1. Introduction

1.1 This document

This Non-Technical Summary (NTS) provides an overview of the Environmental Impact Assessment (EIA) and Amendment process for the proposed Springbok Solar Power Plant, near Welkom/Virginia, Free State Province. It has been prepared by Environamics. The EIA was undertaken in compliance with the National Environmental Management Act (Act 107 of 1998), as amended, and the EIA Regulations, as amended. The project received Environmental Authorisation (EA) on 25 April 2022. The Holder of the EA is proposing amendments to the EA. The Department of Forestry, Fisheries and the Environment (DFFE) Reference number is 14/12/16/3/3/2/2087.

The NTS describes the project proposal, and the potential impacts the Project may have on the biophysical and socio-economic environments. It also addresses the measures that the Project will implement to reduce significant negative impacts and to enhance potential social benefits, and how environmental and social issues will be managed during the construction, operation and decommissioning phases. The NTS is a short document written in non-technical language that can be used to share the findings of the EIA and Amendment process to the general public.

1.2 Overview of Project

Springbok Solar Power Plant (RF) (Pty) Ltd was issued with an EA for the development of a 150 MW photovoltaic solar facility and associated infrastructure on the Farm Weltevrede No. 638, Registration Division Theunissen, situated within the Matjhabeng Local Municipality in the Free State Province The town of Virginia is located approximately 10km north-northeast of the proposed development and the town of Welkom is located approximately 23km north-northwest of the proposed development. The total development footprint of the project will approximately be 350 hectares. The power line will connect the facility to the national grid by connecting into the existing Theseus MTS 400/132/22kV Substation.

1.3 Project Justification

The proposed activity is a direct result of the growing demand for electricity and the need for renewable energy in South Africa. According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fuelled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. The proposed project is intended to form part of the Department of Mineral Resources and Energy's (DMREs) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or any other appropriate energy generation programmes / opportunities. These Programmes aim to secure the generation of electricity from Renewable energy sources (Wind, Solar and Hydro), while simultaneously diversifying South Africa's electricity mix.




1. Introduction Continued

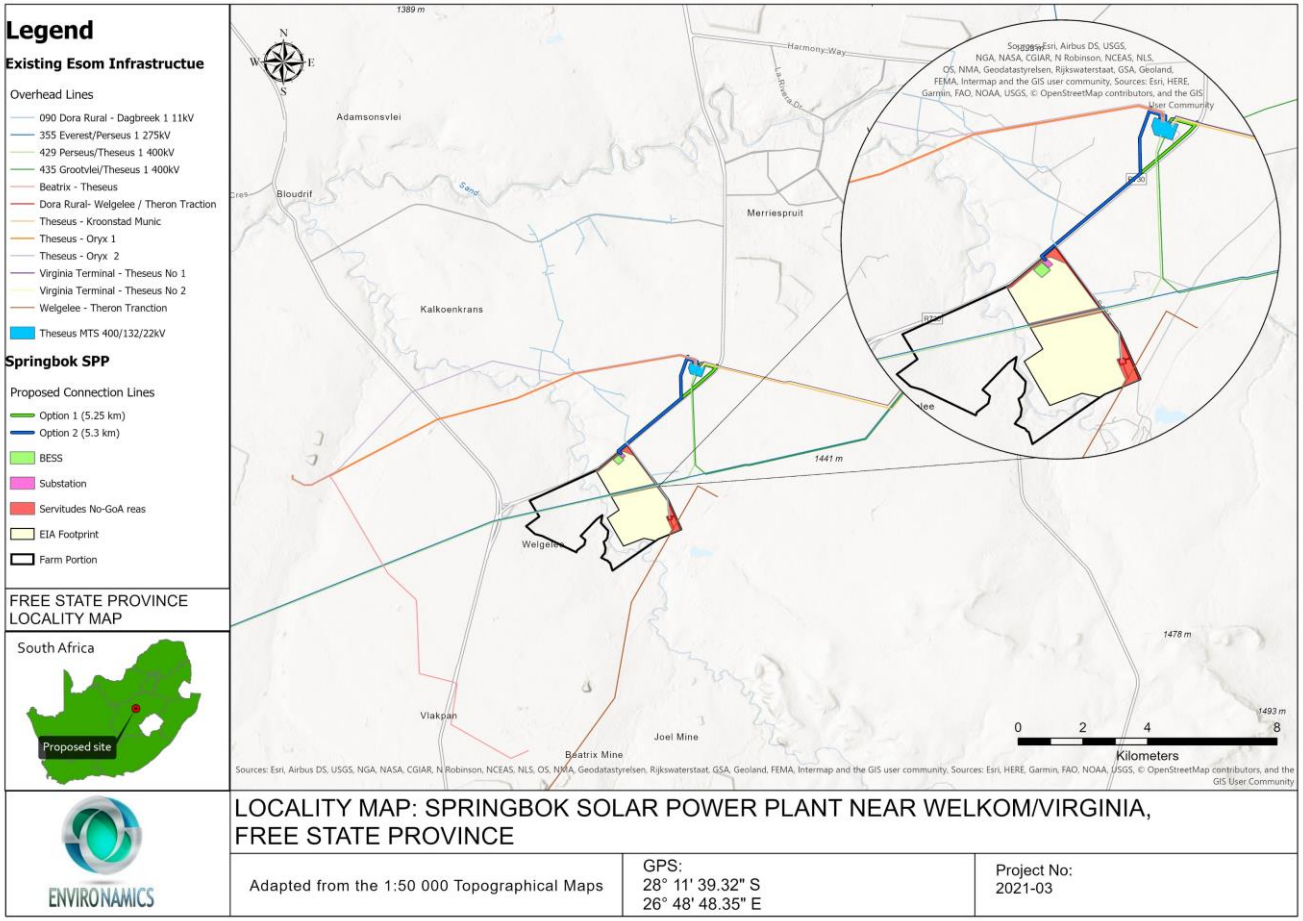


Figure 1:Project Location

2. How does a Typical PV Facility work?

2.1 Project Justification

Solar Panels capture light energy from the sun to generate electricity through a process known as the Photovoltaic effect, where light energy energise the electrons to produce electricity. Each PV cell is made of silicon which is positively and negatively charged on either side, with electrical conductors attached to both sides to form a circuit. This circuit captures the electric current which is transmitted along power lines to nearby substations and ultimately distributed to the consumers as indicated in Figure 2.

Figure 2: The Solar Energy process (source: https://www.eeweb.com/solar-power-plant-working-and-benefits/)

2.3 Services provision

Water: Water for the development will most likely be obtained from the local municipality, or alternatively from ground water resources.

Sanitation: Portable chemical toilets will be utilised, that will be serviced privately or by the local municipality**.**

Waste: Waste will be disposed of at a licensed landfill site.

Electricity: During construction, electricity will either be generated on site through a small solar system or through the use of generators or the existing Eskom supply on the affected property will be utilised.

2.2. Key components of the Proposed project

- **PV Panel Array:** To produce up to 150MW the facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV facility.
- **Battery Energy Storage System (BESS):** Up to 500 MWh Battery Storage Facility with a maximum height of 8m and a maximum volume of 1740 m3 of batteries and associated operational, safety and control infrastructure.
- **Inverters:** The inverter is a pulse-width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency.
- **Connection to grid to transform voltage from 33kV to 132kV:** Connecting the array to the electrical grid requires the transformation of the voltage from 33kV to 132kV.
- **Grid Connection:** The onsite substation will be required on site to step the voltage, after which the power will be evacuated into the national grid via the new proposed power line to the Theseus Main Transmission 400/132/22kV Substation.
- **Electrical reticulations network**: The internal network will be laid ~2.4m underground as far as practically possible.
- **Supporting infrastructure:** The following auxillary building will be required on site and will include water and electricity: office, switch gear and relay room, staff lockers and changing room and security control.
- **Roads:** Access will be obtained via the the S485 gravel road off the R730 Regional Route. An internal site road network will also be required to provide access to the solar field.
- **Fencing:** For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farms. The project will have permanent security on site for 24hrs per day, 7 days a week. Fencing with a height og 2,5 meter will be used.

Decommissioning: The operating period will be up to 20 years from the commencement date of the operation phase. Thereafter two rights of renewal periods of 40 years and 30 years will be relevant.

3. Alternatives

3.1 No-go Alternative

This alternative considers the option of 'do nothing' and maintaining the status quo. The site is currently zoned for agricultural land uses. Should the proposed activity not proceed, the site will remain unchanged.

3.2 Location Alternatives

No other properties have at this stage been secured by Springbok Solar Power Plant (RF) (Pty) Ltd in the Virginia/Welkom area to potentially establish the Springbok Solar Power Plant. From a local perspective, the farm Weltevrede No. 638, is preferred due to its suitable climatic conditions, topography, environmental conditions, proximity to a grid connection point, as well as site.

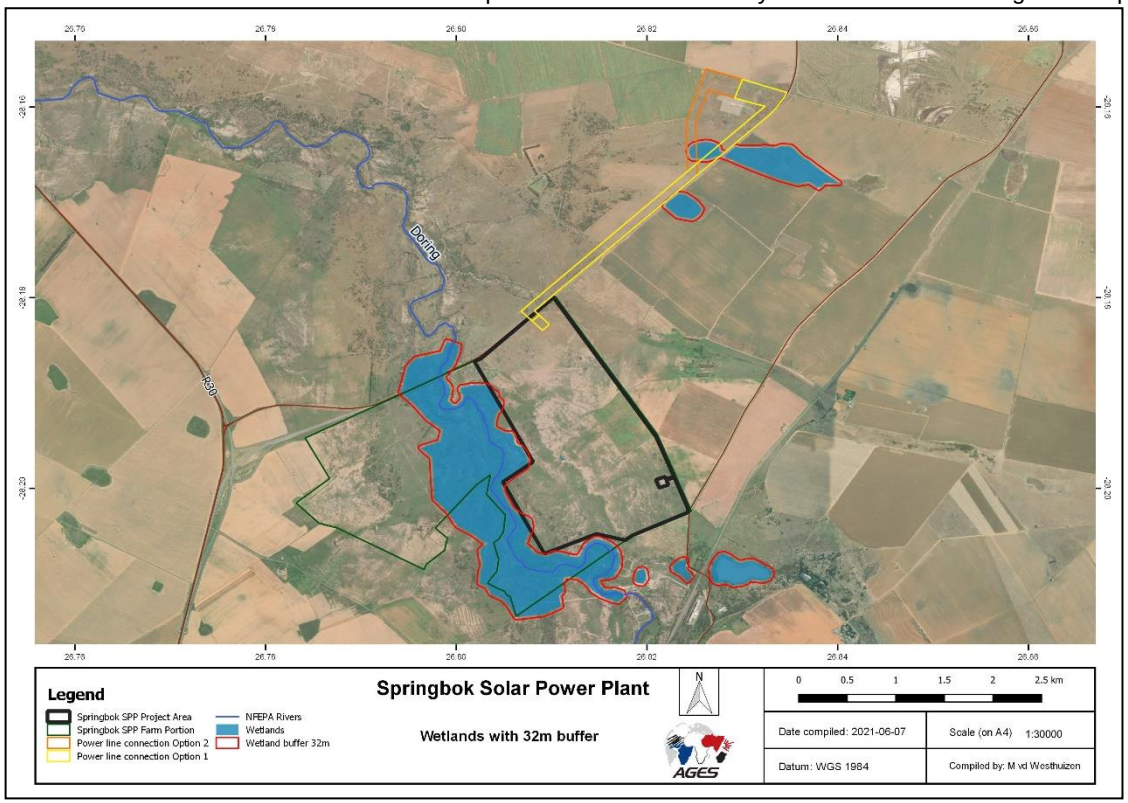
Figure 3: Photograph of the site

3.3 Activity Alternative

The BA process also needs to consider if the development of a solar PV facility would be the most appropriate land use for the particular site. Solar PV technology is appropriately suited to the site, given the high irradiation values for the Welkom / Virginia area.

3.4 Technical Alternatives

Possible technical alternatives for the development of a solar PV facility were considered during the EIA process. These include:



3.4.1 Grid Connection: It is expected that generation from the facility will tie in with the Theseus MTS 400/132/22kV Substation. The preferred power line route is located north-northeast of the project footprint. It is proposed that from this substation one power line will be constructed to connect the project to the Theseus MTS 400/132/22kV substation located approximately 5 kilometres north-northeast of the site. The two proposed 132kV overhead transmission line routes are the only preferred alternatives that were assessed. Option 1 is authorised.

3.4.2 BESS: While there are various battery storage technologies available, the preferred alternative is the utility-scale Lithium-ion (Li-ion) battery energy storage. Li-ion batteries have emerged as the leading technology in utility-scale energy storage applications because it offers the best mix of performance specifications, such as high charge and discharge efficiency, low self-discharge, high energy density, and long cycle life.

3. Alternatives Continued

3.5 Design and layout alternatives

Design alternatives were considered throughout the planning and design phase. The layout follows the limitations of the site and aspects such as environmental sensitive areas, roads, areas under crop production considered as valuable by the landowner, fencing and servitudes are considered.

With regards to the structure orientation, the panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.

The choice of pylon structure to be used for the power lines will be determined in consultation with Eskom. The structures to be utilized for the power line towers include the steel lattice towers, steel monopoles and wooden poles

3.6 Technology Alternatives

There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon, thin film or bifacial PV panels. The technology that (at this stage) proves more feasible and reasonable with respect to the proposed solar facility is crystalline silicon panels, due to it being non-reflective, more efficient, and with a higher durability. However, due to the rapid technological advances being made in the field of solar technology the exact type of technology to be used, such as bifacial panels, will only be confirmed at the onset of the project.

4. Legal Framework & Public Participation

4.1 National Environmental Management Act (NEMA)

Environmental decision making with regards to solar PV plants and associated infrastructure is based on numerous policy and legislative documents. The National Environmental Management Act identifies listed activities (in terms of Section 24) which are likely to have an impact on the environment. These activities cannot commence without obtaining an Environmental Authorisation (EA) from the relevant competent authority. Sufficient information is required by the competent authority to make an informed decision and the project is therefore subject to an environmental assessment process which can be either a Basic Assessment Process or a full Scoping and Environmental Impact Assessment process.

The EIA Regulations No. 324, 325, and 327 outline the activities that may be triggered and therefore require EA. The activities triggered under Listing Notice 1, 2 and 3 for the project implies that the development is considered as potentially having an impact on the environment and therefore require the implementation of appropriate mitigation measures. Based on the activities triggered a full EIA process was undertaken to obtain EA, which is dated 25 April 2022.

Based on the amendments requested by the Holder of the EA a Part 2 Amendment Process needs to be undertaken in terms of the EIA Regulations, 2014 (as amended). This process includes the submission of and Amendment Application and distribution of a draft Motivation Report, see section 4.2 below.

4.2 Public Participation

Public participation is an integral part of the Part 2 Amendment process and aims to involve registered interested and affected parties (I&APs) in the process by notifying them of the proposed Amendments and encouraging them to voice their issues and concerns. Furthermore, the public is also notified of the amendment process and provided with a further opportunity to registered as I&APs on the project database in order to become involved in the amendment process.

The Amendment Process is transparent and allows I&APs to comment on the project/amendments and raise concerns, which are included in the Motivation Report and are taken into consideration during the authorities' decision-making timeframe on the Application for Amendment of the EA. Table 1 indicates the key steps of the Amendment Process and the timelines for the project.

Table 1: Key steps of the Amendment process

Activity	Prescribed timeframe	Timeframe
Placement of advert and site notices	1 Month	09 & 14 March 2023
Submit Amendment Application and Draft Motivation Report to I&APs	-	27 March 2023
Public Participation (Draft Motivation Report)	30 Days	27 March – 02 May 2023
Submit Final Motivation Report	90 Days	Mid May 2023
Decision	107 Days	End August / start September 2023
Appeal period for the decision on the Application	20 Days	September 2023

5. Key Baseline Conditions

5.1 Biophysical Environment

The biophysical environment is described with specific reference to geology, soils, agricultural potential and land capability, vegetation and landscape features, climate, biodiversity, heritage features (in terms of archaeology and palaeontology), the visual landscape and the social environment to be affected.

5.1.1 Geology and Landscape

The site slopes downwards from approximately 1340 mAMSL to 1320 mAMSL from east to west, i.e. towards the Doring River, and the slope flattens towards the river's floodplain. The Doring River is likely the regional drainage feature. A review of the geological map of Winburg (map series 2826, scale 1: 250 000) indicates the site to be underlain by very fine to coarse grained, buff and white sandstone, blue/grey mudstone and shale and subordinate conglomerate of the Adelaide Subgroup, Beaufort Group.

5.1.2 Soil and Agricultural Potential

The land type units represented within the study area include the Dc8 and Bd20 land type.. The majority of the proposed site is classified on the screening tool as less than high (medium) sensitivity for impacts on agricultural resources. The fairly low annual rainfall proves that the climate of the area is a limiting factor to the land capability.

5.1.3 Vegetation and landscape features

The project area falls into the Highveld Alluvial Vegetation unit which is embedded in the Vaal-Vet Sandy Grasslands vegetation unit (Mucina et al., 2018). The last section of the power line connection and the substation falls into the Vaal-Vet Sandy Grasslands vegetation unit. Four plant species that are protected according to Free State Nature Conservation Ordinance 8 of 1969 were recorded.

5.1.4 Surface water resources

The project area borders the Doring River and therefore the riparian area was delineated and assessed. There is also a small exoreic depression (pan) where the proposed power line connection will be. No other wetlands or sensitive areas was identified in the power line corridor.

5.1.5 Climate

The climate is strongly seasonal and semi-arid, with an average rainfall volume of 495 mm/annum, falling between October and May. The summers are hot and wet, with summer temperatures ranging typically between 17-31°C. The winters are cold and dry, with wintertime temperatures ranging typically between -1 to 17°C. An average of 36 frost days occurs each winter. The soils are perpetually moisture stressed.

5.1.6 Biodiversity

The site is situated in an area of moderate avifaunal diversity, however it is adjacent to an important flyway, the Doring River, and, therefore, has the potential to impact many large, fast-flying and otherwise powerline-sensitive species. The resident avifauna is also represented by relatively high species richness and abundance, for which the total transformation of habitat will generate impacts. The project area falls mostly into Ecological Support Area 1 (ESA1) and to a lesser degree in Ecological Support Area 2 (ESA2).

5.1.7 Visual landscape

The site is located in an area with a medium significance in elevation. The landform and drainage described above is unlikely to limit visibility, especially towards the west and south west. The development will not visible from the town of Virginia. Areas within 5km might have a clear view without taking existing screening into account.

5.1.8 Traffic Consideration

The development will generate additional traffic on the surrounding road network in three (3) distinct phases, namely: construction, operational and decommissioning. The impact of the construction trip generation, on the predicted 2023 traffic volumes near the towns of Welkom and Virginia and along the transportation routes, are expected to be low

5,1,9 Socio-Economic conditions

Free State Province is the third biggest province of South Africa in terms of size, and primary agriculture is a key economic sector. Mining is also important but has been declining since 2008. It has the second-smallest population and the second-lowest population density. Languages spoken include Sesotho, Afrikaans and Zulu.

The Lejweleputswa District Municipality makes up almost a third of the province, and consists of five local municipalities, with approximately 18 towns distributed throughout. In 2011 the District Municipality had a population of 624 746 with a dependency ratio of 51.3. By 2016 the population has increased to 646 920 and the dependency ratio was reduced to 46.2.

5.1.10 Cultural and Heritage aspects

No sites, features or objects of cultural significance dating to the Stone Age or Iron Age were identified in the project area. In terms of the historical period a burial site and farmstead are present.

The development is located within an area of potentially medium and very high palaeontological sensitivity. No fossils were recorded within Adelaide Subgroup bedrocks, The mainly Pleistocene to Recent superficial deposits in the project area are poorly known in palaeontological terms.

6. Specialist Studies and Impact Assessment

6.1 Specialist Assessments

To address the key issues highlighted in the previous section the following specialist studies and processes were commissioned and undertaken as part of the EIA Process. Specialist input has also been sought for the Amendment Process.

- Geotechnical Assessment
- Terrestrial Biodiversity Impact Assessment
- Wetland Impact Assessment
- Avifauna Impact Assessment
- Visual Impact Assessment
- Heritage Impact Assessment
- Palaeontological Impact Assessment
- Social Impact Assessment
- Traffic Impact Assessment
- Agricultural Compliance Statement

Each specialist has identified potential impacts and the significance they will have before and after mitigation. The table to the left and overleaf indicates the significance rating per impact for the Construction (C), Operation (O) and Decommissioning (D) phases with the implementation of the recommended mitigation measures.

Impact	C	O	D
Habitat destruction caused by clearance of vegetation	- Medium	- Medium	- Low
Habitat fragmentation caused by clearance of vegetation	- Low	- Low	- Low
Increased soil erosion and sedimentation	- Low	- Low	- Low
Soil, air and water pollution	- Low	- Low	- Low
Air pollution	- Low	- Low	- Low
Spread and establishment of alien invasive species	- Low	- Low	- Low
Negative effect of human activities and road mortalities	- Low	- Low	- Low
Displacement of priority and resident avifauna species	- Low	- Medium	x
Loss of important avian habitats	- Low	- Low	
Collisions with PV panels and electrocution risks leading to injury or loss of avian life which decreases avifauna species diversity	x	- Low	x
Collisions with overhead lines and electrocution risks leading to injury or loss of avian life which decreases avian diversity	x	- Low	x
Electrocution when perched on power line infrastructure	x	- Low	x
Soil compaction and increased risk of sediment transport and erosion in the wetland	- Low	-Low	x
Loss of agricultural potential	- Low	- Low	x
Dust impact and erosion	-Low	- Low	x
Topsoil Loss	-Low	-Low	x
Loss or damage to sites, features or objects of cultural heritage significance	- Low	- Low	x
Disturbance, destruction or damage to fossils preserved at or below surface through surface clearance and excavations during construction phase.	- Low	- Low	x
Visual impact of construction of the solar facility and grid connection	- Low	x	x
Direct and indirect employment opportunities and skills development	+ Medium	+ Medium	x
Economic Multiplier effect	+ Medium	x	x
Potential loss of productive farmland	- Low	x	x
In-migration of people (non-local workforce and jobseekers)	- Low	x	x
Safety and security impacts	- Low	x	x
Impacts on daily living and movement patterns	- Medium	x	x
Nuisance impacts (noise and dust)	- Low	x	x

6. Impact Assessment Continued

Impact	C	O	D
Increased risk of potential veld fires	- Low	N/A	x
Visual and sense of place impacts	- Low	- Low	x
Increase in traffic on the Durban or Saldanha delivery routes	- Low		
Increase in traffic for commuter trips	- Low		
Potential visual impacts on sensitive visual receptors for the solar facility and Grid connection (1km, 1-3km, 3-5km, 5-10km)	x	- Low	x
Lighting Impacts of the solar facility	x	- Low	x
Solar glint and glare impacts of the solar facility	x	- Low	x
Visual and sense of place impacts of the solar facility	x	- Low	x
Visual and sense of place impacts of the grid connection corridor	x	- Medium	x
Direct and Indirect employment opportunities and skills development	x	+Medium	x
Development of non-polluting, renewable energy infrastructure	x	+Medium	x
Potential loss of agricultural land	x	- Low	x
Contribution to Local Economic Development (LED) and social upliftment	x	+High	x
Impact on tourism	x	+ Low	x

7. Mitigation Summary

Field	Main Impacts	Mitigation measure
Terrestrial Biodiversity	Habitat destruction, fragmentation, soil erosion, pollution, spread of alien invasive species, fauna mortalities	Avoid peripheral impacts, sensitive habitats must be avoided, activities restricted to specific areas, environmental training of employees, animal safety to be promoted, poisons and control of animals to be avoided, limit pesticide use, monitoring of activities, rehabilitation of disturbed areas, use of existing infrastructure, minimise land disturbance, protect sloping areas, repair erosion damage, stormwater control and management, store hazardous chemicals on impervious surfaces, implement speed limit, control alien invasive species, no staff accommodation on site, avoid travelling at night.
Avifauna	Loss of species, disturbance, degradation & modification of receiving environment, collisions with PV panels and power lines, electrocution on infrastructure	Minimise construction footprint, preserve indigenous vegetation, control pollution, use designated roads, rehabilitate with indigenous vegetation, roosting areas and nests (where present) must not be disturbed, power lines to be fitted with bird flight diverters.
Visual	Visual impact of construction activities, visual impact on sensitive receptors, lighting impacts, sense of place impacts,	Retain natural vegetation, plan placement of the laydown area, reduce and control dust, limit construction between 07:00 and 18:00, rehabilitate disturbed areas, maintain general appearance, plan lighting impacts and design to minimise lighting impact.
Soils and Agricultural	Loss of land capability	Vegetate/cover all soil stockpiles, spill kits must be available, no cleaning or servicing of vehicles to be undertaken, implement action plans for spills, leaks and impacts to aquatic systems.
Heritage	Loss or damage to heritage sites, features or objects	Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately, all discoveries shall be reported immediately to a heritage practitioner, artefacts must not be removed, destroyed or interfered with.
Palaeontology	Destroy or permanently seal-in fossils	If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented.
Social	Employment and skills development, economic multiplier effect, loss of farm land, in-migration of people, safety and security impacts, impacts on daily movement patterns, nuisance impacts, impact on tourism	Adopt a local employment policy, source labour locally, promote gender equality, site to be fenced off, engage local community representatives, provide transportation for workers, implement a grievance mechanism, appoint a security company, access in an out of the site must be strictly controlled, all vehicles must be road worthy, implement penalties for reckless driving, avoid movement of heavy vehicles over the weekends and public holidays, implement dust suppression, implement a firebreak.
Wetland	Compaction, erosion, watercourse disturbance, pollution	Compaction to be limited, reseed with indigenous grasses, implement erosion control mechanisms, disturbance to wetlands in power line route to be minimised, minimise impact on natural flow regime, perform scheduled maintenance, use existing roads, contain dirty water, provide appropriate sanitary facilities, rehabilitate disturbed areas.