State Province will not benefit from additional generated power being evacuated directly into the province's grid. Therefore, from a regional perspective, the 'do-nothing' alternative is not preferred as there is a perceived loss of benefits for the regional area.

From the specialist studies undertaken in 2013, no environmental fatal flaws were identified to be associated with the Sannaspos Solar PV project. Visual impacts remain low. All impacts associated with the project can be mitigated to acceptable levels. If the solar facility is not developed the following positive impacts will not be realised:

- Job creation from the construction and operation phases.
- Economic benefit to participating landowners due to the revenue that will be gained from leasing the land to the developer.
- Meeting of energy generation mix in a most economic and rapid manner.
- Provision of clean, renewable energy in an area where it is optimally available.

In addition to the above, if the additional area proposed for the PV infrastructure is not utilised, the benefits as a result of the opportunity to utilise single-axis trackers with bi-facial modules and install a more efficient solar PV facility on the site will be foregone. This will result in a less efficient solar facility being constructed which would result in the requirement for additional PV facilities to be developed elsewhere.

The 'do nothing' alternative is therefore not preferred and not proposed to be implemented for the development of the Sannaspos Solar PV Project on the additional footprint.

CHAPTER 7: CONCLUSION AND RECOMMENDATION

This Environmental Impact Assessment Report is aimed at detailing the nature and extent of the proposed development by identifying, and assessing potential issues associated with developing solar infrastructure associated with the Sannaspos Solar PV Facility on the additional footprint. This is done by identifying potential environmental fatal flaws and/or areas of sensitivity to inform the best placement of infrastructure on the additional footprint as well as inform effective mitigation and management strategies as defined in the EMPr. This EIA Report has been compiled in terms of the 2014 EIA Regulations (GNR 326) published in terms of Section 24(5) of NEMA.

A summary of the conclusions of the assessment of the potential impacts identified to be associated with development within the additional footprint is provided in **Section 7.2**. Recommendations regarding mitigation and management of environmental sensitivities required to be undertaken throughout the project life cycle are defined in the EMPr included in **Appendix K**.

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
3(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.	A summary of the findings of the specialist studies undertaken for the Sannaspos Solar PV Additional Footprint has been included in **section 7.2.**
3(l) an environmental impact statement which contains (i) a summary of the key findings of the environmental impact assessment, (ii) (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and (iii) (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	An environmental impact statement containing the key findings of the environmental impacts of the Sannaspos Solar PV Additional Footprint has been included as section 7.5. An Environmental Sensitivity and Layout map of the Sannaspos Solar PV Facility has been included as **Figure 7.1** which overlays the development footprint (as assessed within the EIA) of the solar facility with the environmental sensitive features located within the project site. An optimised layout which adheres to the avoidance measures based on the sensitivity analysis has been provided by the developer and has been overlain with the environmental sensitivities (**Figure 7.2**). A summary of the positive and negative impacts associated with the Sannaspos Solar PV Additional Footprint has been included in **section 7.6**.
3(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed [impact management objectives, and the] impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions for authorisation;	Recommendations from the specialist reports and impact management objectives are outlined in **section 7.2**. Key conditions required to be included within an authorisation issued for the development of infrastructure associated with the Sannaspos Solar PV

Requirement	Relevant Section
	facility within the identified additional footprint are discussed in **section 7.6**.
(n) the final proposed alternatives which respond to the impact management measures identified through the assessment;	**Section 7.4** summarises the environmental costs versus benefits of the project which informed the selection of the preferred alternative.
3(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	All conditions required to be included in the Environmental Authorisation of the Sannaspos Solar PV Additional Footprint has been included in **section 7.6**.

7.2 Conclusions drawn from the Evaluation of the PV Facility Development

Sannaspos Solar PV (Pty) Ltd received an Environmental Authorisation for the proposed Sannaspos PV Plant Phase 1 and associated infrastructure, located on Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe, within the Mangaung Metropolitan Municipality, Free State Province in May 2013 (DFFE Reference No.: 14/12/16/3/3/2/360). The project has been selected as a Preferred Bidder project under Round 5 of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

A developmental footprint of 150 ha in extent is authorised for the facility and associated infrastructure. In order to implement the project, an additional 50ha is required. This additional area is located within the properties assessed for the project. This additional area is located immediately adjacent to the authorised area and within on Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe.

The need for the additional footprint for the construction of the solar PV facility is due to the advancements in technology and spatial needs for the optimised operation of the facility. The developer (Sannaspos Solar PV (Pty) Ltd) proposes to install bifacial PV modules, which enable energy generation from both sides of the PV modules thus requiring additional space between PV module rows, compared to traditional monofacial PV modules, for reflected solar irradiation (solar energy) to reach the underside of the bifacial modules. This will improve the technical and economic feasibility of the project, ultimately reducing the cost of the electricity.

The preceding chapters of this report together with the specialist studies contained within **Appendices G to I** provide a detailed assessment of the potential impacts that may result from the development of the proposed solar infrastructure within the additional footprint. This chapter concludes the environmental assessment of the project by providing a summary of the results and conclusions of the assessment of the development area. In so doing, it draws on the information gathered as part of the EIA process, the knowledge gained by the environmental specialists and the EAP and presents a combined and informed opinion of the environmental impacts associated with the project.

No environmental fatal flaws were identified in the detailed specialist studies conducted. It is recommended that mitigation measures are implemented to reduce impacts to acceptable levels. The potential environmental impacts associated with development within the additional footprint identified and assessed through the EIA process include:

- Impacts on Terrestrial Biodiversity
- Impacts on Aquatic Ecology
- Impacts on Soils and Agricultural Potential

7.2.1. Potential Impacts on Terrestrial Ecology

The completion of a comprehensive desktop study, in conjunction with the results from the field survey, suggest there is a good confidence in the information provided. The survey ensured that there was a suitable ground truth coverage of the assessment area and most habitats and ecosystems were assessed to obtain a general species (fauna and flora) overview and the major current impacts were observed. The conservation status is classified as Least Concern albeit the protection level is regarded as 'Not Protected and Poorly Protected' Ecosystem. Moreover, the proposed activity overlaps with an ESA1, ESA2 and NPAES.

The current layout, the project area overlaps within sensitive habitats and other areas of high biodiversity potential. Portions current layout as well as the expected access and service road of the development would be considered to have a significant and high negative impact as it would directly affect the habitat of threatened plant species and expected listed avifaunal species that use these ecosystems;

» The assessment area possesses a protected flora species. Moreover, protected fauna are ubiquitous within the assessment area and surrounding landscape was ubiquitous within the assessment area and surrounding landscape; and
» One threatened species of avifauna were observed to occur and utilise the habitats within the assessment area during the survey period. *Sagittarius serpentarius* (Secretarybird) possess high priority scores indicating that they are particularly susceptible to collisions with power lines. Excessive noise will lead to displacement of the species and the vehicle traffic potentially will lead to direct mortality.

The developer is urged to alter the layout or design which represents a compromise between the needs of the development and the environmental concerns at the site, especially in regard to the high sensitivity areas. Historically, overgrazing from livestock (Sheep, goats and cattle) and mismanagement has led to the deterioration these habits. However, the high sensitivity areas can be regarded as important, not only within the local landscape, but also regionally; as they are used for habitat, foraging, water resource and movement corridors for fauna within the landscape.

The habitat existence and importance of these habitats is regarded as crucial, due to the species recorded as well as the role of this intact unique habitat to biodiversity within a very fragmented disturbed local landscape, not to mention the sensitivity according to various ecological datasets.

The very high and sensitivity terrestrial areas surrounding the development site still:

» Serve as and represent ESA as per the Conservation Plan;
» Supports and protects fauna and flora; and
» Support various organisms and may play a more important role in the ecosystem if left to recover from the superficial impacts.

The ecological integrity, importance and functioning of these terrestrial biodiversity areas provide a variety of ecological services considered beneficial, with one key service being the maintenance of biodiversity. The preservation of these systems is the most important aspect to consider for the proposed project.

Any development on the high sensitivity areas will lead the direct destruction and loss of portions of functional ESA, and also the floral and faunal species that are expected to utilise this habitat. Thus, if these areas are not maintained in a natural or near natural state, destroyed or fragmented, then meeting targets

for biodiversity features will not be achieved. The mitigations, management and associated monitoring regarding these operational impacts will be the most important factor of this project and must be considered by the issuing authority.

The main expected impacts of the proposed project will include the following:

» habitat loss and fragmentation;
» degradation of surrounding habitat;
» disturbance and displacement caused during the construction, operational and maintenance phases; and
» direct mortality during the construction phase.

Mitigation measures as described in this report can be implemented to reduce the significance of the risk but there is still a possibility of impacts. Considering that this area that has been identified as being of significance for biodiversity maintenance and ecological processes (ESAs), development may proceed but with caution and only with the implementation of mitigation measures.

Considering the above-mentioned information, no fatal flaws are evident for the proposed project. It is the opinion of the specialist that the project may be favourably considered, on condition all prescribed mitigation measures and supporting recommendations are implemented.

7.2.2. Potential Impacts on Freshwater Resources

In total four (4) water resources were identified and delineated for the project. These included both natural and artificial systems, with the artificial systems comprising of impoundments and drainage features. Three (3) natural wetland hydrogeomorphic (HGM) units belonging to three HGM types (unchannelled valley bottom, depression and seepage) were identified within the 500 m regulated area. The unchannelled valley bottom (HGM 1) is traversed by a portion of the project area and was determined to be the only system at an appreciable level of risk and was the focus for the functional assessment. No functional assessment was completed for the artificial systems.

Overall, HGM 1 scored Moderately Low in terms of the wetland ecosystem services. The wetland was considered relatively important for regulating and supporting benefits. The integrity (or health) for HGM 1 was rated as being in a Largely Modified state (class D). The unchanneled valley bottom wetland type is classified as Critically Endangered and the ecological importance and sensitivity is Moderate.

A 30 m buffer width was recommended for the project. All identified natural wetland units and the Modder River were classified as having a High sensitivity, while the artificial systems and the associated 30 m buffer was assigned a Medium sensitivity. The remaining extent of the project area was assigned a Low sensitivity from a water resource perspective.

A risk assessment was conducted in line with Section 21 (c) and (i) of the National Water Act, 1998, (Act 36 of 1998). High risks are applicable based on the fact that wetlands may be directly impacted on by the proposed development. Medium risk refers to wetland areas that are either on the periphery of the infrastructure and at an indirect risk. Low risks are wetland systems beyond the project area that would be avoided, or wetland areas that could be avoided if feasible. Development in all the 'segments' of the project area is permissible, and the significance of all post-mitigation risks was determined to be low. All

recommendations and mitigation measures are applicable to these areas, in order to achieve a low residual risk significance.

In terms of Water Use Authorisation, owing to the expected post-mitigation Low risks, a General Authorisation is permissible for the development. A General Authorisation has been issued for one of the affected farm portions, namely the farm Basemkop 1808 (reference number: WU23983). An application for the other affected farm (Portion 0 of Farm 2962 Lejwe) is in process (reference number: WU25438).

7.2.3. Potential Impacts on soil and agriculture

One soil form was identified within the project area, namely the Swartland soil form. The land capability of the abovementioned soil has been determined to be class "III" and a climate capability level 8 given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capabilities and climate capabilities results in a land potential "L6". The "L6" land potential level is characterised by very restricted potential. Regular and/or severe limitations are expected due to soil, slope, temperatures or rainfall. This land potential is regarded as non-arable.

This land potential level was used to determine the sensitivities of soil resources. Only "Low" sensitivities were determined throughout the project area by means of baseline findings. Potential impacts identified include:

Direct impacts:
» Erosion due to heavy trucks transporting PV structures

Indirect impacts:
» Water runoff
» Low penetration of rainwater
» Loss of arable land for grazing
» Desertification

Considering the low sensitivities associated with land potential resources, it is the specialist's opinion that the proposed activities will have an acceptable impact on soil resources and that the proposed activities should proceed as have been planned.

7.2.4. Potential Cumulative Impacts

A total of 3067 ha of cumulatively transformed land comprising of other renewable energy developments is located within the 30 km (282 700 ha) radius of the additional footprint for the Sannaspos Solar Project. With the development of solar energy facilities in the Free State Province it is expected that the landscape will be altered by renewable energy development (Lavin, 2021). However, the facilities surrounding the additional footprint are scarcely located throughout the greater project area and comprise of a small fraction of the total land area which is predominantly agricultural fields and open natural areas. There are no other renewable energy facilities to the north of the project site. Furthermore, existing facilities are evenly distributed throughout the landscape imposing no major aesthetic alteration to the landscape or impacts regarding species fragmentation.

Based on the specialist studies undertaken, the following conclusions can be drawn regarding the cumulative impacts associated with the project:

- There will be no unacceptable loss or impact on ecological aspects (vegetation types, species, and ecological processes) due to the development of the PV facility within the additional footprint and other renewable energy projects within the surrounding area, provided the recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.
- There will be no significant loss of sensitive and significant aquatic features. The cumulative impact is therefore acceptable.
- There will be no unacceptable loss of land capability due to the development of the PV facility within the additional footprint and other renewable energy projects within the surrounding area, provided recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.

All cumulative impacts associated with the development of the PV facility within the additional footprint will be of a medium or low significance. A summary of the cumulative impacts is included in the table below.

Issue	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Ecology	Medium	Medium
Soils and land Capability	Low	Low

7.3 Sensitivity Analysis for the Development Area

Figure 7.1 and 7.2 displays the environmental sensitivities as identified in this Environmental Impact Assessment as well as the detailed layout produced by the applicant. The layout overlain with environmental sensitivities aims to make recommendations for the implementation of avoidance strategies and mitigation and management measures to ensure that the final assessed layout retains an environmental impact within acceptable limits. No high sensitivity areas or no-go areas have been identified within the additional footprint. The project overlaps with an ESA1, ESA2 and NPAES. Impacts on these features were assessed to be of low significance after the implementation of mitigation.

Based on an analysis of the identified sensitivities for the project development area, no optimisation of the layout is required. The layout as presented within **Figure 3** is therefore considered to be the most appropriate from an environmental perspective.

7.4. Environmental Costs versus Benefits of the Project

Environmental costs can be anticipated at a local and site-specific level and are considered acceptable provided the mitigation measures as outlined in the EIA report and the EMPr are implemented and adhered to. No fatal flaws have been identified.

These environmental costs could include:

- A loss of biodiversity, flora, and fauna due to the clearing of land for the construction and utilisation of land for the PV facility. The cost of loss of biodiversity has been minimised/avoided through the placement of project components and infrastructure outside of CBA1 areas considered to be of high sensitivity.

» Heritage impacts associated with the PV facility. Although no resources were identified within the proposed additional footprint area, there is the potential for impacts on heritage resources during construction. Impacts can be minimised though the implementation of a Chance Finds Procedure, as detailed in the EMPr in **Appendix K**.
» Loss of land for agriculture. The development will remove areas available for agricultural activities. However, based on the low sensitivity of the soils within the additional development footprint for the PV Facility, all activities will have an acceptable impact on agricultural productivity.

Benefits of the project include the following:
» The project will result in important economic benefits at the local and regional scale through job creation, income and other associated downstream economic development identified in the EIA for the Sannaspos Solar PV Facility. This will occur as the implementation of the Sannaspos Solar PVfacility, a Preferred Bidder project, will be facilitated with the addition of the 50ha. These will persist during the preconstruction, construction, operation, and decommissioning phases of the project.
» The project provides an opportunity for a new land use on the affected properties which is considered as a more efficient use of the land and provides an opportunity for financial benefits to the current land use.
» The project contributes towards the Provincial and Local goals for the development of renewable energy as outlined in the respective IDPs.
» The project serves to diversify the economy and electricity generation mix of South Africa through the addition of solar energy.
» South Africa's per capita greenhouse gas emissions are amongst the highest in the world due to the reliance on fossil fuels. The Sannaspos Solar PV Facility (including the additional footprint) will contribute to achieving goals for implementation of renewable energy and sustaining a 'green' economy within South Africa.

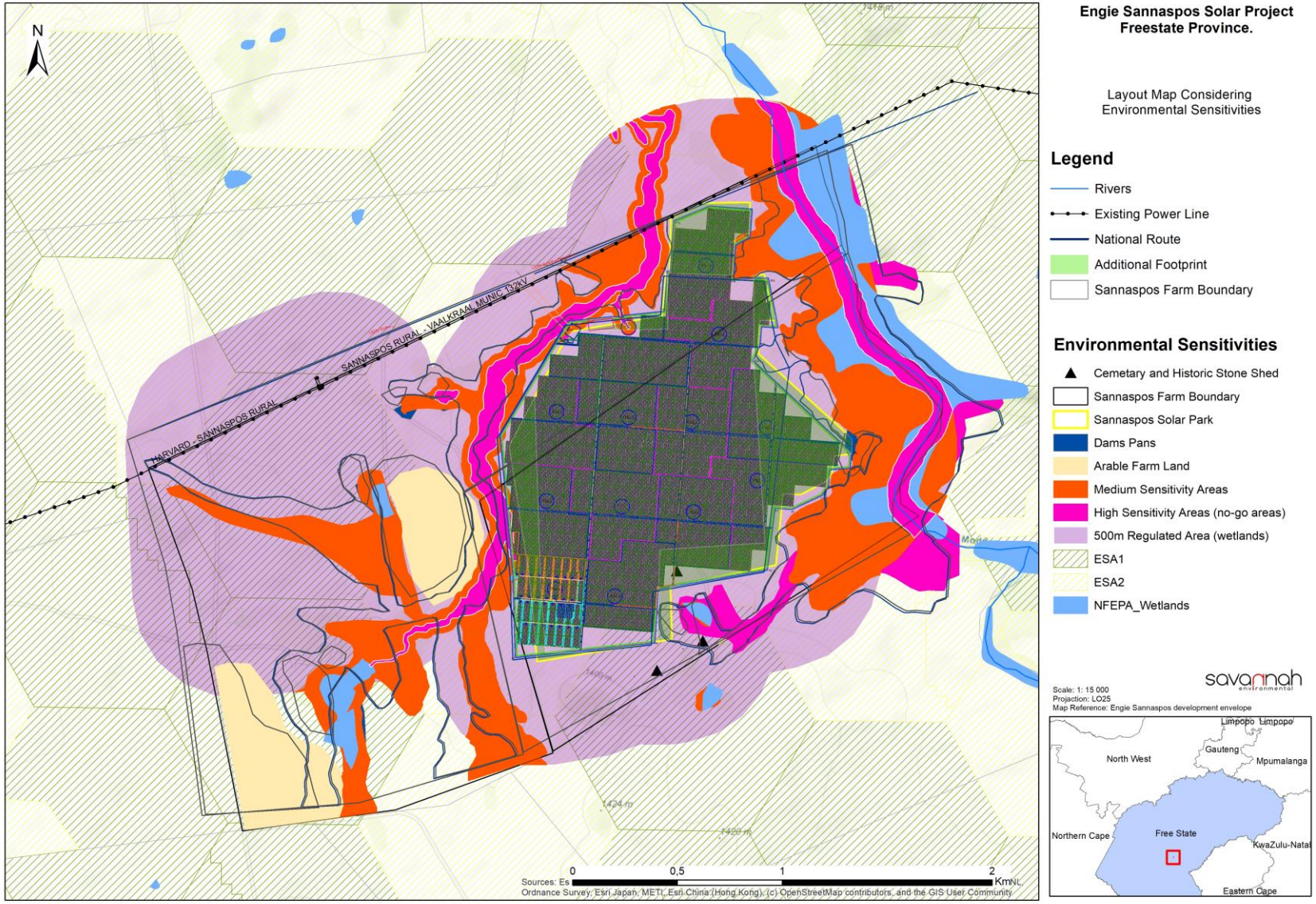


Figure 7.3: Final Layout for the Sannaspos Solar PV Project considering Environmental Sensitivities

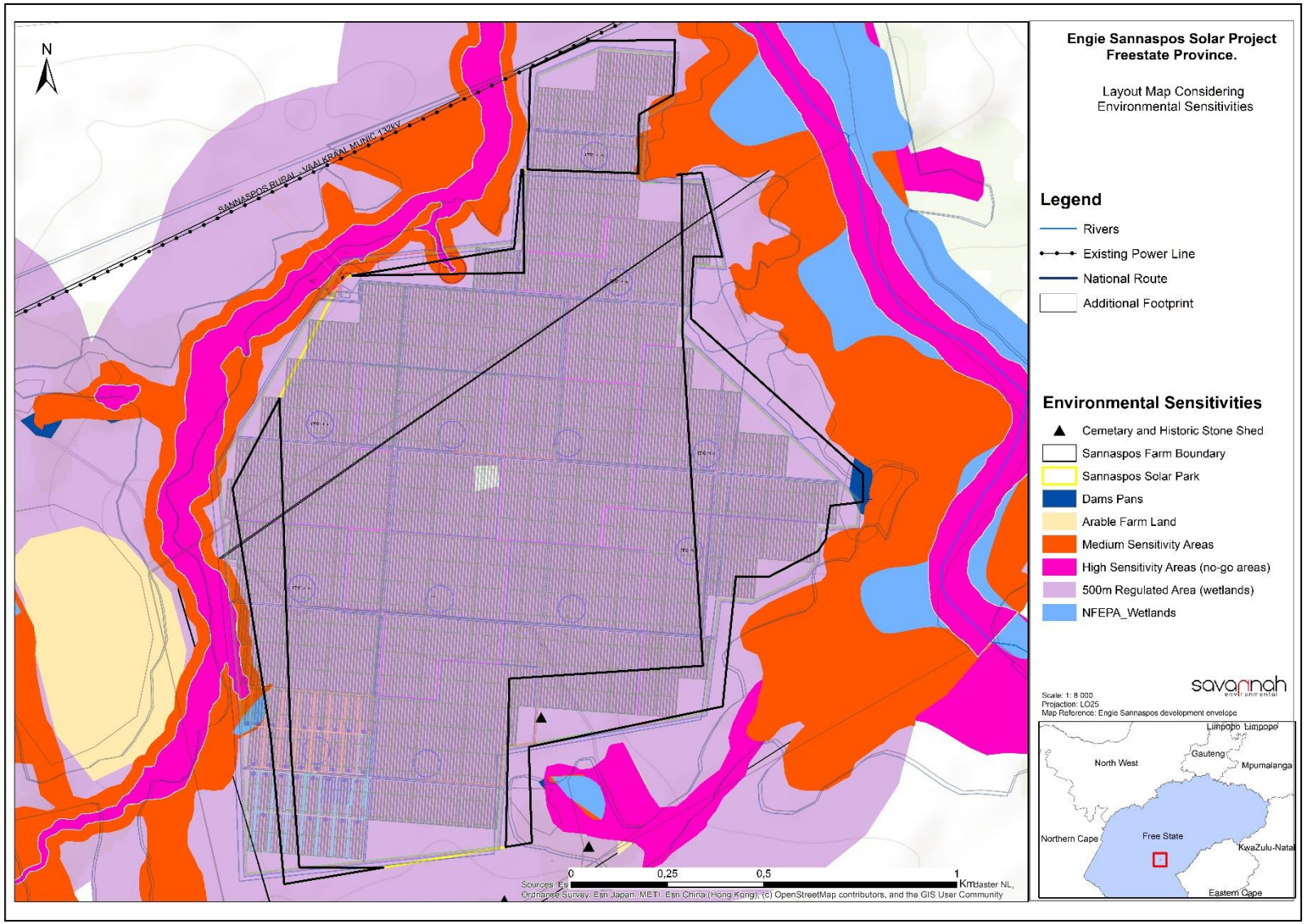


Figure 7.2: Final layout of the Sannaspos Solar PV Facility on the Authorised Area and on the Additional Footprint

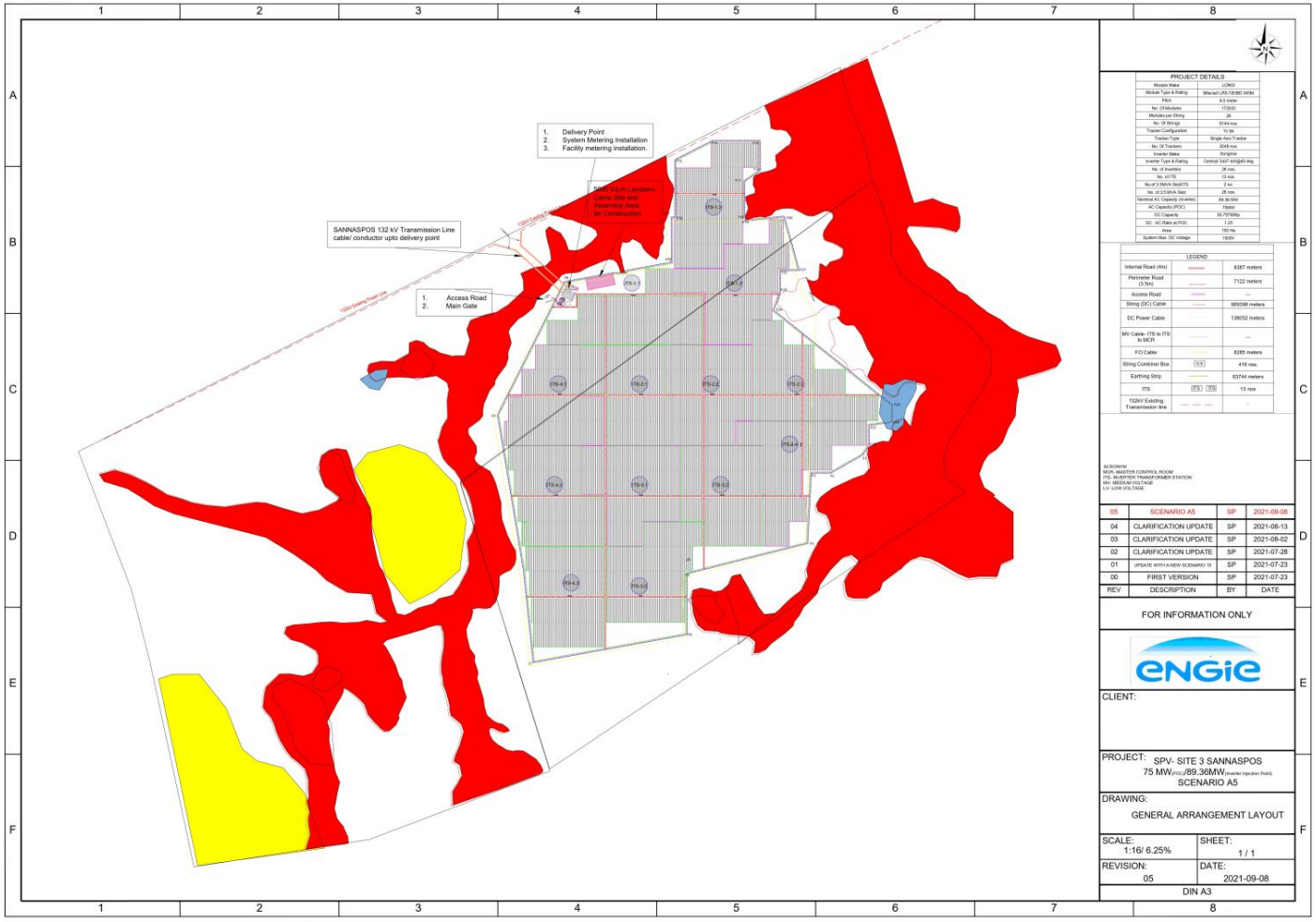


Figure 7.3: Micro setting of Infrastructure provided by the Applicant for the final layout of the Sannaspos Solar PV Facility

The benefits of the development of the Sannaspos Solar PV Facility (including the additional footprint) are expected to occur at a national, regional, and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of infrastructure on the project site within lower sensitive areas through the avoidance of features and areas considered to be sensitive, the benefits of the project are expected to partially offset the localised environmental costs of the PV facility.

7.5. Overall Conclusion (Impact Statement)

The Sannaspos Solar PV Facility, located on Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe, near Sannaspos, has been selected as a Preferred Bidder project under Round 5 of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP). A developmental footprint of 150 ha in extent is authorised for the facility and associated infrastructure. In order to implement the project using the preferred technology, an additional 50ha is required. This additional area is immediately adjacent to the authorised area.

Independent specialists appointed to undertake the assessment of potential impacts associated with the development of PV infrastructure within the additional footprint considered desktop data, results from field work, existing literature and the National Web-based Environmental Screening Tool to inform the identification of sensitivities. The findings of the assessment undertaken have informed the results of this EIA report. The specialist findings have indicated that there are no identified fatal flaws associated with the implementation of the project within the project site.

From a review of the relevant policy and planning framework, it was concluded that the project is well aligned with the policy framework, and a clear need for the project is seen from a policy perspective at a local, provincial, and National level. The project development area is located outside of any formal protected areas and falls within ESA1, ESA2 and NPAES areas as defined within the Provincial Conservation Plan.

As detailed in the cost-benefit analysis, the benefits of the development of the Sannaspos Solar PV project (including that within the additional footprint) are expected to occur at a national, regional and local level. While some impacts of potential significance do exist, it is anticipated that the implementation of appropriate mitigation measures would assist in reducing the significance of such impacts to acceptable levels.

Based on the conclusions of the specialist studies undertaken, it can be concluded that the development of infrastructure associated with the Sannaspos Solar PVfacility within the additional footprint based on the current layout as provided by the developer will not result in unacceptable environmental impacts (subject to the implementation of the recommended mitigation measures).

7.6. Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the development footprint proposed by the developer, the absence of the sensitive environmental features within the project site, as well as the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the EAP that the development of infrastructure associated with the Sannaspos Solar PV facility within the identified additional footprint is acceptable within the landscape and can reasonably be authorised. The proposed layout as provided by the developer (**Figure 7.1**) is considered to be the most

appropriate from an environmental perspective as it avoids identified sensitivities and recommended buffer areas.

The following infrastructure would be included within an authorisation issued for the project:

» A total of 28 325 bifacial solar panels with a combined capacity of 15 MW
» Internal Access roads

The following key conditions would be required to be included within an authorisation issued for the development of infrastructure associated with the Sannaspos Solar PV facility within the identified additional footprint:

» All mitigation measures detailed within this EIA report, as well as the specialist reports contained within **Appendices G to I** are to be implemented.
» The EMPr as contained within **Appendix K** of this EIA report should form part of the contract with the Contractors appointed to construct and maintain the solar facility in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the project is considered key in achieving the appropriate environmental management standards as detailed for this project.
» Implement a chance finds procedure for the rescuing of any fossils or heritage resources discovered during construction.
» Maintain vegetation cover (i.e., either natural or cultivated) immediately adjacent to the actual development footprint, both during construction and operation of the proposed facility.

A validity period of 10 years of the Environmental Authorisation is requested, should the project obtain approval from DFFE.

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