



LION THORN SOLAR PV FACILITY 145 (PTY) LTD PROPOSED DEVELOPMENT OF THE LION THORN SOLAR PHOTOVOLTAIC ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE NORTH WEST PROVINCE

Draft Scoping Report

Issue Date:08 August 2023Revision no.:1.0Project No.18086DFFE Reference Number:TBC

Date:	03 August 2023
Document Title:	Draft Scoping Report: The Proposed Development of the Lion Thorn Solar Photovoltaic Energy Facility and associated Infrastructure near Leeudoringstad, North West Province
Revision Number:	1.0
Author:	Zikhona Wana (EAP) <i>Reg. EAP</i> , EAPASA Reg. No. 2019/555 <i>Pri.Sci.Nat.</i> , SACNASP Reg. No. 119417
Checked by:	Michelle Nevette <i>Reg. EAP</i> , EAPASA Reg No. 2019/1560 <i>Cert.Sci.Nat.</i> , SACNASP Reg No. 120356
Approved by:	Michelle Nevette <i>Reg. EAP</i> , EAPASA Reg No. 2019/1560 <i>Cert.Sci.Nat.</i> , SACNASP Reg No. 120356
Signature:	Mevette
Client:	Lion Thorn Solar PV Facility145 (Pty) Ltd

Confidentiality Statement

© SiVEST SA (Pty) Ltd All rights reserved

Copyright is vested in SiVEST SA (Pty) td in terms of the Copyright Act (Act 98 of 1978). This report is strictly confidential and is to be used exclusively by the recipient.

Under no circumstances should this report or information contained therein be distributed, reprinted, reproduced or transmitted in any form or by any means, electronic or mechanical, without the written consent of SiVEST SA (Pty) Ltd.

KEY PROJECT INFORMATION

Component	Description/ Dimensions		
	27°11'46.28"S		
Location of site (centre point)	26°17'44.21"E		
Application site area	Approximately 324 ha (overall farm area)		
Solar Photovoltaic development area	Approximately 324 ha		
SG codes	T0HP0000000004400006		
Export capacity	Up to 200 MW(ac)		
Proposed technology	PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology. Each PV module will be approximately 2274mm (≈2.3m) long and 1134mm (≈1.1m) wide and mounted on supporting structures above ground. At this stage it is anticipated that the structures will be mono-facial modules. The final design details will become available during the detailed design phase of the proposed development, prior to the start of construction. The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed of the proposed development.		
Max panel height from the ground	6 m		
Substation area	On-site Facility Substation: up to 5000 m ²		
	Switching Substation: up to 25000 m ²		
BESS	Sodium Sulphur) or Vanadium Redox technology and will have a capacity of up to 4.5 GWh. The extent of the system will be approximately 4.57 ha. It must be noted that should the facility layout not require the development and operation of a BESS, the area allocated for the placement of the BESS will be used for papel placement within the development footprint		
	An internal electrical reticulation network will be required and		
Electrical reticulation network	will be laid approximately 2 to 4 m underground as far as practically possible.		
Proximity to grid connection	Connecting the array to the electrical grid requires the transformation of the voltage from 33 kV to 132 kV. The normal components and dimensions of a distribution-rated electrical substation will be required. Approximately 580 m to 2,8 km from proposed SEF site, via underground 33 kV cable network to the proposed new 33/ 132 kV IPP substation and 132 kV Eskom switching station.		
Inverters	is a pulse-width mode inverter that converts DC electricity to AC electricity at grid frequency.		

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Component	Description/ Dimensions	
	Operations and Maintenance building/ office (approximately	
	2500 m²)	
O&M building area	Switch gear and relay room (approximately 800 m ²)	
	Staff lockers and changing room (approximately 200 m ²)	
	Security control (approximately 60 m ²)	
Construction Camp Laydown area	Permanent Laydown Area (about 8 ha)	
Temporary laydown or staging area	Typical area 220m x 100m = 22 000m² (2.2 ha)	
Internal reade	Width of internal access roads: Up to 4m	
	Length of internal roads: Up to 20km	
	Access to the proposed development will be via an existing	
Site Access	gravel road which connects to the tarred R502 road. main	
Sile Access	access road providing direct access to the project will be up to	
	8 m wide.	
	Fencing and lighting.	
	Lightning Protection System.	
	Telecommunication infrastructure.	
Associated Infrastructure	Batching plant (where required).	
	Security infrastructure.	
	Stormwater infrastructure (as required).	
	Water pipelines (as required).	

Prepared by:



Project No.:18086Description:Draft Scoping Report, Proposed 200MW Lion Thorn Solar PV FacilityRevision No.:1.0

Date: 08 August 2023

Page ii

LION THORN SOLAR ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE

DRAFT SCOPING REPORT

EXECUTIVE SUMMARY

INTRODUCTION AND PROJECT DESCRIPTION

Lion Thorn Solar PV 145 (Pty) Ltd is proposing to construct the Lion Thorn Solar Energy Facility (SEF) and associated infrastructure approximately 9 kilometres (km) east of Leeudoringstad in the Maquassi Hills Local Municipality (MHLM) and Dr Kenneth Kaunda District Municipality (DKKDM), in the North West Province (refer to **Figure 1** below).

SiVEST SA (Pty) Ltd's (SiVEST) Environmental Division has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA), i.e. Scoping and Environmental Impact Report (S&EIR), process for the proposed construction and operation of the Lion Thorn SEF and associated infrastructure. The proposed development requires an Environmental Authorisation (EA) from the national Department of Forestry, Fisheries and the Environment/ North West Department of Economic Development, Environmental Impact Assessment Regulations, 2014 as amended (EIA Regulations) promulgated in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act 107 of 1998) as amended (NEMA). Accordingly, the S&EIR for the proposed development will be conducted in terms of the EIA Regulations. The **DFFE Reference Number** is to be allocated.

The SEF is envisaged to have a maximum total generation capacity of up to 200 megawatts alternating current (MWac). The overall objective of the proposed development is to supply suitable private off-taker initiatives (direct supply or wheeling agreements, as applicable), or be bid into the government coordinated Renewable Energy Independent Power Producer Programme (REIPPP) or similar procurement program under the Integrated Resource Plan (IRP).

In order to evacuate the energy generated by the proposed SEF, to supplement the national grid, the applicant is proposing to construct and connect to a new 33/132 kilovolt (kV) Independent Power Producer (IPP) substation and 132 kV Eskom Holdings SOC Limited (Eskom) switching station via an underground 33 kV cable network. This cable network will run from the SEF to the IPP substation and Lion Thorn Switching Station.

The power from the proposed development will be evacuated via the proposed Leeuwbosch powerline grid which is currently undergoing a separate Registration Process in terms of the Standard for the Development and Expansion of Power Lines and Substations within Identified Geographical Areas and the Exclusion of this Infrastructure from the Requirement to obtain EA, Government Notice (GN) 2313 of 2022.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



APPLICABILITY OF NEMA EIA REGULATIONS

The following activities are applied for:

Activity No(s):	Relevant activities as set out in GN No. R. 327, 325 and 324 of the EIA Regulations	Description of the portion of the proposed project to which the applicable listed activity relates
	The development of facilities or	The proposed development involves the construction of medium
11.(i)	intrastructure for the transmission and distribution of electricity: (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV;	voltage cabling (33 kV) to link the various PV arrays internally prior to connecting to the external proposed IPP substation and Eskom switching station.
	The development of:(ii) infrastructure or structures with a physical footprint of $100 m^2$ or more:	The proposed development and
12.(ii)(a)(c)	where such development occurs: (a) within a watercourse;(c) if no	located within a surface water feature / watercourse or within 32m
	32 m of a watercourse, measured from the edge of a watercourse;	feature / watercourse.
	The development of facilities or infrastructure for the storage or for	
14.	the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres (m ³) or more but not exceeding 500 m ³ .	"Dangerous goods" that are likely to be associated with the project include fuel stored during the construction phase. Threshold of 80 m ³ expected to be exceeded.
	The infilling or depositing of any material of more than 10m ³ into, or	The proposed development and associated development may be
19.	the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 m ³ from a watercourse;	located within a surface water feature / watercourse or within 32m from the edge of a surface water feature / watercourse.
		Internal access roads will be required to access the SEF,
	The development of a road:(ii)	although there is existing access to site it the access roads are planned
24.(ii)	meters, or where no reserve exists	to be 8 m with no road reserve.
	where the road is wider than 8 metres;	accommodate cable tranches, stormwater channels (as required), and turning circle/ bypass areas of up to 20m in some sections.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Project No.:18086Description:Draft Scoping Report, Proposed 200MW Lion Thorn Solar PV FacilityRevision No.:1.0

Date: 08 August 2023

Page iv

Activity No(s):	Relevant activities as set out in GN No. R. 327, 325 and 324 of the EIA Regulations	Description of the portion of the proposed project to which the applicable listed activity relates
27.	The clearance of an area of 1 ha or more, but less than 20 ha of indigenous vegetation	Vegetation associated with the Vaal- Vet Sandy Grassland, is likely to be cleared in preparation for the proposed development.
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 1 ha;	The proposed site is currently used and zoned for agricultural purposes, i.e. grazing. The proposed development will result in an area of agricultural land greater than 1 ha being transformed to industrial/ commercial use.
30.	Any process or activity identified in terms of Section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).	As discussed above, the proposed development site falls with the Vaal- Vet Sandy Grassland, this vegetation type is identified as Endangered in terms of the South African National Biodiversity Institute (SANBI) Threatened Ecosystems.
48 (i) (a) (c)	The expansion of- (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	The proposed development will entail the expansion (upgrading) of roads and other infrastructure by 100m ² or more within a surface water feature / watercourse or within 32m from the edge of a surface water feature / watercourse. Although the layouts of the proposed developments will be designed to avoid the identified surface water features / watercourses as far as possible, some of the internal and access roads to be upgraded will need to traverse the identified surface water features / watercourses and construction will occur within some of the surface water features / watercourses and/or be within 32m of some of the surface water features / watercourses.

Prepared by:



Activity No(s):	Relevant activities as set out in GN No. R. 327, 325 and 324 of	Description of the portion of the proposed project to which the
56 (ii)	the EIA RegulationsThe widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -(i) where the existing reserve is wider than 13,5 metres; or 	applicable listed activity relates Internal access roads will be required to access the PV panels and the substation. Existing roads will be used wherever possible, although new roads will be constructed where necessary. The existing access roads will need to be upgraded by widening them many than 6m or by langthaning
Listing Notice 2 (GN No. P. 22	5)	them by more than 1km.
LISTING NOTICE 2 (GN NO. R. 32	ə)	The wave and development will
1.	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 MW or more	entail the construction of a SEF where the respective electricity output will be up to 200 MWac. In addition, the proposed SEF development will be located outside urban areas.
15.	The clearance of an area of 20 ha or more of indigenous vegetation	Vegetation associated with the Vaal-Vet Sandy Grassland, that measures more than 20 ha is likely to be cleared in preparation for the proposed development.
Listing Notice 3 (GN No. R. 32	4)	
4 (h)(ii)(ee)	The development of a road wider than 4m with a reserve less than 13.5 metres. g. North West ii. Outside Urban Areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	The development of the SEF facility and associated infrastructure will require the development of roads wider than 4 m with a reserve of less than 13.5 m within ESA area. These roads will occur within the North West Province, outside urban areas.
10.h.vi	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. h. North West	"Dangerous goods" that are likely to be associated with the project include fuel stored during the construction phase. Threshold of 80 m ³ expected to be exceeded. Wetlands were delineated on site, although it is not advised to place these substances within watercourses/ 100 m of watercourses the likelihood exists.

Prepared by:



	Relevant activities as set out in	Description of the portion of the	
Activity No(s):	GN No. R. 327, 325 and 324 of	proposed project to which the	
	the EIA Regulations	applicable listed activity relates	
	iv. Critical biodiversity areas as	The site is situated within an ESA	
	identified in systematic biodiversity	area.	
	plans adopted by the competent		
	authority		
	vi. Areas within a watercourse or		
	wetland, or within 100 m from the		
	edge of a watercourse or wetland.		
	The clearance of an area of 300 m ²	The 324 ha site is overlain Vaal-Vet	
	or more of indigenous vegetation	Sandy Grassland vegetation,	
		situated within ESA, vegetation	
	h. North West	exceeding 300 m ² will be cleared in	
	iv. Critical biodiversity areas as	preparation for the construction	
12.h.vi	identified in systematic biodiversity	phase. Some of the area to be	
	plans adopted by the competent	cleared may be located within a	
	authority	watercourse or wetland, or within	
	vi. Areas within a watercourse or	100m from the edge of a	
	wetland, or within 100 m from the	watercourse or wetland.	
	edge of a watercourse or wetland.	Evisting second read/s loading to	
	then 4 m or the lengthening of a	Existing access road/s leading to	
	road by more than 1 km	to 8 m some of the infrastructure is	
	Toad by more than T km.	likely to be within and/ in 100 m of	
	h. North West	wetlands	
18.h.ix	v Critical biodiversity areas as	wollando.	
	identified in systematic biodiversity		
	plans adopted by the competent		
	authority		
	ix. Areas within a watercourse or		
	wetland, or within 100 m from the		
	edge of a watercourse or wetland.		
23 (ii)(a)(c) (g)(ii)(ee)	The expansion of—	The proposed development will	
		entail the development and	
	(II) Infrastructure or structures	expansion of roads and other	
	expanded by 10 square metres or	within a watercourse or within 32m	
	more;	from the edge of a watercourse.	
		Č	
	where such expansion occurs—	The expansion of the infrastructure	
	(a) within a watercourse:	will occur within the North West	
	(c) if no development setback has	within ESA area.	
	been adopted, within 32 metres of a		
	watercourse, measured from the	Although the layout of the proposed	
	edge of a watercourse;	development will be designed to	
		avoid the identified surface water	
		teatures as far as possible, some of	

Prepared by:



Project No.:18086Description:Draft Scoping Report, Proposed 200MW Lion Thorn Solar PV FacilityRevision No.:1.0

Page vii

Activity No(s):	Relevant activities as set out in GN No. R. 327, 325 and 324 of the EIA Regulations	Description of the portion of the proposed project to which the applicable listed activity relates
	excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. g. North West <i>iv. Critical biodiversity areas as</i> <i>identified in systematic biodiversity</i> <i>plans adopted by the competent</i> <i>authority</i>	the existing internal and access roads will need to traverse some of the identified surface water features.

DETAILS OF ALTERNATIVES CONSIDERED

Prior to the initiation of the EIA process, alternative properties/ sites were considered for the location of the proposed development. The selection of a potential solar farm site includes several key aspects including solar resource, grid connection suitability/ infrastructure as well as environmental and social constraints, topography and access. This proposed project site was selected based on the above criteria ahead of other regional properties/ sites due to the cumulative assessment of all criteria. This internal process takes several weeks to complete and ensures that the least environmentally sensitive property/ site is selected in the specific region of development.

Based on the reasons above no site alternatives have been considered during the EIA process for this proposed development. The placement of SEFs is dependent on the factors discussed above, all of which are favourable at the proposed site location. The proposed project site has topography which is suitable for the development of a SEF and is in close proximity to a grid connection that has been identified to have sufficient capacity to evacuate the generation. In addition, the proposed site is easily accessible off the public gravel roads R502. The site is therefore considered highly suitable for the proposed development of a SEF and no other locations have been considered.

No other activity alternatives have been considered. RE developments in South Africa are highly desirable from a social, environmental and development perspectives respectively. The importance of RE has been outlined in the sections of the report below, highlighting national, district and local support. The solar resource in this area along with the rapid advancements in solar energy technology efficiency serves as further motivations for the proposed development.

Specialist studies identified the environmental constraints upfront. Based on the specialist sensitivities, a preliminary layout has been designed to avoid sensitive areas as far as possible. The preliminary layout will be assessed during the EIA phase and further refined following seasonal site visits from the various specialists. Should any additional constraints be identified from the various specialists these will be incorporated into the final layout.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



The 'no-go' alternative is the option of not undertaking the proposed SEF project. Hence, if the 'no-go' option is implemented, there would be no further development. This alternative would result in no additional environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the EIA process.

POTENTIAL IMPACTS IDENTIFIED FOR THE PREFERRED ALTERNATIVE

Planning

Environmental Aspect		Potential Impact During Planning		Proposed Mitigation
Agricultural	•	None identified	٠	None Identified
Avifaunal	٠	None identified	٠	None Identified
Aquatic	٠	None identified	٠	None Identified
Geotechnical	•	None identified	٠	None Identified
Terrestrial Biodiversity	•	Vegetation type loss	•	Undertake a summer season survey to properly assess the state of vegetation and vegetation communities on site, and to accurately delineate the terrestrial ecosystems on site.
Heritage (Archaeological, Paleontological, Cultural Landscape)	•	Disturbance of delineated burial ground Further disturbance and loss of delineated LSA site	•	Implement a chance to find procedures in case where possible heritage finds are uncovered. The burial site should be demarcated with a 50 m no-go-buffer-zone and the graves should be avoided and left in situ. If the site is going to be impacted directly and the graves need to be removed a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with SAHRA under the NHRA and NHA. No further palaeontological studies are required, however a protocol for chance finds is required.
Social	•	None Identified	•	None Identified
Visual	•	None Identified	•	None Identified

Construction

Environmental Aspect	Potential Impact During Construction	Proposed Mitigation
Agriculture	Soil erosion and degradation	A system of storm water management, which will prevent erosion on and

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Environmental Aspect	Potential Impact During Construction	Proposed Mitigation
		 downstream of the site, will be an inherent part of the engineering on site. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there. Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 20 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it remains at the surface. Topsoil should only be stripped in areas that are excavated. Across the majority of the site, including construction lay down areas, it will be much more effective for rehabilitation, to retain the topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire cut surface. It will be advantageous to have topsoil and vegetation cover below the panels during the operational phase to control dust and erosion.
Avifaunal	 Displacement due to habitat loss Displacement due to disturbance associated with establishment, and construction Entrapment and entanglement in perimeter fencing 	 Impacts associated with the loss of bird foraging habitat due to construction activity cannot be mitigated in relation to the majority of the habitats but can be mitigated by avoiding avifaunal specific highly sensitive areas and their associated buffers, such as the wetlands. The overall severity of the impact can be reduced to being insignificant if avoidance mitigation is applied related to the positioning of the panels and supporting infrastructure and minimisation mitigation is applied. The aforementioned impacts will be described and assessed in detail, following the site verification and seasonal surveys to the proposed 200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project development area

Prepared by:

SiVEST

Environmental Aspect	Potential Impact During Construction	Proposed Mitigation
		and PAOI during the EIA phase of the project process.
Aquatic/ Freshwater	 Infilling, excavation and/or modification of water resources during construction. Erosion and/or sedimentation of water resources due to catchment/site land clearing and landcover disturbance during construction. Erosion and/or sedimentation of water resources due to temporary flow diversion during construction. Pollution of wetlands/vadose zones due to the mishandling of hazardous substances and/or improper maintenance of machinery during construction e.g. oil and diesel leaks and spills. Fragmentation of water resources as a result of construction activities within and surrounding the rivers / streams and wetlands. Removal or alteration of vadose zone flow paths feeding water resources. 	 Construction of the proposed surface infrastructure may result in disturbance to the natural buffer zone surrounding the freshwater ecosystems which may result in the reduction of surface roughness. This can be mitigated by ensuring that no concentrated runoff from the surface infrastructure construction area enters the freshwater ecosystems.
Geotechnical	 Disturbance and removal of rock and soil Soil Erosion 	 Design access roads, platforms and post locations to minimise earthworks and levelling. The design must be based on intrusive investigation results and high resolution ground contour information. Correct topsoil and spoil management. Avoid development in any preferential drainage paths. Temporary berms and drainage channels to divert surface runoff where needed. Landscape and rehabilitate disturbed areas timeously (e.g. regressing). Use designated access and laydown areas only to minimise disturbance to surrounding areas.
Terrestrial Biodiversity	 Loss, degradation or fragmentation of provincially and national protected vegetation through direct clearing for panels, access roads. Habitat transformation and fragmentation for fauna Loss of threatened and protected ecosystems 	 Proposed mitigation to be provided during the EIA phase once the seasonal site visit has been undertaken.

Prepared by:



Environmental Aspect	Potential Impact During Construction	Proposed Mitigation	
Heritage (Archaeological, Paleontological, Cultural Landscape)	Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	 During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts. An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified. Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted. The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource. The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered. 	
Visual/ Landscape	• Dust generated during construction activities will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the site, during the decommissioning period.	 Limit vegetation clearance and the footprint of decommissioning to what is absolutely essential. Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. Keep stockpiled aggregate and sand covered to minimise dust generation. Keep site tidy. 	
Social	Temporary stimulation of the provincial economy and growth in the regional GVA	Mitigation measures to be provided during EIA phase	

Prepared by:



Environmental Aspect	Potential Impact During Construction	Proposed Mitigation
	 Temporary employment creation in local communities Temporary change to the sense of place Temporary increase in crime and social conflicts associated with influx (or removal) of people Impact on the environment 	

Operational

Environmental Aspect	Potential Impact During Operation	Proposed Mitigation	
Agriculture	 Loss of land utilised for stock grazing The development will provide a positive economic impact on the farm. The income generated by the farming enterprises through the lease of the land to the energy facility is highly likely to exceed the potential agricultural income from the site. It will diversify the farm's income sources and provide reliable and predictable income that is independent of variable agricultural economic factors such as weather, agricultural markets and agricultural input costs. 	The PV panels will not necessarily totally exclude agricultural production. The area can still be used to graze sheep that will, in addition, be protected against stock theft within the security area of the facility.	
Avifaunal	 Displacement due to habitat loss Displacement due to disturbance associated with operational and maintenance activities Bird mortalities due to collisions with infrastructure (PV panels) Entrapment and entanglement in perimeter fencing 	 The aforementioned impacts will be described and assessed in detail, following the site verification and seasonal surveys to the proposed 200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project development area and PAOI during the EIA phase of the project process 	
Aquatic/ Freshwater	 Accidental direct impacts to water resources during operational repair and maintenance. Erosion and/or sedimentation of water resources due to catchment alterations and stormwater management system. Erosion and/or sedimentation of water resources due to flow concentration associated with watercourse crossings and channel diversions / modifications. Pollution of water resources due to the mishandling of hazardous substances and/or improper maintenance of 	 No indiscriminate driving through the freshwater ecosystems may be permitted. Use must be made of the existing freshwater ecosystem crossings only. Unnecessary disturbances surrounding the perimeter of the surface infrastructure must be avoided. Vehicles used in the development site must be regularly washed (within a nonpermeable area or off-site) to avoid the dispersal of seeds on any alien or invasive species into the freshwater ecosystems. 	

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Environmental Aspect	Potential Impact During Operation	Proposed Mitigation
	 machinery during operation e.g. oil and diesel leaks and spills. Removal or alteration of vadose zone flow paths feeding water resources. 	 Ensure that routine inspections and monitoring of any instream infrastructure are undertaken to manage the establishment of indigenous vegetation and reduce the presence of any alien or invasive plant species; and Monitoring for the establishment for alien and invasive vegetation species must be undertaken, specifically at the road crossings and surface infrastructure areas. Should alien and invasive plant species be identified, they must be removed and disposed of as per an alien and invasive species control plan and the area must be revegetation.
Geotechnical	Soil Erosion	 Maintain access roads including drainage features. Monitor for erosion and remediate and rehabilitate timeously.
Terrestrial Biodiversity	 Establishment and spread of alien invasive plant species due disturbance vectors Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with powerlines and PV panels Maintenance around the PV facility will need to occur, particularly with the control of encroaching vegetation. Maintenance within the protected and sensitive ecosystems could result in edge effects, and establishment of alien and invasive species Displacement and/or disturbance of fauna communities 	Proposed mitigation to be provided during the EIA phase once the seasonal site visit has been undertaken.
Heritage (Archaeological, Paleontological, Cultural Landscape)	Disturbance of delineated burial ground	 The burial site should be demarcated with a 50 m no-go-buffer-zone and the graves should be avoided and left in situ. Implementation of the recommendations included in the VIA
Visual/	Light spillage and visual intrusion of large PV panels	 Lights at night management Papels less than 4 m in bought
Social	 Employment creation in local communities Local economic development benefits Impact on the environment Change in sense of place 	 Mitigation measures to be provided during EIA phase

Decommissioning

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Project No.:18086Description:Draft Scoping Report, Proposed 200MW Lion Thorn Solar PV FacilityRevision No.:1.0

Date: 08 August 2023

Page xiv

Environmental Aspect	Potential Impact During Decommissioning	Proposed Mitigation	
Agricultural	none identified		
Avifaunal	none provided	none provided	
Aquatic/ Freshwater	 Infilling, excavation and/or modification of water resources during construction. Erosion and/or sedimentation of water resources due to catchment/site land clearing and landcover disturbance during construction. Erosion and/or sedimentation of water resources due to temporary flow diversion during construction. Pollution of wetlands/vadose zones due to the mishandling of hazardous substances and/or improper maintenance of machinery during construction e.g. oil and diesel leaks and spills. Fragmentation of water resources as a result of construction activities within and surrounding the rivers / streams and wetlands. Removal or alteration of vadose zone flow paths feeding water resources. 	• Refer to construction mitigation measures	
Geotechnical – Soil Erosion	 Disturbance and removal of rock and soil Soil erosion 	 Restore natural site topography. Landscape and rehabilitate access roads and disturbed areas timeously (e.g. regressing. Temporary berms and drainage channels to divert surface runoff where needed Use designated access and laydown areas only to minimise disturbance to surrounding areas. 	
Terrestrial Biodiversity	• Decommissioning phase impacts are anticipated to be the same as the construction and operation phase impacts, therefore mitigation measures for the construction and operation phase must be followed .	 Proposed mitigation to be provided during the EIA phase once the seasonal site visit has been undertaken. 	

Prepared by:



Environmental Aspect	Potential Impact During Decommissioning	Proposed Mitigation
Heritage (Archaeological, Paleontological, Cultural Landscape)	 Disturbance of delineated burial ground Further disturbance and loss of delineated LSA site 	 Implement a chance to find procedures in case where possible heritage finds are uncovered. If large quantities of LSA remains are discovered during decommissioning, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. The burial site should be demarcated with a 50 m no-go-buffer-zone and the graves should be avoided and left in situ. During the decommissioning phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented. Implementation of the Chance Fossil Finds Protocol. Implementation of the recommendations included in the VIA
Visual/ Landscape	 Dust generated during decommissioning activities will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the site, during the decommissioning period. 	 Limit vegetation clearance and the footprint of decommissioning to what is absolutely essential. Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. Keep stockpiled aggregate and sand covered to minimise dust generation. Keep site tidy.
Social	None identified	None identified

Cumulative

Environmental Aspect	Potential Impact	Proposed Mitigation
Agricultural	• Regional loss (including by degradation) of future agricultural production potential	• It should also be noted that renewable energy development can only be located in fairly close proximity to a substation that has available capacity. This creates cumulative impact in such places. However, this is acceptable because it also effectively protects most agricultural land in the country from renewable energy development because only a small proportion of the country's total land surface is located in close enough proximity to an available substation to be viable for renewable energy development.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Environmental Aspect	Potential Impact	Proposed Mitigation
		 The PV panels will not necessarily totally exclude agricultural production. The area can still be used to graze sheep that will, in addition, be protected against stock theft within the security area of the facility. The proposed development will have the wider societal benefits of generating additional income and employment in the local economy. In addition, the proposed development will contribute to the country's urgent need for energy generation, particularly renewable energy that has much lower environmental and agricultural impact than existing, coal powered energy generation. All renewable energy development in South Africa decreases the need for coal power and thereby contributes to reducing the large agricultural impact that open cast coal mining has on highly productive agricultural land throughout the coal mining areas of the country.
Avifaunal	none provided	to be assessed during the EIA phase
Aquatic	none provided	to be assessed during the EIA phase
Geotechnical	None specified	
Terrestrial Biodiversity	None specified	to be assessed during the EIA phase
Heritage	 none provided 	to be assessed during the EIA phase
Visual	none provided	to be assessed during the EIA phase
Social	 none provided 	to be assessed during the EIA phase

PUBLIC PARTICIPATION PROCESS

Notification of EIA process to be undertaken as follows:

- A Register of I&APs was compiled which includes all affected landowners, adjacent landowners, • occupiers of affected and adjacent land, other I&APs, key stakeholders and other surrounding project developers.
- Issuing of the notifications and initial landowner consultation (circulated to potential I&APs and the • local area in general). Proof will be included in FSR.
- Placement of site notices in English and Afrikaans (as per regulations) were placed along the • entrance road to the application site and around the site itself on 12 July 2023 (proof included in in Appendix 5).
- Notification letters were sent via e-mail or sms (where cell phone numbers/ email address was available, proof will be included in the FSR).
- Public notification of the S&EIR process was advertised in a local newspaper, namely Stellalander • Newspaper, on 9 August 2023 as required according to Regulation 41(2)(c) of the EIA Regulations. Proof of advertisement will be included in the FSR.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Availability of DSR for Review

- The DRR is available on SiVESTs website for download.
- Electronic copies will be made available to parties via a secure digital link that will be emailed upon request for the documentation.
- CDs / Flash drive to be posted, only upon request.
- The DSR is located and available for review at the following location:
 - Maquassi Hills Library, 56 Smuts Street, Leeudoringstad, North West .

PLAN OF STUDY

The EIR Phase will be informed by the Scoping Phase. The following steps will be undertaken as part of the EIR Phase:

- The preliminary layout will be further investigated in order to avoid or minimize negative impacts and maximize potential benefits;
- Environmental impact statements regarding the potential significance of residual impacts, taking into account proposed mitigation measures will be provided in the DEIR;
- An EMPr covering construction and decommissioning phases of the proposed development will be prepared. The EMPr will include input from specialists and will incorporate recommendations for mitigation and monitoring.

The following specialist studies have been undertaken for the project and the significant environmental aspects will be further in the EIR Phase:

- Desktop Geotechnical Assessment;
- Agricultural compliance statement and site sensitivity verification;
- Aquatic/ Freshwater Assessment;
- Terrestrial Biodiversity (including Animal and Plant Species) Assessment.
- Avifaunal Assessment;
- Socio-Economic Assessment;
- Cultural Heritage, Archaeological and Palaeontological Assessment; and
- Landscape/ Visual Assessment;

The preliminary findings of the specialist studies have been included in the Scoping Phase of this project, i.e. this DSR.

While the summer season for avifaunal and biodiversity is generally from October to January, the avifaunal and biodiversity specialist survey will be undertaken in September. Following discussions with the specialists, this is not seen as a limitation, based on their experience in the area as well as preexisting data collected from surveys for properties directly adjacent to Lion Thorn.

The associated Impact Assessment tables will be included in the DEIR. Should the need for additional specialist studies be identified through the consultation process, these studies will be commissioned in the EIR Phase to further advise on the potential impacts that may arise from the proposed development.

Lion Thorn Solar PV Facility 145 (PTY) LTD



The specialist studies may identify opportunities and constraints as associated with the site and the proposed development.

SiVEST will consult with DFFE as follows:

- Submission of EA application form to obtain EA reference number.
- The DSR will be made available for comment to I&APs, key stakeholders and the authorizing authority including the general local public.
- After the DSR has been made available for comment within the public domain, comments will be incorporated into the CRR and FSR.
- The FSR will then be submitted to DFFE/ DEDECT for review and decision-making.
- Notify I&APs and key stakeholders of the decision on the FSR.
- The DEIR will be made available for comment to I&APs, key stakeholders and the authorizing authority including the general, local public.
- After the DEIR has been made available for comment within the public domain, comments will be incorporated into the CRR and FEIR for submission to DFFE/ DEDECT.
- Notify I&APs of the decision.
- Apart from the above-mentioned occasions, further consultation with authorities will occur whenever necessary.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



LION THORN SOLAR ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE NORTH WEST PROVINCE

DRAFT SCOPING REPORT

TABLE OF CONTENTS

KEY PRO	JECT INFORMATIONI
EXECUTI	VE SUMMARY III
TABLE O	F CONTENTSXX
1.	INTRODUCTION AND BACKGROUND 1
1.1	Overview of the EIA Process
1.1.1	Objectives and Overview of the Scoping Phase
1.1.2	Public Participation Process
1.2	Content Requirements for a Scoping Report
2.	PROJECT TITLE
3.	DETAILS OF APPLICANT
3.1	Name and contact details of the Applicant
4.	DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTIONER AND SPECIALISTS
4.1	Name and contact details of the Environmental Consultant
4.2	Names and expertise of the Environmental Assessment Practitioner
4.3	Names and expertise of the Specialists7
5.	LOCATION OF THE ACTIVITY
5.1	21 Digit SG Codes and Property Information8
52	Coordinates of the Site 8

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



6.	ACTIVITY INFORMATION	11
6.1	Project Description	11
6.1.1	SEF and associated Infrastructure	11
6.1.2	Main components of a Solar PV Facility	12
6.1.3	Technical Detail Summary	15
6.2	NEMA Listed Activities	17
7.	NATIONAL WEB-BASED ENVIRONMENTAL SCREENING TOOL 2	21
8.	DESCRIPTION OF THE BIOPHYSICAL AND PHYSICA ENVIRONMENT	۱L 24
8.1	Geography	24
8.2	Land Use/ Cover	25
8.3	Climate	26
8.4	Topography and Drainage	27
8.5	Geology	29
8.5.1	Description of Receiving Environment	29
8.5.2	Geological Environment Potential Impacts	31
8.5.3	Preliminary Conclusion	31
8.6	Agriculture and Soils	32
8.6.1	Field Verification and Findings	32
8.6.2	Agriculture and Soils Potential Impacts	33
8.6.3	Preliminary Conclusion	34
8.7	Aquatic/ Freshwater Assessment	34
8.7.1	Field Verification and Findings	35
8.7.2	Aquatic/ Freshwater Potential Impacts	36
8.7.3	Preliminary Conclusion	36
8.8	Terrestrial Biodiversity	36
8.8.1	Vegetation Type	37
8.8.2	Animal Species Theme	39
8.8.3	Terrestrial Biodiversity Potential Impacts	40
8.8.4	Preliminary Conclusion	40
8.9	Avifaunal Assessment	40
8.9.1	Desktop Findings	41
8.9.2	Avifaunal Potential Impacts	43
8.9.3	Preliminary Conclusion	43

SiVEST

9.	DESCRIPTION OF THE SOCIO- ECONOMIC ENVIRONMENT	44
9.1	Socio-Economic Characteristics	44
9.1.1	Dr Kenneth Kaunda District Municipality	44
9.1.2	Maquassi Hills Local Municipality	44
9.1.3	Demographics	45
9.1.4	Income and Education Level	45
9.1.5	Economic Profile	46
9.1.6	Living Conditions	46
9.1.7	Socio-Economic Potential Impacts	47
9.1.8	Preliminary Conclusion	47
9.2	Cultural Heritage, Archaeology and Palaeontology	48
9.2.1	Cultural Heritage and Archaeology	48
9.2.2	Palaeontology	50
9.2.3	Potential Cultural Heritage, Archaeological and Palaeontological Impacts	51
9.2.4	Preliminary Conclusion	52
9.3	Landscape/ Visual Assessment	52
9.3.1	Field Verification and Findings	52
9.3.2	Potential Landscape/ Visual Impacts	57
9.3.3	Preliminary Conclusion	57
10.	POLICY AND LEGISLATIVE CONTEXT	57
10.1	The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996) amended.	as 57
10.2	National Environmental Management Act, 1998 (107 of 1998) as amended	58
10.2.1	Environmental Impact Assessment Guideline for Renewable Energy Projects, Notice 9 of 2015	89 58
10.3	National Water Act, 1998 (Act 36 of 1998) as amended	59
10.4	The National Heritage Resources Act, 1999 (Act 25 of 1999) as amended	59
10.5	National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004) amended.	as 60
10.6	National Environmental Management Protected Areas Act, 2003 (Act 57 of 200 as amended)3) 61
10.7	National Forests Act, 1998 (Act 84 of 1998) as amended	61
10.7.1	Protected Trees	62
10.7.2	Forests	62
10.8	National Veld and Forest Fire Act, 1998 (Act 101 of 1998) as amended	62

Prepared by:

Sivest

10.9	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) as amende	d 2
10.10	Subdivision of Agricultural Land Act (SALA) (Act No. 70 of 1970, as amended) 6	3
10.11	National Road Traffic Act, 1996 (Act 93 of 1996) as amended6	3
10.12	Civil Aviation Act, 2009 (Act 13 of 2009) as amended6	4
10.13	Astronomy Geographic Advantage Act, 2007 (Act 21 of 2007) as amended 6	4
10.14	National Energy Act, 2008 (Act 34 of 2008) as amended6	4
10.15	Electricity Regulation Act, 2006 (Act 4 of 2006) as amended	5
10.16	Protection of Public Information Act, 2013 (Act 4 of 2013) as amended	5
10.17	Renewable Energy Development Zones (REDZs) and Strategic Transmissio	n 6
10.18	Additional Relevant Legislation6	7
11.	KEY DEVELOPMENT STRATEGIES AND GUIDELINES	8
11.1	National and Provincial Policies6	8
11.2	District and Local Municipalities7	1
12.	NEED AND DESIRABILITY7	2
12.1	South Africa's Energy Economy7	2
12.1.1	Energy Provision Crisis7	3
12.1.2	Renewable Energy as a Solution7	3
12.2	Need and Desirability Assessment7	5
13.	DETAILS OF PROCESS FOLLOWED TO REACH THE PREFERRED OPTION) 7
13.1	Details of Alternatives7	7
13.1.1	Location/ Site Alternatives7	7
13.1.2	The type of activity to be undertaken7	7
13.1.3	The technology to be used in the activity7	8
13.1.4	Design or Layout of the Activity7	8
13.1.5	No – Go Option7	8
13.2	Details of PPP Undertaken7	8
13.2.1	Identification of Key Stakeholder and I&AP's7	9
13.2.2	Responsibilities of I&APs7	9
13.2.3	Steps taken to notify Key Stakeholders and Potential I&APs7	9
13.2.4	Details of notification of Landowners	0

Prepared by:



14.6.3	Public Meetings/ Consultation during the PPP		
14.6.4	Inclusion of Comments into the FEIR		
14.6.5	Notification of Decision		97
15.	EAP DECLARATION		
16.	INFORMATION REQUIRED BY CA (IF APPLICAE	3LE)	
17.	CONCLUSION		
18.	WAY FORWARD		97
Lion Thorn Sc	Nar PV Facility 145 (PTY) TD	Propared by:	
Project No.: Description: Revision No.:	18086 Draft Scoping Report, Proposed 200MW Lion Thorn Solar PV Facility 1.0		SiVEST
Date: 08 Augu	st 2023		Page xxiv

Summary of Issues Raised......80

Construction Phase81

Cumulative 88

MK-R-801 Rev..05/18

13.2.5

13.3

13.3.1

13.3.2

13.3.3

13.3.4

13.3.5

13.4

14.

14.1

14.2

14.2.1

14.2.2

14.2.3

14.2.4

14.3

14.4

14.5

14.6

14.6.1

14.6.2

LIST OF FIGURES

Figure 1: Regional context of the Lion Thorn 200MWac SEF	2
Figure 2: Lion Thorn Solar Plant in relation to existing approved projects	3
Figure 3: Locality of the proposed development site	9
Figure 4: Preliminary layout showing proposed location of solar PV panels (i.e. buildable areas)	.12
Figure 5: Typical components of a solar PV panel	.13
Figure 6: Solar PV electricity generation process	.13
Figure 7: Regional context associated with the proposed site	.25
Figure 8: Land Cover Classification	.26
Figure 9: Topography of the proposed site (VRMA 2023)	.28
Figure 10: Drainage features associated with the project site	.28
Figure 11: The regional geology of the site	.29
Figure 12: Desktop level aquatic sensitivity of the proposed development site	.35
Figure 13: The wetlands identified with the proposed project site	.36
Figure 14: The terrestrial biodiversity sensitivity on a desktop level	.37
Figure 15: The vegetation type associated with the proposed development site	.38
Figure 16: Terrestrial biodiversity sensitivity as per the SANBI datasets	.39
Figure 17: Location of the four SABAP2 pentad grid cells that were considered for the project	.41
Figure 18: Regional map detailing the location of the closed Inkbospan Vulture Restaurant and	
sensitive avian habitat i.e. rivers, wetlands and waterbodies within the project area	.42
Figure 19: Preliminary avifauna sensitivity map for the SEF	.43
Figure 20: Population Demographics	45
Figure 21: Heritage resources identified within the development site/ area	.49
Figure 22: LSA flakes from LT001	.49
Figure 23: General view of LT002	.49
Figure 24: One of the stone packed graves at LT002.	.50
Figure 25: Extract of the 1 in 250 000 SAHRIS PalaeoMap (Council of Geosciences)	51
Figure 26: Regional Digital Elevation Mapping and Profiles Graphs with approximate extent depicte	d
	55
Figure 27: Receptor Key Observation Point and Visual Exposure Map	.56
Figure 28: Visual Resource Management Classes map in relation to KOP locations	.56
Figure 29: Formally gazzetted REDZs in South Africa and the proposed Lion Thorn PV Plant location	nر
in relation to the REDZs	.67
Figure 30: Photovoltaic Yield tracking of Study Area (source Mappable, adapted by Urban Econ)	. 74
Figure 31: RE Projects within 35km of the Lion Thorn SEF	.89
Figure 32: Preliminary specialist sensitivities (to be further updated taking into account the specialis	t
sensitivities and included in the DEIR)	.91
Figure 33: Preliminary layout with sensitivities (to be further updated taking into account the special	IST
Sensitivities and included in the DEIK)	92
Figure 34: Preliminary site layout	94

LIST OF TABLES

Table 1: Adjacent PV Facilities status and reference numbers	2
Table 2: Content requirements for a Scoping Report	4
Table 3: Name and contact details of the applicant	6
Table 4: Name and contact details of the Environmental Consultant who prepared the report	6
Table 5: Names and details of the expertise of the EAP's involved in the preparation of this report.	6
Table 6: Names of specialists involved in the project	7
Table 7: 21 Digit Surveyor General Code and Property Information	8
Table 8: Corner point coordinates for the proposed site boundary	9
Table 9: Technical Detail Summary of Solar PV Facility	. 15
Table 10: Listed activities in terms of EIA Regulations applicable to the proposed project	. 17

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



APPENDICES CVs of EAPs involved in the process and EAP declaration Appendix 1: Appendix 2: Locality Map Site Development Plan Appendix 3: Photographs

Table 17: LM contributions to North-West and South Africa (2021) economy (Urban-Econ, 2023).....46 Table 18: Details of the heritage resources identified within the development site/ area......48 Table 21: The SEA for Wind and Solar PV Energy in South Africa (Phase 1 and Phase 2) (CSIR,

- Appendix 4:
- Appendix 5: Proof of public participation process
- Appendix 6: Specialist studies and declarations
- Appendix 7: SiVEST Impact Rating System
- **DFFE Screening Report** Appendix 8:

Lion Thorn Solar PV Facility 145 (PTY) LTD



Prepared by:

LION THORN SOLAR PV FACILITY 145 (PTY) LTD

LION THORN SOLAR ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE NORTH WEST PROVINCE

DRAFT SCOPING REPORT

1. INTRODUCTION AND BACKGROUND

Lion Thorn Solar PV Facility 145 (Pty) Ltd is proposing to construct the Lion Thorn Solar Energy Facility (SEF) and associated infrastructure approximately 9 kilometres (km) east of Leeudoringstad in the Maquassi Hills Local Municipality (MHLM) and Dr Kenneth Kaunda District Municipality (DKKDM), in the North West Province (refer to Figure 1 below).

SiVEST SA (Pty) Ltd's (SiVEST) Environmental Division has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA), i.e. Scoping and Environmental Impact Report (S&EIR), process for the proposed construction and operation of the Lion Thorn SEF and associated infrastructure. The proposed development requires an Environmental Authorisation (EA) from the national Department of Forestry, Fisheries and the Environment/ North West Department of Economic Development, Environmental Conservation and Tourism (DFFE) as it triggers Listed Activities in terms of the Environmental Impact Assessment Regulations, 2014 as amended (EIA Regulations) promulgated in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act 107 of 1998) as amended (NEMA). Accordingly, the S&EIR for the proposed development will be conducted in terms of the EIA Regulations. The DFFE Reference Number is to be allocated.

The SEF is envisaged to have a maximum total generation capacity of up to 200 megawatts alternating current (MWac). The overall objective of the proposed development is to supply suitable private off-taker initiatives (direct supply or wheeling agreements, as applicable), or be bid into the government coordinated Renewable Energy Independent Power Producer Programme (REIPPP) or similar procurement program under the Integrated Resource Plan (IRP).

In order to evacuate the energy generated by the proposed SEF, to supplement the national grid, the applicant is proposing to construct and connect to a new 33/132 kilovolt (kV) Independent Power Producer (IPP) substation and 132 kV Eskom Holdings SOC Limited (Eskom) switching station via an underground 33 kV cable network. This cable network will run from the SEF to the IPP substation and Lion Thorn Switching Station.

The power from the proposed development will be evacuated via the proposed Leeubosch powerline grid which is currently undergoing a separate Registration Process in terms of the Standard for the Development and Expansion of Power Lines and Substations within Identified Geographical Areas and the Exclusion of this Infrastructure from the Requirement to obtain EA, Government Notice (GN) 2313 of 2022.

Lion Thorn Solar PV Facility 145 (PTY) LTD

18086

Prepared by:



Project No. Proposed 200MWac Lion Thorn Solar Energy Facility and associated Infrastructure Description Revision No. 1.0



Figure 1: Regional context of the Lion Thorn 200MWac SEF

The Lion Thorn Solar PV forms part of a larger cluster of projects and sits adjacent to the Leeuwbosch 1 and 2 Solar PV Facilities. The various projects are as follows:

Project	Status	Reference number
Proposed Lion Thorn Solar PV Facility	This project	ТВА
Leeumax Solar PV Facility	Approved	(Ref No: NWP/EIA/96/2022)
Leeuwbosch 1 Solar PV Facility	Approved	(Ref No: NWP/EIA/42/2021)
Leeuwbosch 2 Solar PV Facility	Approved	(Ref No: NWP/EIA/45/2021)
Leeudoringstad Solar PV Substation	Approved	(Ref No: NWP/EIA/43/2021)
Wildebeestkuil 1 Solar PV Facility	Approved	(Ref No: NWP/EIA/44/2021)
Wildebeestkuil 2 Solar PV Facility	Approved	(Ref No: NWP/EIA/46/2021)
Proposed Leeudoringstad 132kV power line	Pending	ТВА
and associated infrastructure (Leeubosch to		
Vaalreef Ten)		

т	able	1:	Adi	acent	ΡV	Facilities	s status	and	reference numbers	s
			, .œj.			1 4011110	otatao	ana		-



Lion Thorn Solar PV Facility 145 (PTY) LTD



Figure 2: Lion Thorn Solar Plant in relation to existing approved projects

1.1 Overview of the EIA Process

The NEMA promotes the use of S&EIR in order to ensure integrated environmental management. The purpose of an EIA is to provide the Competent Authority (CA) with sufficient information to make an informed decision on whether an activity should proceed or not, and to assist with selecting an option that will provide the most benefit and cause the least impact. The EIA process should identify activities which may have a detrimental effect on the environment, and which would therefore require EA prior to commencement.

This project requires an EA in terms of the EIA Regulations. All the phases including the Environmental Management Programme (EMPr) must be prepared in terms of the EIA Regulations.

1.1.1 Objectives and Overview of the Scoping Phase

The Scoping Phase involves establishing the existing environmental baseline of the site proposed for development, considering the type of development and its potential impacts on the existing environment, and therefore determining what potential impacts should be assessed and how, within the EIA process. The EAP therefore has compiled a Draft Scoping Report (DSR) inclusive of a Plan of Study for the Environmental Impact Report (PoSEIR) phase which is made available for public and stakeholder comment for a period of 30 days as part of the PPP. All comments received in response to the DSR will then be considered and responded to, incorporated into the Final Scoping Report (FSR) and PoSEIR.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



 Project No.
 18086

 Description
 Proposed 200MWac Lion Thorn Solar Energy Facility and associated Infrastructure

 Revision No.
 1.0

1.1.2 Public Participation Process

Public and stakeholder participation is a fundamental component of the EIA Process. The inclusion of the views of the affected and interested public aids in ensuring the EIA Process is open, transparent and robust, as well as that the decision-making process is equitable and fair. This in turn guides informed choice and better environmental outcomes. It further presents a valuable source of information on key impacts, potential mitigation measures and the identification and selection of feasible alternatives. This process allows the EAP to identify key stakeholders and Interested and Affected Parties (I&APs), as well as to identify any fatal flaws, at the onset of a project. The DSR will be made available to all I&APs as well as Organs of State for a period of 30 days, thereafter, all comments will be drafted and responded to in a Comments and Response Report (CRR) which will then be submitted to the DFFE for approval. Following this, the EIR Phase can proceed.

1.2 Content Requirements for a Scoping Report

The content requirements for a Scoping Report as provided for in Appendix 2 of the EIA Regulations, as well as details of which section of this report fulfils these requirements are shown in the table below.

Table	2: Cont	ent requ	irements	for a	Scoping	Report	

Content Requirements	Applicable Section
(a) details of-	
(i) the EAP who prepared the report; and	4 and Appendix 1
(ii) the expertise of the EAP, including a curriculum vitae (CV);	
(b) the location of the activity, including-	
(i) the 21-digit Surveyor General (SG) code of each cadastral land parcel;	
(ii) where available, the physical address and farm name;	5
(iii) where the required information in items (i) and (ii) is not available, the	
coordinates of the boundary of the property or properties;	
(c) a plan which locates the proposed activity or activities applied for at an appropriate	
scale, or, if it is-	
(i) a linear activity, a description and coordinates of the corridor in which the	5 and Appendix 3
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;	
(d) a description of the scope of the proposed activity, including-	
(i) all listed and specified activities triggered;	6
(ii) a description of the activities to be undertaken, including associated structures	Ŭ
and infrastructure;	
(e) a description of the policy and legislative context within which the development is	
proposed including an identification of all legislation, policies, plans, guidelines, spatial	10
tools, municipal development planning frameworks and instruments that are applicable	
to this activity and are to be considered in the assessment process;	
(f) a motivation for the need and desirability for the proposed development including the	12
need and desirability of the activity in the context of the preferred location;	12
(g) a full description of the process followed to reach the proposed preferred activity,	
site and location of the development footprint within the site, including -	
(i) details of all the alternatives considered;	
(ii) details of the PPP undertaken in terms of Regulation 41 of the EIA Regulations,	
including copies of the supporting documents and inputs;	13 and Appendix 5
(iii) a summary of the issues raised by I&APs, and an indication of the manner in	
which the issues were incorporated, or the reasons for not including them;	
(iv) the environmental attributes associated with the alternatives focusing on the	
geographical, physical, biological, social, economic, heritage and cultural aspects;	

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Content Requirements	Applicable Section
(v) the impacts and risks which have informed the identification of each alternative,	
including the nature, significance, consequence, extent, duration and probability of	
such identified impacts, including the degree to which these impacts-	
(aa) can be reversed;	
(bb) may cause irreplaceable loss of resources; and	
(cc) can be avoided, managed or mitigated;	
(vi) the methodology used in identifying and ranking the nature, significance,	
consequences, extent, duration and probability of potential environmental impacts	
and risks associated with the alternatives;	
(vii) positive and negative impacts that the proposed activity and alternatives will	
have on the environment and on the community that may be affected focusing on	
the geographical, physical, biological, social, economic, heritage and cultural	
aspects;	
(viii) the possible mitigation measures that could be applied and level of residual	
risk;	
(ix) the outcome of the site selection matrix;	
(x) if no alternatives, including alternative locations for the activity were	
investigated, the motivation for not considering such and	
(xi) a concluding statement indicating the preferred alternatives, including	
preferred location of the activity;	
(h) a PoSEIR process to be undertaken, including-	
(i) a description of the alternatives to be considered and assessed within the	
preferred site, including the option of not proceeding with the activity;	
(ii) a description of the aspects to be assessed as part of the EIA process;	
(iii) aspects to be assessed by specialists;	
(iv) a description of the proposed method of assessing the environmental aspects,	
including aspects to be assessed by specialists;	
(v) a description of the proposed method of assessing duration and significance;	14
(vi) an indication of the stages at which the CA will be consulted;	
(vii) particulars of the PPP that will be conducted during the EIA process; and	
(viii) a description of the tasks that will be undertaken as part of the EIA process;	
(ix) identify suitable measures to avoid, reverse, mitigate or manage identified	
impacts and to determine the extent of the residual risks that need to be managed	
and monitored.	
(i) an undertaking under oath or affirmation by the EAP in relation to-	
(i) the correctness of the information provided in the report;	
(ii) the inclusion of comments and inputs from stakeholders and I&APs and	Appendix 1
(iii) any information provided by the EAP to I&APs and any responses by the EAP	
to comments or inputs made by I&APs	
(i) an undertaking under oath or affirmation by the EAP in relation to the level of	
agreement between the EAP and I&APs on the PoSEIR;	Appendix 1
(k) where applicable, any specific information required by the CA; and	16
(I) any other matter required in terms of Section 24(4)(a) and (b) of the Act.	All requirements have
(2) Where a GN gazetted by the Minister provides for any protocol or minimum	
information requirement to be applied to a Scoping Depart, the requirements as	Annendix 8
indicated in such notice will apply	



Project No.18086DescriptionProposed 200MWac Lion Thorn Solar Energy Facility and associated InfrastructureRevision No.1.0

2. PROJECT TITLE

Proposed Development of the Lion Thorn Solar Energy Facility and associated Infrastructure near Leeudoringstad in the Maquassi Hills Local Municipality within the North West province.

3. DETAILS OF APPLICANT

3.1 Name and contact details of the Applicant

Table 3: Name and contact details of the applicant

Name of Applicant	LION THORN SOLAR PV FACILITY 145 (PTY) LTD
Physical Address	25 The Oval, Umhlali Country Club.Ballito. 4390
Postal Address	P.O. Box 1171, Umhlanga Rocks
Postal Code	4320
Applicant Contact Person	Emil Unger
Telephone	082 465 9825
Email	emil@megatrade.co.za

4. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTIONER AND SPECIALISTS

4.1 Name and contact details of the Environmental Consultant

The table below provides the name and contact details of the Environmental Consultants who prepared this report:

Name of EAP	SiVEST SA (PTY) Ltd
Physical Address	4 Pencarrow Crescent, La Lucia Ridge Office Estate
Postal Address	PO Box 1899, Umhlanga Rocks
Postal Code	4320
Telephone	031 581 1500
Fax	031 566 2371
EAP Contact Person	Zikhona Wana
Email	ZikhonaW@sivest.com

Table 4: Name and contact details of the Environmental Consultant who prepared the report

4.2 Names and expertise of the Environmental Assessment Practitioner

The table below provides the names, qualifications and registrations of the EAP's who prepared this report.

Table 5: Names and details of the expertise of the EAP's involved in the preparation of this report

Name EAP representative	Educational Qualifications	Professional Registrations/ Affiliations	Experience (years)
	MEnvMgt.	EAPASA Registration No. 2019/1560	
Michelle Nevette	Environmental	SACNASP Registration No. 120356	21
	Management	IAIAsa	

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



 Project No.
 18086

 Description
 Proposed 200MWac Lion Thorn Solar Energy Facility and associated Infrastructure

 Revision No.
 1.0

Name EAP	Educational	Professional Registrations/ Affiliations	Experience
representative	Qualifications		(years)
Zikhona Wana	BTech Environmental Sciences	EAPASA Registration No. 2019/555 SACNASP Registration No. 119417	9

CV's of SiVEST personnel and the EAP declaration are attached in Appendix 1.

4.3 Names and expertise of the Specialists

The table below provides the names of the specialists involved in the project:

Company/ Name	Name of representative of the specialist	Specialist	Educational Qualifications	Experienc e (years)
VRM Africa cc	Stephen Stead	Landscape/ Visual Assessment	BA (Honours) Geography	18
PGS Heritage (Pty) Ltd	Jessica Angel	Cultural Heritage, Archaeological, and Palaeontological Assessment	MSc. Archaeology	10
	Wouter Fourie		BA (Honours) Archaeology Professional Archaeologist with ASAPA Accredited Professional Heritage Specialist with APHP	21
Johann Lanz	Johann Lanz	Agriculture and Soils Compliance Statement (desktop)	MSc. Environmental Geochemistry <i>Pri.Sci.Nat.</i> (Soil Science) with SACNASP, Reg. No. 400268	24
Feathers Environmental Services	Megan Diamond	Avifaunal Assessment	BSc. Environmental Management <i>Pri.Sci.Nat.</i> (Environmental Science) with SACNAP, Reg. No. 300022	17
EcoAssist Environmental Consulting	Wayne Jackson	Wetland Assessment	BSc. Soil Science and Hydrology <i>Cert.Sci.Nat.</i> (Soil Science) with SACNASP, Reg No. 119037	13

 Table 6: Names of specialists involved in the project

SiVEST

Lion Thorn Solar PV Facility 145 (PTY) LTD

Company/ Name	Name of representative of the specialist	Specialist	Educational Qualifications	Experienc e (years)
GaGE Consulting (Pty) Ltd	Duan Swart	Desktop Geotechnical Assessment	MSc Engineering Geology <i>Pri.Sci.Nat.</i> (Geological Science) with SACNASP, Reg. No. 137543	6
Urban-Econ Development Economists (Pty) Ltd	Louis Calitz	Socio-Economic Assessment	B.Com (Honours) Business Communication	17
	Nthabiseng Makhoali		B.Com (Honours) Transport Economics	4
David Hoare Consulting (Pty) Ltd	David Hoare	Terrestrial Biodiversity	SACNASP (Pr Sci. Nat)	25

5. LOCATION OF THE ACTIVITY

5.1 21 Digit SG Codes and Property Information

Table 7: 21 Digit Surveyor General Code and Property Information

SG CODE	DESCRIPTION	
T0HP00000000004400006	Portion 6 of Farm 44 Leeuwbosch	
T0HP0000000004400037	Portion 37 of the Farm Leeuwbosch No. 44	

5.2 Coordinates of the Site

The centre point coordinates for the proposed site are as follows:

- Latitude: 27°11'46.28"S
- Longitude: 26°17'44.21"E




Figure 3: Locality of the proposed development site

The corner point coordinates of the site have been included below:

Table 8: Corner point coordina	es for the proposed site boundary
--------------------------------	-----------------------------------

LION THORN SEF: APPLICATION SITE			
COORDINATES AT CORNER POINTS (DD MM SS.sss)			
POINT SOUTH EAST			
1	27°11'41.345"S	26°16'51.116"E	
2	27°11'15.044"S	26°18'28.24"E	
3	27°11'50.066"S	26°18'40.234"E	
4	27°12'14.534"S	26°17'4.762"E	
COORDINATES AT CENTRE POINT (DD MM SS.sss)			
POINT	SOUTH	EAST	
5	27°11'46.508"S	26°17'47.38"E	

LION THORN: SUBSTATION AND SWITCHING STATION			
COORDINATES AT CORNER POINTS (DD MM SS.sss)			
POINT SOUTH EAST			
1	27°12'11.029"S	26°18'29.001"E	

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



LION THORN: SUBSTATION AND SWITCHING STATION			
COORDINATES AT CORNER POINTS (DD MM SS.sss)			
POINT SOUTH EAST			
2	27°12'10.108"S	26°18'29.97"E	
3	27°12'11.157"S	26°18'31.082"E	
4	27°12'12.03"S	26°18'30.05"E	
COORDINATES AT CENRE POINTS (DD MM SS.sss)			
POINT	SOUTH	EAST	
5	27°12'11.109"S	26°18'30.002"E	

LION THORN SEF: O&M BUILDING				
COORDINATES AT CORNER POINTS (DD MM SS.sss)				
POINT	POINT SOUTH EAST			
1	27°11'50.123"S	26°18'37.954"E		
2	27°11'49.913"S	26°18'38.702"E		
3	27°11'50.654"S	26°18'38.856"E		
4	27°11'50.82"S	26°18'38.1"E		
COORDINATES AT CENTRE POINT (DD MM SS.sss)				
POINT	SOUTH	EAST		
5	27°11'50.385"S	26°18'38.387"E		

LION THORN GRID CONNECTION CENTRE LINE COORDINATES (DD MM SS.sss)				
CORRIDOR ALTERNATIVE	START POINT	MIDDLE POINT	END POINT	APPROX LENGTH (KM)
ALTERNATIVE 1	27°11'45.166"S	27°11'59.638"S	27°12'7.734"S	0.70
POWERLINE	26°17'46.295"E	26°18'37.049"E	26°18'31.273"E	0.70
ALTERNATIVE 2	27°11'52.157"S	27°12'34.326"S	27°12'8.015"S	2.76
POWERLINE	26°17'51.976"E	26°17'56.932"E	26°18'30.902"E	2.76
ALTERNATIVE 3 POWERLINE	27°11'50.535"S	27°11'59.545"S	27°12'7.925"S	0.56
	26°18'25.225"E	26°18'28.289"E	26°18'31.082"E	0.50

Prepared by:



Lion Thorn Solar PV Facility 145 (PTY) LTD

6. ACTIVITY INFORMATION

6.1 **Project Description**

Lion Thorn Solar PV Facility 145 intends to develop a PV solar facility and associated infrastructure approximately 9 km east of Leeudoringstad. The solar facility will have a generating capacity of up to 200 MWac. The total development footprint of the project will approximately be 324 ha (including supporting infrastructure on site.

6.1.1 SEF and associated Infrastructure

In summary, the proposed SEF development will include the following components:

- The proposed solar PV plant will include PV fields (arrays) comprising multiple PV modules;
- PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology;
- Each PV module will be approximately 2465mm (≈2.5m) long and 1134mm (≈1.1m) wide and mounted • on supporting structures above ground;
- The foundations will most likely be either concrete or rammed piles;
- Generation capacity of up to +/-200MWac
- Inverters with a pulse-width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency
- One (1) new 33/132kV on-site distribution rated electrical substation (facility substation) occupying an • area of up to approximately $0.5ha (5 000m^2)$;
- One (1) new 132kV switching substation (Eskom substation) occupying an area of up to approximately 2.5ha (25 000m²);
- An internal electrical reticulation network to be laid ~2-4 m underground as far as practically possible
- One (1) new Operations and Maintenance building/ office (~2500m²) •
- One (1) new Switch gear and relay room (~800m²)
- One (1) new Staff lockers and changing room (~200m²)
- One (1) new Security control (~60m²)
- One (1) new Permanent Laydown Area (~8ha)
- Site and internal access roads, up to 4m wide, will provide access to the PV arrays. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary;
- Perimeter fencing
- Existing boreholes will be used where possible. Water will potentially be stored in water storage tanks;

The Preliminary Layout is reflected in the figure below and attached in Appendix 3. Photographs of the site are included in Appendix 4.

18086





Figure 4: Preliminary layout showing proposed location of solar PV panels (i.e. buildable areas)

The solar PV panels and all other project infrastructure will be placed strategically within the developable area based on environmental constraints.

6.1.2 Main components of a Solar PV Facility

The term PV describes a solid-state electronic cell that produces direct current (DC) electrical energy from the radiant energy of the sun through a process known as the PV Effect. This refers to light energy placing electrons into a higher state of energy to create electricity. Each PV cell is made of silicon (i.e. semiconductors), which is positively and negatively charged on either side, with electrical conductors attached to both sides to form a circuit. This circuit captures the released electrons in the form of an electric current (DC).

It is anticipated that the proposed Solar PV energy facility will include PV fields (arrays) comprising multiple PV panels. Solar PV panels are usually arranged in rows consisting of a number of PV modules, refer to the figure below for the typical components of a solar panel.





Figure 5: Typical components of a solar PV panel

The solar arrays are usually connected in strings, which are in turn connected to inverters. Sections of the PV array will be wired to inverters. The inverter is a pulse-width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency. DC power from the panels will be converted into AC power in the inverters and the voltage will be typically stepped up to a medium voltage in the transformers. Medium voltage cabling will link the solar PV energy facility to the grid connection infrastructure (132kV overhead power line and 33/132kV on-site substation). The medium voltage cables will be run underground (wherever technically feasible) in the facility before being fed to the on-site and/or collector substation, where the voltage will typically be stepped up.



The solar PV electricity generation process is illustrated in the figure below.

Figure 6: Solar PV electricity generation process

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



The main components of the proposed project are described below:

6.1.2.1 Solar PV arrays

The proposed Solar PV energy facility will include PV fields (arrays) comprising multiple PV panels. The PV Panel Array is proposed to produce up to 200 MWac the facility will require numerous linked cells placed behind a protective glass sheet to form a panel. PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology. Each PV module will be approximately 2465mm (≈2.5m) long and 1134mm (≈1.1m) wide and mounted on supporting structures above ground. At this stage it is anticipated that the structures will be bi-facial modules. The final design details will become available during the detailed design phase of the proposed development, prior to the start of construction. The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development.

Sections of the PV array will be wired to inverters. The inverter is a pulse-width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency

6.1.2.2 Independent Power Producer and Switching Substations

The proposed development will include the construction of one (1) new 33/132 kilovolt (kV) Independent Power Producer (IPP) substation and one (1) new 132 kV Eskom Holdings SOC Limited (Eskom) switching station with a capacity of more than 33kV but less than 275kV. The IPP substation will occupy an area of up to approximately 0.5ha. The IPP substation will contain transformer(s) for voltage step-up from medium voltage to high voltage. DC power from the modules will be converted into AC power in the inverters and the voltage will be stepped up to medium voltage in the inverter transformers. Medium voltage cabling (anticipated to be approx. 0.8m x 0.6m wide at this stage) will link the various PV arrays to the IPP substation. These cables will be laid underground, wherever technically feasible. The onsite substation will be required on site to step the voltage up to 33kV/132kV, after which the power will be evacuated into the national grid via the proposed Eskom switching substation (approx. 2.5ha).

6.1.2.3 Electrical reticulation network

An internal electrical reticulation network will be required and will be laid ~2-4 m underground as far as practically possible.

6.1.2.4 Battery Energy Storage System

The battery energy storage system (BESS) will have a capacity of up to 4.5 gigawatt-hour (GWh). The Bess will make use of Lithium-ion (Lithium Iron Phosphate/ Sodium Sulphur) or Vanadium Redox technology however the specific technology will only be determined following Engineering, Procurement, and Construction (EPC) procurement. The extent of the system will be approximately 4.57 ha. The BESS components will arrive on site pre-assembled. It must be noted that should the facility layout not require the development and operation of a BESS, the area allocated for the placement of the BESS will be used for panel placement within the development footprint.



Lion Thorn Solar PV Facility 145 (PTY) LTD

6.1.2.5 Water

To obtain water from available local sources, existing boreholes will be utilised. Water will potentially be stored in temporary water storage tanks. The necessary approvals from the Department of Water and Sanitation (DWS) will be applied for separately (should this be required).

6.1.2.6 Roads

Access to the proposed facility will be via an existing approved gravel road which connects to the tarred R502 road. This will be upgraded and formalised to allow delivery of material as part of the project. The main access road providing direct access to the project will be up to 8 m wide.

Existing internal gravel roads will be used to within the solar PV facility. New internal gravel roads of up to approximately 4 m wide may however be constructed, where necessary.

6.1.2.7 Fence and Security

For health, safety and security reasons, the facility will be fenced off from the surrounding farms. The project will have permanent security on site for 24 hours per day, 7 days a week.

6.1.2.8 Supporting Infrastructure

The following auxiliary buildings with basic services including water and electricity will be required on the site:

- Operations and Maintenance (O&M) building/ office (approximately 2500 m² [square metres]);
- Switch gear and relay room (approximately 800 m²);
- Staff lockers and changing room (about 200 m²);
- Security control (about 60 m²); and
- Permanent Laydown Area (envisaged to comprise 8 ha).

6.1.3 Technical Detail Summary

A summary of the project technical detail is provided in the table below.

Component	Dimensions		
	Total installed capacity:	200 MWac	
Solar panels	Total footprint of solar panels and laydown area (hardstand area):	Up to approximately 324 ha	
	Permanently affected area:	Up to 324 ha, may be able to rehabilitate some of this area	
Inverters	Description	The inverter is a pulse-width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency	

Table 9: Technical Detail Summary of Solar PV Facility



Lion Thorn Solar PV Facility 145 (PTY) LTD

Component	Dimensions		
Grid connection:	Description	Connecting the array to the electrical grid requires the transformation of the voltage from 33kV to 132kV. The normal components and dimensions of a distribution-rated electrical substation will be required. A switching substation with a capacity of 132kV will also be required.	
	Under or aboveground:	Underground, unless not possible due to enviro reasons.	
Internal transmissions and/or	Capacity:	Typically 33 kV	
distribution lines on site	If below, maximum depth:	Up to 2 to 4 m	
	Length:	To follow internal site roads as far as possible, length TBD	
		Electrochemical Batteries including:	
		Vanadium Redox	
BESS	Battery technology type:	Lithium-ion (Lithium Iron Phosphate/ Sodium Sulphur) Batteries The BESS would therefore comprise the	
		selected batteries together with chargers, inverters and related equipment.	
	Approximate footprint:	Up to 4.57 ha	
	Capacity:	4.5 GWh	
O&M building/ office	Footprint:	Up to 2 500 m ² (within On-site Substation Hub)	
Construction Compounds and Laydown Areas	Footprint: Up to approximately 8 ha (for temporary construction period laydown/ staging area)		
	Width of internal access roads:	up to 8m	
Roads	Length of internal access roads:	Up to 20km	
	Site access points:	8 m wide access road off R502	
	Type of material:	ТВС	
	Height:	TBC	
Perimeter 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 and lighting.		
	- Lightning Protection System (LPS).		
	- Telecommunication infrastructure.		
Associated Infrastructure	- Batching plant (if required).		
	- Security infrastructure.		
	- Access and internal roads.		
	- Stormwater Infrastructure (as needed). - Water pipelines (as needed)		

The above details will be finalised as the project proceeds.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:

SiVEST

6.2 NEMA Listed Activities

The EIA Regulations, promulgated under Section 24(5) of the NEMA and published in GN No. R. 326, lists activities which may not commence without EA from the CA. The proposed project comprises activities identified in terms of GN No. R. 327, 325 and 324 (Listing Notice 1, 2 and 3 respectively), activities which must therefore follow a S&EIR process. The triggered, listed activities are depicted in the table below:

Activity No(s):	Relevant activities as set out in GN No. R. 327, 325 and 324 of	Description of the portion of the proposed project to which the
	the EIA Regulations	applicable listed activity relates
Listing Notice 1 (GN No. R. 32	7)	· · · · · ·
11.(i)	The development of facilities or infrastructure for the transmission and distribution of electricity: (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV;	The proposed development involves the construction of medium voltage cabling (33 kV) to link the various PV arrays internally prior to connecting to the external proposed IPP substation and Eskom switching station.
12.(ii)(a)(c)	The development of:(ii) infrastructure or structures with a physical footprint of 100 m ² or more; where such development occurs: (a) within a watercourse;(c) if no development setback exists, within 32 m of a watercourse, measured from the edge of a watercourse;	The proposed development and associated development may be located within a surface water feature / watercourse or within 32m from the edge of a surface water feature / watercourse.
14.	The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres (m ³) or more but not exceeding 500 m ³ .	"Dangerous goods" that are likely to be associated with the project include fuel stored during the construction phase. Threshold of 80 m ³ expected to be exceeded.
19.	The infilling or depositing of any material of more than 10m ³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 m ³ from a watercourse;	The proposed development and associated development may be located within a surface water feature / watercourse or within 32m from the edge of a surface water feature / watercourse.
24.(ii)	The development of a road:(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	Internal access roads will be required to access the SEF, although there is existing access to site it the access roads are planned to be 8 m with no road reserve. Internal roads are also proposed to accommodate cable tranches,

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:

SiVEST

	Relevant activities as set out in	Description of the portion of the
Activity NO(S).	the EIA Regulations	applicable listed activity relates
		stormwater channels (as required), and turning circle/ bypass areas of up to 20m in some sections.
27.	The clearance of an area of 1 ha or more, but less than 20 ha of indigenous vegetation	Vegetation associated with the Vaal- Vet Sandy Grassland, is likely to be cleared in preparation for the proposed development.
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 1 ha;	The proposed site is currently used and zoned for agricultural purposes, i.e. grazing. The proposed development will result in an area of agricultural land greater than 1 ha being transformed to industrial/ commercial use.
30.	Any process or activity identified in terms of Section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).	As discussed above, the proposed development site falls with the Vaal- Vet Sandy Grassland, this vegetation type is identified as Endangered in terms of the South African National Biodiversity Institute (SANBI) Threatened Ecosystems.
48 (i) (a) (c)	The expansion of- (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; or	The proposed development will entail the expansion (upgrading) of roads and other infrastructure by 100m ² or more within a surface water feature / watercourse or within 32m from the edge of a surface water feature / watercourse.
	(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	Although the layouts of the proposed developments will be designed to avoid the identified surface water features / watercourses as far as possible, some of the internal and access roads to be upgraded will need to traverse the identified surface water features / watercourses and construction will occur within some of the surface water features / watercourses and/or be within 32m

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:

SiVEST

Activity No(s):	Relevant activities as set out in GN No. R. 327, 325 and 324 of the EIA Regulations	Description of the portion of the proposed project to which the applicable listed activity relates
		of some of the surface water
50 (ii)	The widewing of a read by more	teatures / watercourses.
56 (11)	than 6 metres, or the lengthening of a road by more than 1 kilometre -	required to access the PV panels and the substation. Existing roads
	 (i) where the existing reserve is wider than 13,5 metres; or (ii) where no reserve exists, where the existing road is wider than 8 metres – 	Will be used wherever possible, although new roads will be constructed where necessary. The existing access roads will need to be upgraded by widening them more than 6m, or by lengthening them by more than 1km.
Listing Notice 2 (GN No. R. 32	5)	
1.	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 MW or more	The proposed development will entail the construction of a SEF where the respective electricity output will be up to 200 MWac. In addition, the proposed SEF development will be located outside urban areas.
15.	The clearance of an area of 20 ha or more of indigenous vegetation	Vegetation associated with the Vaal-Vet Sandy Grassland, that measures more than 20 ha is likely to be cleared in preparation for the proposed development.
Listing Notice 3 (GN No. R. 32	4)	
4 (h)(ii)(ee)	The development of a road wider than 4m with a reserve less than 13.5 metres. g. North West ii. Outside Urban Areas:	The development of the SEF facility and associated infrastructure will require the development of roads wider than 4 m with a reserve of less than 13.5 m within ESA area.
	(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	These roads will occur within the North West Province, outside urban areas.
10.h.vi	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.	"Dangerous goods" that are likely to be associated with the project include fuel stored during the construction phase. Threshold of 80 m ³ expected to be exceeded. Wetlands were delineated on site, although it is not advised to place these substances within watercourses/ 100 m of watercourses the likelihood exists.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:

SiVEST

	Relevant activities as set out in	Description of the portion of the
Activity NO(S).	the EIA Regulations	applicable listed activity relates
	iv. Critical biodiversity areas as	The site is situated within an ESA
	identified in systematic biodiversity	area.
	plans adopted by the competent	
	authority	
	vi. Areas within a watercourse or	
	wetland, or within 100 m from the	
	edge of a watercourse or wetland.	The 004 has the transmission of the 1974 h
	ar more of indigenous vegetation	I ne 324 ha site is overlain vaai-vet
	or more of margenous vegetation	situated within ESA vegetation
	h North West	exceeding 300 m^2 will be cleared in
	iv. Critical biodiversity areas as	preparation for the construction
12.h.vi	identified in systematic biodiversity	phase. Some of the area to be
	plans adopted by the competent	cleared may be located within a
	authority	watercourse or wetland, or within
	vi. Areas within a watercourse or	100m from the edge of a
	wetland, or within 100 m from the	watercourse or wetland.
	edge of a watercourse or wetland.	
	The widening of a road by more	Existing access road/s leading to
	road by more than 1 km	to 8 m some of the infrastructure is
		likely to be within and/ in 100 m of
	h. North West	wetlands.
18.h.ix	v. Critical biodiversity areas as	
	identified in systematic biodiversity	
	plans adopted by the competent	
	authority	
	ix. Areas within a watercourse or	
	wetland, or within 100 m from the	
23 (ii)(a)(c) (d)(ii)(ee)	The expansion of	The proposed development will
		entail the development and
	(ii) infrastructure or structures	expansion of roads and other
	where the physical footprint is	infrastructure by 10m ² or more within 2 watercourse or within 32m
	more;	from the edge of a watercourse.
	where such expansion occurs—	The expansion of the infrastructure
	'	will occur within the North West
	(a) within a watercourse;	Province, outside urban areas,
	been adopted, within 32 metres of a	
	watercourse, measured from the	Although the layout of the proposed
	edge of a watercourse;	development will be designed to
	excluding the expansion of	avoid the identified surface water
	infrastructure or structures within	the existing internal and access
	existing ports or harbours that will	roads will need to traverse some of

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:

SiVEST

Activity No(s):	Relevant activities as set out in GN No. R. 327, 325 and 324 of the EIA Regulations	Description of the portion of the proposed project to which the applicable listed activity relates
	not increase the development footprint of the port or harbour. g. North West <i>iv. Critical biodiversity areas as</i> <i>identified in systematic biodiversity</i> <i>plans adopted by the competent</i> <i>authority</i>	the identified surface water features.

7. NATIONAL WEB-BASED ENVIRONMENTAL SCREENING TOOL

The National Web-based Environmental Screening Tool (Screening Tool) is a geographically based webenabled application which allows a proponent intending to submit an application for EA, in terms of the EIA Regulations, to screen their proposed site for any environmental sensitivity.

According to the Screening Report, attached in **Appendix 8**, the themes described in **Table 11** below are applicable to the proposed development. The table also includes verifications by both the EAP and specialists.

Theme	Sensitivity	EAP/ Specialist Verification	EAP/ Specialist Sensitivity
Agriculture	Medium	The Screening Tool rating of the agricultural sensitivity of the assessment area is entirely medium. None of the land is classified as cropland and agricultural sensitivity is therefore purely a function of classified land capability. The classified land capability of the site is 6 to 7 (low-moderate). This assessment verifies that the site is not within crop boundaries and verifies the classified land capability, based on the assessment of the cropping potential of the site. This assessment therefore confirms the medium sensitivity rating by the screening tool.	Medium
Animal Species Medium		Parts of the proposed study area have a Medium Animal Species Theme sensitivity as a result of the potential presence of Secretary bird (<i>Sagittarius serpentarius</i>). A single Secretarybird was recorded in the broader nine-pentad assessment area, discussed below, in 2016. The Secretarybird was not recorded during previous monitoring within the area. However, the species was recorded during	Medium

Table 11: Screening Report Environmental Sensitivity and Verification

SiVEST

Lion Thorn Solar PV Facility 145 (PTY) LTD

Theme	Sensitivity	EAP/ Specialist Verification	EAP/ Specialist Sensitivity
		a survey conducted in August 2022 at the Wildebeestkuil 1 SEF and Wildebeestkuil 2 SEF. This observation coupled with the availability of suitable habitat, confirms the <i>Medium</i> sensitivity rating.	
		This rating will be verified further during the EIA phase of the project, following a site verification and seasonal surveys to the proposed development area and broader area.	
Aquatic Biodiversity	Very High	The majority of the area is deemed as Low Sensitivity with the wetland zones showing a High Sensitivity.	Majority of the site is Low with the wetland zones showing a High Sensitivity.
Archaeological and Cultural Heritage	Low	According to the Screening Report, the directly affected area has a low sensitivity rating. The fieldwork in the study area demonstrates that only one burial ground warrants conservation. Therefore, in the case of this study area, the Screening Tool sensitivity map is only partly supported based on the findings of this fieldwork. The fieldwork identified two heritage finds that were then classified as Late Stone Age (LSA), LT001, and burial ground (LT002). From an archaeological and historical structure perspective, the proposed project area, the possible construction impacts calculated on the tangible cultural heritage resources is overall Moderate Negative rating but with the implementation of the recommended buffers and management guidelines, will be reduced to a Low Negative impact. Therefore, impacts on heritage resources can be mitigated to acceptable levels allowing for the development to be authorised.	Low
Avian	High	Parts of the proposed study area are considered to have a High Avian Theme sensitivity as a result of the site being situated within 20 km of a vulture restaurant and a Medium Animal Species Theme sensitivity as a result of the potential presence of Secretarybird (<i>Sagittarius serpentarius</i>), Feathers (2023).	Medium

^{/:} SiVEST

Theme	Sensitivity	EAP/ Specialist Verification	EAP/ Specialist Sensitivity
		The Inkhoek Vulture Restaurant, located on the farm Inkbospan, is no longer operational, the High sensitivity associated with Avifauna is therefore refuted.	
		A single Secretarybird was recorded in the broader nine-pentad assessment area, discussed below, in 2016. The Secretarybird was not recorded during previous monitoring within the area. However, the species was recorded during a survey conducted in August 2022 at the Wildebeestkuil 1 SEF and Wildebeestkuil 2 SEF (Feathers, 2023). This observation coupled with the availability of suitable habitat, confirms the <i>Medium</i> sensitivity rating.	
		This rating will be verified further during the EIA phase of the project, following a site verification and seasonal surveys to the proposed development area and broader area.	
Civil Aviation (Solar PV)	Low	The entire site has a low sensitivity in terms of the defence theme. No further assessment required.	Low
Defence	Low	The entire site has a low sensitivity in terms of the defence theme. No further assessment required	Low
Landscape (Solar)	High	While the proposed site is located 800m form the Kgakala Township, the site is not prominent with regards to the town location, with the proposed panels viewed in the Mid Ground on the same elevation in a uniform line following the horizon line. The proposed landscape change will not degrade the existing Moderate levels of Scenic Quality of the locality.	Medium to Low
Palaeontology	Medium	The proposed SEF site is underlain by the Allanridge Formation (Ventersdorp Supergroup). The updated Geology Map compiled by the Council for Geosciences also indicates that the development is underlain by the Allanridge Formation of the Ventersdorp Supergroup. The PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database indicates that the Palaeontological Sensitivity of the Allanridge Formation is Zero (Almond and Pether, 2008; SAHRIS website). A Low Palaeontological Significance has thus been allocated to the project.	Low

Lion Thorn Solar PV Facility 145 (PTY) LTD

ared by:



Theme	Sensitivity	EAP/ Specialist Verification	EAP/ Specialist Sensitivity
Plant Species	Medium	This rating will be verified further during the EIA phase of the project, following a site verification and seasonal survey to the proposed development area.	ТВС
RFI (Radio Frequency Interference)	Medium	The Screening Report describes areas falling within 1 km of a telecommunication facility or between 30 and 60 km from a Weather Radar installation and within the radar's line of sight as medium sensitivity. It is unlikely that the proposed development will interfere with the telecommunication and weather radar installations given in nature, SEF. The sensitivity has therefore been assign low and no further assessment is required. The relevant departments will be consulted with during the Scoping Phase to confirm requirements (if any).	Low
Terrestrial Biodiversity	Very High	The Terrestrial Biodiversity Sensitivity is noted to be Very High due to the presence of untransformed Vaal-Vet Sandy Grassland. This rating will be verified further during the EIA phase of the project, following a site verification and seasonal survey in the correct season to the proposed development area.	TBC

8. DESCRIPTION OF THE BIOPHYSICAL AND PHYSICAL ENVIRONMENT

8.1 Geography

The proposed site is situated approximately 9 km east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, which falls within the Dr Kenneth Kuanda District Municipality in the North West Province (refer to the figure below).





Figure 7: Regional context associated with the proposed site

8.2 Land Use/ Cover

According to the South African National Land Cover dataset (GeoTerra Image, 2018), the majority of the proposed assessment area is characterized by natural vegetation which is dominated by natural grassland (refer to the figure below). There are, however, small patches of land classified as forested, shrubland and barren. Immediately outside the site the landuses/ land cover comprises grassland, cultivated land and built-up areas including patches of forested, shrubland and barren. Throughout the general study area the land appears to be fallow grasslands, hence livestock farming is the dominant agricultural activity, although livestock densities appear to be relatively low.





Figure 8: Land Cover Classification

Farm properties in the broader study area tend to be relatively large resulting in a low density of rural settlement. Built form is largely characterised by scattered farmsteads and ancillary farm buildings, gravel access roads, telephone lines, existing electrical lines, fences and the remnants of disused workers' dwellings. Notwithstanding the above, Kgakala a medium to high density township of the Leedoringstad town is located some 750 m from the proposed site. Other human influence is visible in the area in the form of road, rail and electricity infrastructure. This includes the R502 regional road adjacent to the site and the R504 regional road which traverses 5 km to the south-western side of the site. In addition, an operational railway line runs directly adjacent to the R502 and several high voltage powerlines feed into the Leeubosh TR 132 kV Traction Substation situated approximately 5.5 km to the south of the application site. The tall steel structures of the Traction Substation, as well as the tall steel towers of the powerlines are visible in the landscape.

8.3 Climate

The study area is characterized by a dry climate with a 'BSk' classification according to the Köppen-Geiger climate classification. Leeudoringstad receives a mean annual precipitation of about 588 millimetres (mm). All areas with less than 400 mm rainfall are considered to be arid and all areas with more than 600 mm are moist. The study area can therefore be considered to be intermediate. The average lowest rainfall is received in July (approximately 6 mm) and the highest in January (about 103 mm), which is a seasonally variation of 97 mm. Winter frost is common and severe, and occurs on average 37 days per year.

The average maximum midday temperature for Leeudoringstad ranges from about 23.2°C in January to 9.5°C in July, which is a seasonal variation of 13.7°C.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



The average monthly distribution of rainfall and temperature is shown in the table below.

	Average	Temperature (°C)		
Months	(mm)	Maximum	Minimum	Average
January	103	30.2	16.3	23.2
February	93	28.6	15.8	22.2
March	80	27	13.7	20.3
April	50	24.4	9.5	16.9
May	23	21.4	5	13.2
June	8	18.2	1.2	9.7
July	6	18.3	0.7	9.5
August	10	21.4	2.9	12.1
September	16	24.9	7.4	16.1
October	51	27.8	11.3	19.5
November	67	28.5	13.6	21
December	81	29.3	15.2	22.4

Table 12: Summary of climate conditions associated with the study site (Climate-Data.org)

8.4 Topography and Drainage

The topography within and in the immediate vicinity of the proposed application site is characterised by a mainly flat to gently undulating landscape, sloping down in a south-easterly direction. In addition, the topography in the wider area is largely characterised by level plains with little noticeable relief and very gradual slopes. The topography and slopes in the general project area are showed in **Figure 9** below.

There is seemingly no non-perennial stream passing through the site. The site drainage is expected to occur as sheetwash and throughflow towards the east, refer to **Figure 10** below, which will eventually flow into the Klipspruit. The elevation of the site is between 1 330 to 1 320 metres above mean sea level.





Figure 9: Topography of the proposed site (VRMA 2023)



Figure 10: Drainage features associated with the project site

Prepared by:



Lion Thorn Solar PV Facility 145 (PTY) LTD

8.5 Geology

A Desktop Geotechnical Assessment, dated July 2023, was undertaken by Gage Consulting (Pty) Ltd (Gage).

8.5.1 Description of Receiving Environment

Seismicity:

According to the Seismic Hazard Map of South Africa (SANS 10160-4, 2017), the peak ground acceleration is approximately 0.2 grams for the site. The peak ground acceleration may be described as the maximum acceleration of the ground shaking during an earthquake, which has a 10% probability of being exceeded in a 50-year period.

The site is within seismic hazard Zone II as per SANS 10160-4 (2017), regions of natural and mining induced seismic activity.

Bedrock Geology

According to the 1:250 000 scale geological map 2726 Kroonstad (2000), the bedrock geology comprises green-grey to dark grey amygdaloidal and porphyritic lavas of andesitic to basaltic composition, with agglomerates and tuffs found in the Ventersdorp Supergroup. The geological map does not indicate any fossil occurrences in any of the geological units across the site. The regional geology of the site is illustrated in **Figure 11** below.



Figure 11: The regional geology of the site

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:

SIVEST

Engineering Geology

The entire site is expected to be underlain by residual clayey soils to depths greater than 2.00 metres below ground level. The residual material is expected to possess high plastic behaviour and shrink-swell properties. Within the residual soil, rounded, hard rock core stones are expected to exist. The transported surface material is expected to comprise high amounts of clay material and may also possess undesirable shrink-swell properties.

Swelling clays, also known as expansive clays or clay minerals with swelling properties, are a type of clay material that exhibits the unique ability to undergo significant volume changes in response to changes in moisture content. When exposed to water, these clays can absorb large amounts of water molecules into their crystalline structure, causing them to expand and swell. Conversely, when the moisture content decreases, they release water and contract. This property can exert powerful pressures on adjacent structures, leading to potential issues such as heaving, cracking, and damage to buildings, roads, and other infrastructures (Gage, 2023).

Pedogenic ferricrete is expected to form within and at the boundary between the transported and residual material. The ferricrete can range from very weakly cemented to strongly cemented nodular to hardpan ferricrete. As per Gage (2023), the ferricrete has a positive influence on the site stability and if thick enough can be used as a founding medium that will reduce the impact of the swelling clays at depth. The geotechnical zonation map in provided in **Figure 10** below.

According to Gage (2023), the expected fine nature of the soils on site are expected to cause waterlogged conditions in trenches and depression during and after heavy rainfall.

In terms of construction material for access roads, foundation platforms and other structures, a quarry or borrow pit near the site should be explored or consideration should be given to commercial suppliers (Gage, 2023).

As per Gage (2023), the entire assessment area may be divided into one (1No.) ZONE (refer to the table below). Intrusive investigation may reveal additional facets once variations in the subsoil profile become apparent. Some geotechnical constraints have been identified, namely potentially expansive colluvium and residual soils. These constraints may be mitigated via standard engineering design and construction measures.

Z O N E	Ground Conditions	Geotechnical Conditions / Constraints	Impacts on Engineering Design and Construction
I	Potentially expansive colluvium and residual soils	 Shrink-swell clays in colluvium and residual horizons Bedrock at depths greater than foundation expected levels Soft to intermediate/ boulder excavation conditions when corestones are encountered 	 Minor to moderate earth works required at founding level Removal of expansive material and replacement of inert sand fill may be necessary Conventional shallow raft foundations suitable on replacement fill Surface drainage measures required to minimise risk of flooding and imbibition of moisture under foundations

Table 13: Summary of the Geotechnical Conditions/ Constraints

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:

SIVEST

Z O N E	Ground	Geotechnical Conditions /	Impacts on Engineering Design and
	Conditions	Constraints	Construction
		 Waterlogged conditions in trenches and on surface during and after heavy rainfall 	 Conventional subgrade preparation for roads Variable excavation conditions Soft to intermediate excavation conditions for pole planting / trenching / earthworks

8.5.2 Geological Environment Potential Impacts

The main impact of the proposed development from a geological perspective is the displacement and removal of soil and rock materials. These activities will predominantly take place during the construction phase. The degree of disturbance is largely dependent on the topography and location of the project site and the nature of the proposed infrastructure. Areas with thick, highly expansive, soil are unfavourable as these require bulk earthworks to remove and replace expansive material (Gage, 2023).

The risk of soil erosion is also increased during construction activities, by the removal of vegetation and by possible disturbance to the natural surface drainage environment. These activities may prevent infiltration of rainwater, increase surface runoff and cause concentration of surface water flow. Erosion will increase the disturbance and displacement of soils and the impact may extend beyond the infrastructure footprint/s over time.

The topography of the site is generally flat and will require minor earthworks depending on the final layout design. The majority of soils do not render the site particularly susceptible to soil erosion, though mitigation measures need to be implemented to limit potential of any erosion possible erosion.

Appropriate engineering design of access roads, particularly drainage and erosion control measures, are critical to limit the impact of the development on the geological and geotechnical environment. Drainage measures must be such that moisture moves away from all foundations and that ponding does not occur adjacent to any foundation. Ponding water will allow moisture to infiltrate and percolate under the foundation, potentially causing clay soils to expand and cause foundation damage.

A detailed geotechnical materials investigations should be undertaken to assess the suitability of the in-situ materials and the need for processing (e.g. crushing, stabilisation).

8.5.3 Preliminary Conclusion

No fatal flaws or 'no-go' areas have been identified that would render the assessment area unsuitable from a geological and geotechnical perspective.

The potential geological impact of the SEF will be caused by the top stripping, construction of access roads, including earthworks required for the construction of foundation platforms, and excavations as well as trenching for underground cables. Bulk earthworks, where required, for the construction of access roads and working platforms on highly expansive material may cause a more significant impact. These zones will only become clear once intrusive investigations have been completed.

Additional impacts would be caused by the opening of borrow pits or quarry that may be undertaken to obtain construction materials.

Prepared by:



Lion Thorn Solar PV Facility 145 (PTY) LTD

8.6 Agriculture and Soils

An agricultural compliance statement and site sensitivity verification was undertaken by Johann Lanz (report dated 25 June 2023).

8.6.1 Field Verification and Findings

The site falls outside of an area that is classified as a Protected Agricultural Area (PAA). A PAA is a demarcated area in which the climate, terrain, and soil are generally conducive for agricultural production and which, historically, has made important contributions to the production of the various crops that are grown across South Africa. PAAs, the protection, particularly of arable land, is considered a priority for the protection of food security in South Africa, but the protection of land outside of these areas is generally not considered a food security priority.

The agricultural production potential is one of the three factors that determine the significance of the agricultural impact. All important parameters that control the agricultural production potential of the site are given in the table below (Johann Lanz, 2023).

	Parameter	Value
	Köppen-Geiger climate description	Arid, steppe, cold
Clin	Mean Annual Rainfall (mm)	526
nate	Reference Crop Evaporation Annual Total (mm)	1 500
	Climate capability classification (out of 9)	4 (low-moderate) to 5 (moderate)
	Terrain type	Level plains with very little topography
-	Terrain morphological units	Mid-slope
errai	Slope gradients (%)	0 to 3
п	Altitude (m)	1 330
	Terrain capability classification (out of 9)	7 (high)
	Geology	ALLANRIDGE FORMATION: Andesite, tuff
	Land type	Fb6 (east) and Bd12 (west)
Soil	Description of soils	Fb6: very shallow, medium textured soils on underlying weathered bedrock. Bd12: very shallow to moderately deep, medium textured soils on underlying weathered bedrock and hardpan.
	Dominant soil forms	Fb6: Rock outcrop, Glenrosa, Mispah Bd12: Clovelly, Glencoe, Avalon, Rock outcrop, Glenrosa
	Soil capability classification (out of 9)	4 (low-moderate)

Table 14: Parameters that control/ describe the agricultural production potential of the site

SiVEST

Lion Thorn Solar PV Facility 145 (PTY) LTD

	Parameter	Value
La	Agricultural land use in the surrounding area	Grazing
nd u	Agricultural land use on the site	Grazing
ISe	Land Cover classification on the site	Natural grassland
Ge	Long-term grazing capacity (hectares per Large Stock Unit)	7
nera	Land capability classification (out of 15)	6 to 7 (low-moderate)
-	Within Protected Agricultural Area	No

The cropping potential of the area is generally limited by the combination of climate (arid climate with low moisture availability) and soil constraints (limited soil depth) so that it is not suitable for rain-fed crop production. The limited depth, in combination with the low moisture availability, provides an insufficient moisture reservoir to carry a crop through the season. Although some rain-fed cropping has been done in the area in the past, it is no longer economically viable. The limited agricultural potential of the site limits its viable agricultural use to grazing only.

It should be noted that cropping potential changes with a changing agricultural economy over time. Poorer soils and/or marginal climates that may have been cropped with economic viability in the past, are abandoned as cropland because they become too marginal for viable crop production in a more challenging agricultural economy, with increased input costs.

8.6.2 Agriculture and Soils Potential Impacts

An agricultural impact is a change to the future agricultural production potential of land. In most developments, including the one being assessed here, this is primarily caused by the exclusion of agriculture from the footprint of the development. Soil erosion and degradation may also contribute to loss of agricultural production potential. The significance of an agricultural impact is a direct function of the following three factors:

- 1. the size of the footprint of land from which agriculture will be excluded (or the footprint that will have its potential decreased);
- 2. the baseline production potential (particularly cropping potential) of that land;
- 3. the length of time for which agriculture will be excluded (or for which potential will be decreased).

In this case, the total footprint of land that will be lost, which will be lost for the lifetime of the development, is approximately 320 ha. The production potential of that land is limited to only being suitable as grazing land. The loss of 320 ha of grazing land, of which there is no particular scarcity in the country, represents a minimal loss of agricultural production potential in terms of national food security and for the affected farm.

It is also important to note that renewable energy (RE) facilities can have both positive and negative effects and it is the net sum of these positive and negative effects that determines the extent of the overall change in future production potential.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



8.6.3 Preliminary Conclusion

Due to the fact that the agricultural land loss is not of viable cropland and that its negative impact is offset by economic benefits to farming, the overall negative agricultural impact of the development is assessed here as being of *low significance* and as acceptable.

The acceptability is substantiated by the following points:

- The amount of agricultural land use by the development is within the allowable development limits prescribed by the agricultural protocol. These limits reflect the national need to conserve valuable agricultural land and therefore to steer, particularly RE developments, onto land with low agricultural production potential.
- The proposed development poses a low risk in terms of causing soil degradation because degradation can be effectively prevented by standard, generic, best practice mitigation actions that are inherent in the project engineering.
- The proposed development offers a positive impact on agriculture by way of improved financial security for farming operations.
- The PV panels will not necessarily totally exclude agricultural production. The area can still be used to graze sheep that will, in addition, be protected against stock theft within the security area of the facility.
- The proposed development will also have the wider societal benefits of generating additional income and employment in the local economy.
- In addition, the proposed development will contribute to the country's urgent need for energy generation, particularly RE that has much lower environmental and agricultural impact than existing, coal powered energy generation.
- All RE development in South Africa decreases the need for coal power and thereby contributes to reducing the large agricultural impact that open cast coal mining has on highly productive agricultural land throughout the coal mining areas of the country.

From an agricultural impact point of view, it is recommended that the development be approved.

8.7 Aquatic/ Freshwater Assessment

A Freshwater Ecological Assessment, dated June 2023, was undertaken by EcoAssist Environmental Consulting (EcoAssist).

The study site falls within the middle Vaal Water Management Area (WMA)., with the project area located within the C25A quaternary catchment. The project area is situated on the crest landscape position on a south-east facing slope, with the slope fairly flat.

On a desktop level, National Freshwater Ecosystem Priority Areas (NFEPA) 2011 and North West Biodiversity Sector Plan (NWBSP) 2015, the proposed development site does not fall under a CBA nor an Ecological Support Area (ESA), refer to **Figure 12** below.



Lion Thorn Solar PV Facility 145 (PTY) LTD



Figure 12: Desktop level aquatic sensitivity of the proposed development site

Two wetlands, one within the site and another in the 500 m radius of the site/ regulated area in terms of the NWA, were identified on the NFEPA and South African Inventory of Inland Aquatic Ecosystems (SAIIAE) national wetland database. SAIIAE, Van Deventer, et al. (2018) has updated the previous NFEPA maps to give a more comprehensive desktop data set of the wetlands at a national level. This dataset is called the National Wetland Map 5 layers (NWM5L). The wetland situated within the regulated area corresponds with the wetland as picked up in the NWBSP (2015). The NFEPA categorises the wetland occurring inside the site boundary as a depression, while that situated within the regulated area is deemed a unchanneled valley bottom (UVB). On the other hand, SAIIAE deemed both these wetlands depressions. These wetlands were rated as largely natural (class A/B), critically endangered and poorly protected.

8.7.1 Field Verification and Findings

The two wetlands discussed above were confirmed on site during the field investigation, 2nd June 2023, undertaken by the aquatic specialist. Additional wetlands were also identified within the project area, refer to the figure below. These wetlands would need to be assessed in detail to determine the wetland health and functionality.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:





Figure 13: The wetlands identified with the proposed project site

8.7.2 Aquatic/ Freshwater Potential Impacts

The summarised impact assessment is a prediction of the risks/ impacts that will be associated with the development phase associated with the proposed footprint area. A full impact assessment will be completed once the final fieldwork assessment has been conducted and included in the DEIR. One main impact has been taken into consideration for the proposed activities, namely "Loss/ Degradation of wetlands" as well as the "loss or alteration of flow drivers" from a hydropedological perspective.

8.7.3 Preliminary Conclusion

The wetland scoping assessment has identified several wetlands within the project boundary and the regulated area. These wetlands are largely natural (as per the NFAPA and SAIIAE wetlands layers).

The confirmed wetlands will be assessed in detail to determine the wetland health and functionality, this information will be included in the Draft Environmental Impact Report (DEIR).

8.8 Terrestrial Biodiversity

On a desktop level, the proposed development site is categorised as ESA1 with uncategorised patches and patches of ESA2 (NWBSP, 2015), refer to **Figure 14**. No CBAs are noted to occur on site.

ESA1 must be maintained in at least a semi-natural state as ecologically functional landscapes that retain basic natural attributes, i.e. ecosystem still in a natural, near-natural state or semi-natural state, and has not been previously developed; ecosystems moderately to significantly disturbed but still able to maintain basic functionality; individual species or other biodiversity indicators may be severely disturbed or reduced; these are areas with low irreplaceability with respect to biodiversity pattern targets only.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



ESA2, on the other hand, must maintain as much ecological functionality as possible (generally these areas have been substantially modified), i.e. maintain current land use or restore area to a natural state; ecosystem not in a natural or near-natural state, and has been previously developed (e.g. ploughed); ecosystems significantly disturbed but still able to maintain some ecological functionality; individual species or other biodiversity indicators are severely disturbed or reduced and these are areas that have low irreplaceability with respect to biodiversity pattern targets only; these areas are required to maintain ecological processes especially landscape connectivity.



Figure 14: The terrestrial biodiversity sensitivity on a desktop level

There are no gazetted protected areas within 10 km of the project area.

There are no Important Bird Areas (IBAs) within 10 km of site.

8.8.1 Vegetation Type

According to the SANBI (2018), the site completely falls under the Vaal-Vet Sandy Grassland vegetation type (refer to **Figure 15** below).

This vegetation type is depicted as Endangered under the SANBI Threatened Ecosystems, published in terms of Section 52 of the NEMBA, Focus and Expansion Priority Area in terms of SANBI National Protected Areas Expansion Strategy (NPAES), refer to **Figure 19** below.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



As per Section 52 of the NEMBA, a single species of concern within the Vaal-Vet Sandy Grassland potentially occurs within the vegetation type, the species being Sensitive Species 1261. This species was last noted in Klerksdorp industrial area in 1918, which is the closest known record to the site.

The vegetation and landscape features, as per Mucina and Rutherford (2006), include plains-dominated landscape with some scattered, slightly irregular undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *T. triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall.



Figure 15: The vegetation type associated with the proposed development site





Figure 16: Terrestrial biodiversity sensitivity as per the SANBI datasets

8.8.2 Animal Species Theme

The Animal Demographic Unit's (ADU) ReptileMAP lists 14 reptile species that potentially occur within the greater study area. These include one species of conservation concern (SCC), namely the Cape Sand Snake/ *Psammophis leightoni*, being recorded in the relevant quarter degree square (refer to the table below). The accuracy of this record is questionable considering that this species is endemic to the western regions of the Western Cape (SANBI, 2023) and the habitat requirement is sand fynbos and strandveld.

Scientific name	Common name	Red list category	Number of records	Last recorded
Psammophis leightoni	Cape Sand Snake	Vulnerable (SARCA 2014)	3	02/03/1982

Table 15: Red List Reptile species predicted to occur within the study area.

The ADU's FrogMAP lists six species of amphibians that may occur within the greater study area. No SCC have been recorded in the relevant quarter degree square.

The ADU's MammalMAP predicts that 20 species of mammal to potentially occur within the study area. Two SCC have been recorded in the quarter degree square (refer to the table below). Presence of Tsessebe on site is unlikely as the parcel of land is currently under livestock agriculture. Black footed cat may occur on site

Lion Thorn Solar PV Facility 145 (PTY) LTD



and in the general area as the habitat requirements of arid grassland, dwarf shrub and savannah is met (SANBI, 2023).

Scientific name	Common name	Red list category	Number of records	Last recorded
Damaliscus Iunatus Iunatus	(Southern African) Tsessebe	Vulnerable (2016)	1	26/06/2013
Felis nigripes	Black-footed Cat	Vulnerable (2016)	2	17/02/2014

Table 16: Red List Mammal species predicted to occur within the study area.

According to the ADU's LepiMAP, eight species of butterflies and moths have been recorded within the greater study area. No SCC have been recorded in the relevant quarter degree square.

Species attributing to the Medium Sensitivity of the Animal Theme is the Secretary Bird (*Sagittarius serpentarius*). This species is highly likely to occur in the area due to the habitat preference for open grasslands/ plains.

8.8.3 Terrestrial Biodiversity Potential Impacts

Potential issues relevant to impacts on the terrestrial biodiversity of the study area include:

- Impacts on fauna and flora: this includes any potential impacts on populations of individual species of flora and fauna, including protected species within the habitats noted on site.
- Impacts on sensitive habitats: this includes potential impacts on any sensitive or protected habitats, including indigenous grassland that leads to direct or indirect loss of such habitat. The potential impacts of the proposed development mainly related to loss of Vaal-Vet Sandy, and ESA1 and protected plants associated with these sensitive ecosystems.
- Impacts on ecosystem function: this includes impacts on any processes or factors that maintain ecosystem functionality at a local and regional scale:
 - Habitat fragmentation;
 - Changes to abiotic environmental conditions;
 - o Changes to disturbance regimes, e.g., increased grazing / overgrazing;
 - Changes to vegetation components (e.g. shifting from primary to secondary state of grasslands);
 - Increased invasion by alien plants.

Changes to factors such as these may lead to a reduction in the resilience of plant communities and shifts in ecosystem function and type.

8.8.4 Preliminary Conclusion

A detailed assessment will be undertaken during the EIA phase of the project, following a site verification and seasonal survey to the proposed development area in the correct season.

8.9 Avifaunal Assessment

A Desktop Avifaunal Screening Assessment, dated June 2023, was undertaken by Feathers Environmental Services (Pty) Ltd (Feathers).



Lion Thorn Solar PV Facility 145 (PTY) LTD

No IBAs, Co-ordinated Waterbird Count Sites (CWAC) and Co-ordinated Avifaunal Roadcount Routes (CAR) are within the 30 km radius of the proposed development site.

The Southern African Bird Atlas Project 2 (SABAP2) maps the distribution of birds based on records of bird species observed during more than two hour surveys within a geographical pentad (approximately 8 × 7.6 km in size). Nine pentad grid cells are relevant to this assessment, refer to **Figure 22** below (Feathers, 2023).

A total of 163 bird species have been recorded within the relevant pentads during the South African Bird Atlas Project 2 atlassing period to date. The presence of these species in the broader area provides an indication of the diversity of species that could potentially occur within the areas earmarked for the proposed development area, particularly where pockets of natural vegetation/habitats persist. Of the 163 species, four of these are considered to be of regional conservation concern. Fifty-two species are designated priority species.



Figure 17: Location of the four SABAP2 pentad grid cells that were considered for the project

8.9.1 Desktop Findings

Five sensitivity categories, ranging from low to high, were assigned to the respective avifaunal features and habitat classes found within the proposed site based on the most recent bird species occurrence and breeding data, and the importance of the specific habitat type from a priority species perspective.

Vegetation is one of the primary factors determining bird species distribution and abundance in an area. It is widely accepted within ornithological circles that vegetation structure is more important in determining which bird species will occur. Whilst much of the distribution and abundance of bird species can be attributed to the broad vegetation types present in an area, it is the smaller spatial scale habitats (micro habitats) that support

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



the requirements of a particular bird species that need to be examined in greater detail. Micro habitats are shaped by factors other than vegetation, such as topography, land use, food availability, and various anthropogenic factors all of which will either attract or deter birds and are critically important in mapping the site in terms of avifaunal sensitivity and ultimately informing mitigation requirements. A desktop investigation of the proposed site revealed at least six broadly described avifaunal micro habitats (**Figure 21**) i.e. rivers, wetlands, waterbodies, grassland, exotic/ alien tree stands and high voltage powerlines.



Figure 18: Regional map detailing the location of the closed Inkbospan Vulture Restaurant and sensitive avian habitat i.e. rivers, wetlands and waterbodies within the project area

A preferred layout for the SEF will be determined based on the avoidance of the avifaunal sensitivities delineated as part of this Screening/ Scoping Phase (refer to **Figure 24** below) as well as those sensitivities identified, following the detailed assessment of the primary data collected during the seasonal site surveys during the EIA phase of the project.





Figure 19: Preliminary avifauna sensitivity map for the SEF

8.9.2 Avifaunal Potential Impacts

The effects of any development on birds are highly variable and depend on a wide range of factors including the specification of the development, the topography of the surrounding land, the habitats affected and the number and diversity of species present. The principal areas of SCC and non-SCC priority species related to the proposed development are listed below:

- Displacement due to habitat loss in the physical footprint;
- Displacement due to disturbance associated with establishment, construction, operation/ maintenance and decommissioning of the proposed project;
- Mortality due to collisions with the PV panels (impact trauma); and
- Entrapment and entanglement in perimeter fencing.

The aforementioned impacts will be described and assessed in detail, following the site verification and seasonal surveys to the proposed development area and general area during the EIR Phase of the project.

8.9.3 Preliminary Conclusion

In conclusion, this high-level desktop assessment has identified at least six avifaunal habitats of varying sensitivities within the proposed development area and general area. Despite anthropogenic impacts, mostly in the form of pastoral practices, sensitive habitat persists within the study area. The establishment and operation of the proposed project will likely result in impacts of Medium Significance, which may be reduced through the application of stringent mitigation measures.



Lion Thorn Solar PV Facility 145 (PTY) LTD

9. DESCRIPTION OF THE SOCIO- ECONOMIC ENVIRONMENT

9.1 Socio-Economic Characteristics

A Socio-Economic Assessment, dated July 2023, was undertaken by Urban-Econ Development Economists (Pty) Ltd (Urban-Econ).

The proposed development is located in North West province, a province bordering Botswana, Limpopo, Gauteng, Free State, and Northern Cape Province to the north, north-east, east, south-east to south and south-west to west respectively. The province has four district municipalities (DMs), namely:

- Bojanala Platinum;
- Dr Ruth Segomotsi Mompati;
- Ngaka Modiri Molema District; and
- Dr Kenneth Kaunda District.

9.1.1 Dr Kenneth Kaunda District Municipality

The DKKDM is bordered by the Ngaka Modiri Molema and Bojanala Platinum DM to the north, Gauteng Province to north-east and east, Free State Province to the south, and Dr Ruth Segomotsi Mompati DM to the west. The DM is the smallest, in terms of footprint, in the province making up approximately 14% of its geographical area and consist of three LMs. These include:

- MHLM;
- City of Matlosana LM; and
- JB Marks LM.

9.1.2 Maquassi Hills Local Municipality

The proposed facility is planned to be situated in the MHLM, a Category B municipality within the DKKDM. MHLM consists of three main towns namely, Wolmaransstad, Makwassi and Leeudoringstad (proposed location). Leeudoringstad is a small farming town in which the most prominent spoken languages are Afrikaans, seTswana, and Northern Sesotho (sePedi).

MHLM covers an area that of approximately 4 643 m² within the DKKDM in the Northwest Province (Maquassi Hills, 2020). This local municipality (LM) is bordered by Tswaing in the north, the Free State province in the south, City of Matlosana in the East and Dr Ruth Segomotsi Mompati District Municipality in the west (Urban-Econ, 2023).

The main socio-economic issues in the area are unemployment and crime which will be discussed further in the sub-sections to follow. The following sub-sections will also briefly unpack the history and cultural aspects of the municipality; the demographics, health, and cultural aspects; the economy of the municipality; the income and education levels of the people living in the municipality; the current labour force and employment structures; the area's access to basic services; as well as highlight any planned developments within the area beside the proposed development.

Lion Thorn Solar PV Facility 145 (PTY) LTD


9.1.3 Demographics

A grasp of this profile is central to understanding the extent, if any, to which communities will be impacted by the project at hand. MHLM consists of more males than females with females accounting only for 48,4% of the total population in the year of 2021 (Urban-Econ, 2023).



Figure 20: Population Demographics

As of 2021, the population of MHLM was estimated to be around 89 862, residing in 181 098 households. This population represents about 11% of the total population of DKKDM and about 2% of the total population of the North West Province. The average household size in MHLM is approximately 3.8%. This average household size is higher than the district average of 3.4%, the provincial average of 3.3% and the national average of 3.6.

9.1.4 Income and Education Level

The average income of an economy is used to assess the associated community's standard of living as well as its state of development. Education levels are also a key indicator of a community's social welfare and access to education.

According to the 2011 Census data, a significant portion of MHLM's population falls within the category of low-income households. Most households (24.2%) fall within the income range of R9,601 to R19,600, which translates to approximately R800 to R 1633 per month. Moreover, 14,5% of households have no income at all. The prevalence of low to middle income households in the LM suggests that many residents face economic challenges and may experience limited financial resources (Urban-Econ, 2023).

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



As per Urban-Econ (2023), low average income levels are often related to the difficulty of getting access to adequate education. Education includes various levels, each of which reflects a broad segment of the education "ladder," i.e., the development from elementary learning to more difficult learning experiences.

The education level data indicates significant disparities in educational attainment levels among the adult population in MHLM (Urban-Econ, 2023). Approximately 30% of the population has no schooling, while 20% have completed matric. About 15% have some primary education, and 23% have some secondary schooling. Less than 6% have higher education qualifications.

The educational landscape in in this LM plays a significant role in shaping the labour market dynamics. The low levels of education among residents tend to be associated with a predominance of low-skilled labour, reports Urban-Econ (2023). This correlation between educational attainment and skill level suggests that the general population faces challenges in accessing higher-paying job opportunities.

9.1.5 Economic Profile

The creation, distribution, and consumption of products and services are the defining activities of an economy. The value of goods and services generated in a certain location, industry, or sector of the economy is measured by gross value added (GVA).

Area/ economy 2021	R (millions)	South Africa	North West Province	DKKDM
South Africa	12 241 428	100%		
North West Province	796 864	7%	100%	
DKKDM	136 978	1%	17%	100%
MHLM	8 594	0%	1%	6%

Table 17: LM contributions to North-West and South Africa (2021) economy (Urban-Econ, 2023)

The table above shows that the GVA of the MHLM was valued at R8 594 million in 2021 (Urban-Econ, 2023). This constituted approximately 1% of the total GVA for the North-West province in that year, making LM is the lowest contributor to the province. The economic profile of municipality is dominated by the primary sector, with the highest contributing sector being agriculture, forestry and fishing at 23% (Urban-Econ, 2023).

9.1.6 Living Conditions

Shelter, water, power, sanitation and other services are factors that help establish people's standard of living in the LM. Another factor to consider when thinking about living standards is infrastructure and the state of municipal infrastructure. The existence of social and economic infrastructure, such as roads, educational institutions and health facilities, further reflects the nature of the study region, which is important in constructing a comprehensive picture of the conditions in which communities live.

58% of households within the LM have piped water within their yards, while approximately 26% have piped water inside their dwellings. About 3% of household's access to water is facilitated through a community stand, while the remaining households rely on alternative sources such as water tankers, boreholes, rainwater tanks, rivers/ streams, and water vendors.

Lion Thorn Solar PV Facility 145 (PTY) LTD



In terms of energy access, an impressive 90% of households in the LM have access to electricity provided by Eskom. However, a small portion, approximately 9%, still rely on candles for indoor lighting (Urban-Econ, 2023). Regarding sanitation, only roughly 90% of MHLM's households have access to flushing toilets connected sewage systems, while 5% have a pit toilets or no sewage system at all. About 48% of the households have their refuse removed by the MHLM on a weekly basis while 29% remove their own refuse.

The above information, besides the provision of electricity, indicates that the LM is likely to be underdeveloped and the standards of living are fairly low (Urban-Econ, 2023).

9.1.7 Socio-Economic Potential Impacts

The proposed project is unlikely to improve the LM's access to basic services, however, it may indirectly impact the standards of living of the local community. The extent of its impact will be discussed in more detail in the DEIR.

The findings reveal that the project is likely to have minimal negative impacts, if it is well-designed and approved (Urban-Econ, 2023). While the study area has a growing population in need of employment opportunities, it is anticipated that only a limited number of jobs will be created by the project. As a result, the current socio-economic conditions are likely to remain largely unchanged. However, the employment opportunities that do emerge would be valuable to the community, particularly given the high levels of unemployment and low-income levels in the region.

The assessment recognises the importance of the energy sector for both the environment and society. Investing in RE technologies not only has the potential to boost the national economy but also to create employment opportunities. Given the current energy crisis in the country, the development of RE sources, such as the proposed project, can enhance the resilience, security, and reliability of the national electricity grid.

While the proposed development appears to offer opportunities to promote the green economy and generate employment for the community, a thorough impact assessment is necessary to fully understand the potential positive and negative effects. The DEIR will provide a comprehensive analysis of the development's impacts on various socio-economic factors, enabling informed decision-making and mitigation measures.

9.1.8 Preliminary Conclusion

The need and desirability assessment examined the factors supporting the development of SEF. The assessment includes an evaluation of both the positive and negative potential impacts that are likely to emerge during the construction and operation of the proposed project. The assessment emphasises the potential positive effects such as increased green energy, employment opportunities and economic growth, while also acknowledging the various negative social impacts that may arise, such as deforestation and an increase in crime due to the influx of job seekers. To determine the overall impact of the proposed project on the community, it is vital to assess the significance of each impact. As a result, further investigation of the identified impacts will be conducted during the EIR Phase.



Lion Thorn Solar PV Facility 145 (PTY) LTD

9.2 Cultural Heritage, Archaeology and Palaeontology

A Cultural Heritage, Archaeological and Palaeontological Assessment (HIA), dated June 2023, was undertaken by PGS Heritage (Pty) Ltd (PGS).

9.2.1 Cultural Heritage and Archaeology

The fieldwork conducted for the evaluation of the possible impact of the Lion Thorn SEF revealed the presence of two (2) heritage resources.

Burial ground

One (1) burial ground (LT002) was identified and rated as having high heritage significance.

Archaeological features

One (1) Stone Age site find spot (**LT001**) of a low-density Stone Age surface artefact scatter rated as having low heritage significance was located. This is from the Later Stone Age (LSA). This site was located within a previously excavated area, believed to be for diamond prospection (relayed during conversation with the landowner) so the sites scientific potential and heritage significance is somewhat lowered. Based on findings from a range of other heritage reports in the area, these types of sites are to be expected in this region.

Site Nr	Site Co-	ordinates	Time Period	Brief Site Description	Grading	Heritage
	x	У	Thine Ferrou	Bher one Description	Orading	Significance
LT001	26.287591°	-27.199714°	Archaeological period	Small exposed LSA scatter – Exposed from prospecting excavations	Grade 3 - C (IIIC)	Low
LT002	26.310041°	-27.197675°	Historical Period	Burial ground of approximately 10 graves, located directly outside of the proposed project area	Grade 3 - A (IIIA)	High

Table 18: Details of the heritage resources identified within the development site/ area





Figure 21: Heritage resources identified within the development site/ area

Photographic evidence of LT001 and LT002 is depicted in the figures below.



Figure 22: LSA flakes from LT001



Figure 23: General view of LT002

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:





9.2.2 Palaeontology

The proposed site is underlain by the Allanridge Formation of the Ventersdorp Supergroup. The PalaeoMap on the SAHRIS database indicates that the Palaeontological Sensitivity of the Allanridge Formation is Zero (Almond and Pether, 2008; SAHRIS website), refer to the figure below. A Low palaeontological significance rating has thus been allocated for the project.

It is thus considered that the proposed development will not lead to detrimental impacts on the palaeontological resources of the area. The construction and operation of the project may be authorised, as the whole extent of the development footprint is not considered sensitive in terms of palaeontological heritage. If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Procedure must be implemented immediately and the Environmental Control Officer (ECO) in charge of these developments must report to the South African Heritage Resources Agency (SAHRA) so that mitigation can be carried out by a palaeontologist.

Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012). These recommendations should be incorporated into the EMPr for the proposed development.

Lion Thorn Solar PV Facility 145 (PTY) LTD

18086

Prepared by:



Project No. Proposed 200MWac Lion Thorn Solar Energy Facility and associated Infrastructure Description Revision No. 1.0



Figure 25: Extract of the 1 in 250 000 SAHRIS PalaeoMap (Council of Geosciences)

9.2.3 Potential Cultural Heritage, Archaeological and Palaeontological Impacts

The fieldwork findings have shown that the study area is devoid of significant heritage sites apart from site LT002 which occurs directly outside of the proposed area. From the proposed location of the SEF, the cultural significance of the heritage resources and their context may be impacted by proximity to the development area.

Archaeological remains are rare objects, often preserved due to unusual circumstances and are nonrenewable resources. When a development is proposed, and specialist studies are undertaken as part of the wider evaluation of heritage resources, this provides an opportunity into a depository that would not otherwise exist. In this sense the impact is positive for archaeology if efforts are made to preserve or mitigate heritage resources in the study footprint, prior to and during the construction phase of the development.

The general nature of impacts from the proposed development will be visual regarding spatial and built heritage, and physical with regard to archaeological heritage resources.

If large quantities of LSA/ LT001 remains are discovered during construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the Environmental Control Officer (ECO) in charge of this development.

The burial ground/ LT002 site should be demarcated with a 50 m no-go buffer zone and the graves should be avoided and left in situ. If the site is going to be impacted directly and the graves need to be removed, a grave

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



relocation process is recommended as a mitigation and management measure. This will involve the necessary social consultation and PPP before grave relocation permits can be applied for with SAHRA under the NHRA and National Health Act, 2003 (Act 61 of 2003) as amended (NHA).

9.2.4 Preliminary Conclusion

The proposed area is considered acceptable subject to the recommended mitigation.

In the event that heritage resources are discovered during site clearance, construction activities must stop in the vicinity, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.

From an archaeological and historical structure perspective, the proposed project area, the possible construction impacts calculated on the tangible cultural heritage resources is overall Moderate Negative rating but with the implementation of the recommended buffers and management guidelines, will be reduced to a Low Negative impact. Therefore, impacts on heritage resources can be mitigated to acceptable levels allowing for the development to be authorised.

9.3 Landscape/ Visual Assessment

A Landscape/ Visual Assessment, dated June 2023, was undertaken by Visual Resource Management Africa (VRMA).

Landscape character is defined as the 'distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. Regional and local topography has the potential to strongly influence landscape character, as well as the extent of the Zone of Visual Influence. In order to better understand these aspects of the study, a Digital Elevation Model was generated making use of the NASA STRM digital elevation model.

9.3.1 Field Verification and Findings

In terms of the local and regional planning, there is a clear emphasis in support of renewable energy that aligns with the project planning, although the project area is not located in a REDZ

Zones of Visual Influence

The visible extent, or viewshed, is "the outer boundary defining a view catchment area, usually along crests and ridgelines" (Obelholzer, 2005). In order to define the extent of the possible influence of the proposed project, a viewshed analysis was undertaken from the proposed site at a specified height above ground level (refer to the table below). This is a subjective appraisal but informed by the viewshed and the other factors mentioned. With regards to the proposed PV development, the expected Zone of Visual Influence (ZVI) is likely to be retained with the 6 km distance and is defined as Localised (Medium) in extent (VRMA, 2023).



Lion Thorn Solar PV Facility 145 (PTY) LTD

Proposed Activity	Height (m)	Model Extent	Motivation
PV	5 m	12 km	The expected height of the PV panels at 5 km is highly unlikely to extend beyond 12 km from site due to the gently undulating terrain.
Substation	30 m	6 km	The small visual footprint of the lattice type structure of the substation are unlikely to extend beyond 6 km from site.

Table 19: Proposed Project Heights Table

Key Observation Points (KOPs)

Key Observation Points (KOPs) are the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. The following KOPs, refer to **Table 20** below, were identified as located within the project ZVI:

- Kgakala Township (Medium Visual Exposure)
- R502 Road Receptors (High Visual Exposure)

 Table 20: KOP Motivation Table

Name	Theme	Exposure	KOP Status	Motivation
Kgakala Township	Residential	High	Yes	The development is likely to be viewed in the distance but only in the background and is unlikely to change the local area sense of place.
KOP R502	Road	Very High	Yes	The road is a main transport route in the region and has close proximity to the proposed substation and High Exposure to the PV area.

Scenic Quality

The scenic quality of the proposed development site is rated *Medium to Low*. The majority of the landscape is defined by rural agricultural grasslands with moderate undulation and lower levels of Scenic Quality due to uniformity of the landscape and higher VAC levels due to the prominence of multiple linear infrastructure within the immediate landscape context. The exception is the Vaal River that is a significant landscape feature where the large volume of water (rare in the South African landscape context) and associated riverine landforms create scenic value. An approximate area of 500m buffer from the river was proposed to ensure that some landscape protection can take place. However, where the area overlaps with the local multiple Eskom powerline, the landscape is already degraded (refer to **Figure 30** below) and as such, would not significantly detract from the Vaal River if located along this existing infrastructure corridor located more than 400m from the Vaal River.

Receptor sensitivity

Receptor sensitivity to landscape changes is rated Medium to Low. No recreational resources were identified in the vicinity so public interest is rated Low, although, the area is in close proximity to the R502 and the Kgakala Township where Visual Exposure was rated High. No special areas were identified on the site.

This depicts the theoretical area where the proposed landscape change could be visible. This theoretical viewshed, refer **Figure 31** below, excludes vegetation, structural development as well as distance from the location where atmospheric influence would reduce visual clarity over increasing distance. Due to the

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



predominantly flat terrain surrounding the site, the extent of the viewshed is uniformly distributed within the 6 km Foreground/ Mid Ground distance, with some variance beyond this distance to the north, west and south. Visibility towards the west where the nearest PV plant is located, as well as the Vaal River landscape resource, is excluded from the viewshed.

Visual Recourse Management Assessment

The BLM has defined four Classes that represent the relative value of the visual resources of an area and are defined making use of the VRM Matrix:

- Classes I and II are the most valued.
- Class III represent a moderate value.
- Class IV is of least value

Class I is assigned when legislation restricts development in certain areas. The visual objective is to preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention. A Class I visual objective was assigned to the following features within the proposed development area due to their protected status within the South African legislation:

- Any wetlands identified as significant;
- Any ecological areas (or plant species) identified as having a high significance;
- Any heritage area identified as having a high significance.

As no sensitive receptors were identified and the proposed landscape change is well set back from residential receptors, no VRM Class II areas were identified on site.

The Class III objective is to partially retain the existing character of the landscape, where the level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

The following landscape was defined as having Class III Visual Objectives where development would be most suitable: Undulating Grasslands. The site is uniformly covered by gently undulating grasslands that add to the rural agricultural sense of place





Figure 26: Regional Digital Elevation Mapping and Profiles Graphs with approximate extent depicted

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:

SiVEST



Figure 27: Receptor Key Observation Point and Visual Exposure Map



Figure 28: Visual Resource Management Classes map in relation to KOP locations



Lion Thorn Solar PV Facility 145 (PTY) LTD

The Class IV objective is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the landscape can be high, and the proposed development may dominate the view and be the major focus of the viewer's (s') attention without significantly degrading the local landscape character.

Due to the degraded sense of place, the following areas were rated Class IV: Not applicable.

Although the scenic quality ratings and receptors sensitivity to landscape change were rated low and assigned a Visual Inventory Class of IV, the rural agricultural location of the areas around the proposed PV area would require some restraint in terms of landscape change to ensure that the surrounding farming areas are not significantly degraded. As such, the Undulating Grasslands area were upgraded to VRM Class III.

9.3.2 Potential Landscape/ Visual Impacts

Light spillage and large PV panels set in a rural landscape adjacent to a residential area could set a negative precedent for RE development in the area. With mitigation of panel heights and light spillage management, a positive RE development could be set.

9.3.3 Preliminary Conclusion

It is the recommendation of the assessment that with mitigation, the proposed development is unlikely to significantly degrade the local landscape and visual resources. Final review of the layout is required to confirm the above statement, and review mitigations.

10. POLICY AND LEGISLATIVE CONTEXT

The relationship between the project and certain key pieces of environmental legislation is discussed in the subsections to follow.

10.1 The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996) as amended

The Constitution of the Republic of South Africa, Act 108 of 1996 (as amended CRSA), sets the legal context in which environmental law in South Africa occurs and was formulated. All environmental aspects should be interpreted within the context of the CRSA, NEMA and the Environment Conservation Act, 1989 (Act 73 of 1989) as amended (ECA).

The CRSA has enhanced the status of the environment by virtue of the establishment of environmental right (Section 24) and other rights created in the Bill of Rights may impact on environmental management through, for example, access to health care, food and water and social security (Section 27). Section 24 of the CRSA states that: *"Everyone has the right to:*

- an environment that is not harmful to their health or well-being; and
- have their 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."

Lion Thorn Solar PV Facility 145 (PTY) LTD



The CRSA is the overarching legislation for South Africa. Although it provides for certain rights and obligations, the NEMA has been promulgated in order to manage the various spheres of both the social and natural environment.

10.2 National Environmental Management Act, 1998 (107 of 1998) as amended

The NEMA was promulgated in 1998 but has since been amended on several occasions from this date. The act intends to provide for:

- co-operative environmental governance by establishing principles for decision-making on matters affecting the environment;
- institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state;
- to provide for the prohibition, restriction or control of activities which are likely to have a detrimental effect on the environment; and
- to provide for matters connected therewith.

NEMA is the overarching legislation which governs the EIA process and environmental management in South Africa. Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an EA. Activities that may significantly affect the environment must be considered, investigated and assessed prior to implementation.

According to Section 2(3) of the NEMA, "development must be socially, environmentally and economically sustainable", which means the integration of these three factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

The EIA Regulations identify lists of activities which have the potential to result in detrimental environmental impacts and thus require EA, subject to either "BA" or "S&EIR". The EIA Regulations prescribe the procedural and substantive requirements for the undertaking of EIAs and the issue of EAs.

The proposed project triggers listed activities under Listing Notice 1, 2 and 3, as detailed in sections above, and thus requires an EA subject to a S&EIR rocess.

10.2.1 Environmental Impact Assessment Guideline for Renewable Energy Projects, Notice 989 of 2015

The purpose of this document is primarily to provide guidance on the environmental management legal framework applicable to RE operations and all the role players in the sector. The guideline is principally intended for use by the following stakeholder groups:

- Public Sector Authorities (as regulator and/or competent authority);
- Joint public sector authorities and project funders (e.g., Eskom, IDC, etc.);
- Private Sector Entities (as project funder/ developer /consultant); and
- Other I&APs (as determined by the project location and/or scope).

This guideline seeks to identify activities requiring authorisation prior to commencement of that activity and provide an interface between the EIA Regulations and other legislative requirements of various authorities.



Lion Thorn Solar PV Facility 145 (PTY) LTD

The guidelines are applicable for the construction, installation and/or development of the following RE projects:

- Concentrating Solar Power (CSP) Plant;
- Wind Energy Facility (WEF);
- Hydropower Station; and
- PV Power Plant.

As the proposed development is for a solar PV plant, it is subject to the recommendations proposed in the guidelines.

10.3 National Water Act, 1998 (Act 36 of 1998) as amended

The NWA was promulgated on the 20th of August 1998, this act provides for a framework to protect water resources against over exploitation and to ensure that there is water for socio-economic and economic development, human needs and to meet the needs of the aquatic environment. The NWA also recognises that water belongs to the whole nation for the benefit of all people.

Water resources as defined include a watercourse, surface water, estuary or aquifer. Specifically, a watercourse is defined as (*inter alia*) a:

- river or spring;
- natural channel in which water flows regularly or intermittently; and
- wetland, lake or dam into which, or from which water flows.

Due to the possible encroachment into wetland areas, the following Section 21 Water Uses in terms of the NWA may be triggered and require licensing:

- (c) impeding or diverting the flow of water in a watercourse; and
- (i) altering the bed, banks, course or characteristics of a watercourse.

In light of the above, there are a number of stipulations within the NWA that are relevant to the potential impacts on rivers, streams and wetlands that may be associated with the proposed development. An Aquatic/ Freshwater Assessment has been conducted to explore how the proposed development may impact on identified water resources as protected by the NWA. Should the proposed development require a General Authorisation (GA) or Water Use Licence (WUL), which it is likely to, it will be determined and applied for separately prior to construction.

10.4 The National Heritage Resources Act, 1999 (Act 25 of 1999) as amended

The NHRA promotes good management of the heritage resources of South Africa which are deemed to have cultural significance and to enable and encourage communities to ensure that these resources are maintained for future generations.

The aim of the NHRA is to introduce an integrated, three-tier system for the identification, assessment and management of national heritage resources (operating at a national, provincial and local level). This legislation makes provision for a grading system for the evaluation of heritage resources on three levels which broadly coincide with their national, provincial and local significance.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



This act requires investigation to determine the impact of heritage resources when developments exceed the thresholds list in section 38 (1) of the act:

- the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or • barrier exceeding 300 m in length;
- the construction of a bridge or similar structure exceeding 50 m in length;
- any development or other activity which will change the character of a site:
 - exceeding 5 000 m² in extent; or 0
 - involving three or more existing erven or subdivisions thereof; or 0
 - involving three or more erven or divisions thereof which have been consolidated within the past five 0 years; or
 - the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage 0 resources authority;
- the re-zoning of a site exceeding 10 000 m² in extent; or
- any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

The proposed development would involve the underlined above.

Under the legislation the SAHRA was established, which replaced the National Monuments Council. SAHRA is responsible for the preservation of heritage resources with exceptional qualities of special national significance (Grade I sites). A Provincial Heritage Resources Authority, North West Provincial Heritage Resources Authority (NWPHRA) in this case, established in each province will protect Grade II heritage resources which are significant within the context of a province or region. Buildings and sites of local interest (Grade III sites) are the responsibility of local authorities as part of their planning functions. In this case, the SAHRA and NEPHRA will need to be consulted with extensively throughout the process.

Within the scope of this project, Section 38 of the NHRA, as described above, states that an assessment of potential heritage resources in the development area needs to be done. A HIA has therefore been commissioned to explore how the proposed development may impact on heritage resources and potential cultural artefacts as protected by the act.

10.5 National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004) as amended

As the principal national act regulating biodiversity protection, the National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004) as amended (NEMBA), which is administered by the DFFE/ DEDECT, is concerned with the management and conservation of biological diversity, as well as the use of indigenous biological resources in a sustainable manner.

The overarching aim of the NEMBA, within the framework of the NEMA, is to provide for:

- The management and conservation of biological diversity within South Africa, and of the components of • such biological diversity;
- The use of indigenous biological resources in a sustainable manner; and
- The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving • indigenous biological resources.

In terms of this act, the developer has a responsibility to:

Lion Thorn Solar PV Facility 145 (PTY) LTD

18086

Prepared by:



Project No. Description Proposed 200MWac Lion Thorn Solar Energy Facility and associated Infrastructure Revision No. 1.0

- Conserve endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA Regulations);
- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity; and
- Limit further loss of biodiversity and conserve endangered ecosystems.

The SANBI was established in terms of the NEMBA, its purpose being (*inter alia*) to report on the status of the country's biodiversity and the conservation status of all listed threatened or protected species and ecosystems.

The NEMBA provides for a range of measures to protect ecosystems and for the protection of species that are threatened or in need of protection to ensure their survival in the wild, including a prohibition on carrying out a 'restricted activity' involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7 of the act.

A Terrestrial Biodiversity (including Animal and Plant Species) Assessment as well as the Avifaunal Assessment will be conducted to explore how the proposed development may impact on biodiversity as protected by the act.

In addition, all relevant conservation departments (such as the DFFE/ DEDECT, SANBI, etc.) will be invited to provide comments with regards to the proposed development.

10.6 National Environmental Management Protected Areas Act, 2003 (Act 57 of 2003) as amended

The overarching aim of the National Environmental Management Protected Areas Act, 2003 Act 57 of 2003 as amended (NEMPAA), within the framework of NEMA, is to provide for:

- the declaration and management of PAs;
- co-operative governance in the declaration and management of PAs;
- effect a national system of PAs in South Africa as part of a strategy to manage and conserve its biodiversity;
- a representative network of PAs on state land, private land and communal land;
- promote sustainable utilisation of PAs for the benefit of people, in a manner that would preserve the ecological character of such areas;
- promote participation of local communities in the management of PAs, where appropriate; and
- the continued existence of South African National Parks.

The proposed project is not located in any PA.

10.7 National Forests Act, 1998 (Act 84 of 1998) as amended

The National Forest Act, 1998 (Act 24 of 1998) as amended (NFA), was enacted to:

- Provide for the protection, management and utilisation of forests;
- The protection of certain plant and animal life;

Lion Thorn Solar PV Facility 145 (PTY) LTD



- The regulation of trade in forest produce; and
- The control and management of a national hiking way system and National Botanic Gardens.

The NFA enforces the necessity for a license to be obtained prior to destroying any indigenous tree in a natural forest and, subject to certain exemptions, cutting, disturbing, damaging, destroying or removing any protected tree. The list of protected trees is currently contained in GN 908 of 21 November 2014. Licenses are issued by the Minister/ Member of the Executive Council and are subject to periods and conditions as may be stipulated.

10.7.1 Protected Trees

According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'.

No protected trees were delineated on site.

10.7.2Forests

Prohibits the destruction of indigenous trees in any natural forest without a licence.

The NFA is relevant to the proposed development as the removal and/or disturbance and/or clearance of indigenous vegetation (grassland) will be required and a license in terms of the NFA may be required for this to be done.

10.8 National Veld and Forest Fire Act, 1998 (Act 101 of 1998) as amended

This act provides for a requirement for veldfire prevention through firebreaks and required measures for firefighting. Chapter 4 of the act places a duty on landowners to prepare and maintain firebreaks. Chapter 5 of the act places a duty on all landowners to acquire equipment and have available personnel to fight fires.

10.9 Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) as amended

The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983), as amended (CARA) controls the utilisation of natural agricultural resources in South Africa. The act promotes the conservation of soil, water sources and vegetation as well as the combating weeds and invader plants. The act requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

The primary objective of the act is to conserve natural agricultural resources by:

- maintaining the production potential of land;
- combating and preventing erosion and weakening or destruction of the water resources;
- protecting vegetation; and
- combating weeds and invaders plants.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



In terms of this act, no degradation of natural land is permitted. Rehabilitation after disturbance to agricultural land is also managed by this act. The CARA is relevant to the proposed development as the construction of a SEF as well as other components (such as permanent guardhouse) may impact on agricultural resources and vegetation on the site. The act prohibits the spreading of weeds and prescribes control measures that need to be complied with in order to achieve this. As such, measures will need to be taken to protect agricultural resources and prevent weeds and exotic plants from invading the site as a result of the proposed development.

Declared Weeds and Invaders in South Africa are categorised according to one of the following categories:

- Category 1 plants: are prohibited and must be controlled.
- Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

A Site Sensitivity Verification and Agricultural Compliance Statement has been prepared to explore how the proposed development may impact on the agricultural production potential of the proposed site.

10.10 Subdivision of Agricultural Land Act (SALA) (Act No. 70 of 1970, as amended)

The Subdivision of Agricultural Land Act (SALA) (Act No. 70 of 1970, as amended) controls the subdivision of all agricultural land in South Africa, prohibiting certain actions pertaining to agricultural land. Under the Act, the owner of agricultural land is required to obtain consent from the Minister of Agriculture in order to subdivide agricultural land.

The development requires approval from the National Department of Agriculture, Land Reform and Rural Development (DALRRD) because it is on agriculturally zoned land. There are two approvals that apply. The first is a No Objection Letter for the change in land use. This letter is one of the requirements for receiving municipal rezoning. This application requires a motivation backed by good evidence that the development is acceptable in terms of its impact on the agricultural production potential of the development site. This agricultural assessment report will serve that purpose.

The second approval is a consent for long-term lease required in terms of the Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA). SALA approval is not required if the lease is over the entire farm portion. If DALRRD approval for the development has already been obtained in the form of the No Objection letter, then SALA approval is likely to be readily forthcoming. SALA approval can only be applied for once the Municipal Rezoning Certificate and Environmental Authorisation has been obtained.

The Department of Agriculture, Land Reform and Rural Development will be notified as an I&AP.

10.11 National Road Traffic Act, 1996 (Act 93 of 1996) as amended

The National Road Traffic Act, 1996 (Act 93 of 1996), as amended (NRTA) provides for all road traffic matters and is applied uniformly throughout South Africa. The act enforces the necessity of registering and licensing motor vehicles. It also stipulates requirements regarding fitness of drivers and vehicles as well as making provision for the transportation of dangerous goods.

Lion Thorn Solar PV Facility 145 (PTY) LTD



All the requirements stipulated in the NRTA will need to be complied with during the construction and operational phases of the proposed development.

10.12 Civil Aviation Act, 2009 (Act 13 of 2009) as amended

The Civil Aviation Act, 2009 (Act 13 of 2009) as amended (CAA) controls and regulates aviation within South Africa. It provides for the establishment of a South African Civil Aviation Authority (SACAA) and independent Aviation Safety Investigation Board in compliance with Annexure 13 of the Chicago Convention. It gives effect to various conventions related to aircraft offences, civil aviation safety and security, and provides for additional measures directed at more effective control of the safety and security of aircrafts, airports and matters connected thereto.

Although the act is not directly relevant to the proposed development, it should be considered as the establishment of electricity distribution infrastructure (such as a substation) may impact on aviation and air traffic safety, if located directly within aircraft flight paths.

The Air Traffic and Navigation Services Company Limited (ATNS) and the SACAA will be consulted with throughout the EIA process and the required approvals will be obtained, where necessary. It is not, however, anticipated that any approvals will be required.

10.13 Astronomy Geographic Advantage Act, 2007 (Act 21 of 2007) as amended

The Astronomy Geographic Advantage Act, 2007 (Act 21 of 2007) as amended provides for:

- The preservation and protection of areas that are uniquely suited for optical and radio astronomy; and
- Intergovernmental cooperation and public consultation on matters concerning nationally significant astronomy advantage areas and matters connected therewith.

Under Section 22(1) of the act, the Minister has the authority to protect the radio frequency spectrum for astronomy observations within a core or central astronomy advantage area. As such, the Minister may under section 23(1) of the act, declare that no person may undertake certain activities within a core or central Astronomy Advantage Area (AAA). These activities include the construction, expansion or operation of any fixed radio frequency interference source, facilities for the generation, transmission or distribution of electricity, or any activity capable of causing radio frequency interference or which may detrimentally influence the astronomy and scientific endeavours.

In terms of Section 7(1) and (2) of the act, national government established the following AAAs:

- Karoo Central AAA (GN 198 of 2014) proposed development falls outside this AAA
- Sutherland Central AAA proposed development falls outside this AAA
- Northern Cape AAA (GN 115 of 2010) proposed development falls outside of this AAA

Even though the proposed development falls outside the respective AAAs, the relevant authorities, including the Square Kilometre Array (SKA) and South African Large Telescope (SALT), will be consulted throughout the EIA process.

10.14 National Energy Act, 2008 (Act 34 of 2008) as amended

South Africa has two acts that direct the planning and development of the country's electricity sector, namely:

Lion Thorn Solar PV Facility 145 (PTY) LTD



- i. The National Energy Act, 2008 (Act 34 of 2008) as amended (NEA); and
- ii. The Electricity Regulation Act, 2006 (Act 4 of 2006) asmaneded (ERA).

The NEA has, as one of its key objectives, the promotion of diversity of supply of energy and its sources. From this standpoint, the act directly references the importance of the RE sector, with a mention of the solar energy sector included. The aim is to ensure that the South African economy is able to grow and develop, fast-tracking poverty alleviation, through the availability of a sustainable, diverse energy mix. Moreover, the goal is to provide for the increased generation and consumption of RE (Republic of South Africa, 2008).

10.15 Electricity Regulation Act, 2006 (Act 4 of 2006) as amended

In 2011, the electricity regulation on new generation capacity was published under Section 35(4) of the ERA. This act applies to the procurement of new generation capacity by organs of state. The objectives of the act include:

- To facilitate planning for the establishment of new generation capacity;
- The regulation of entry by a buyer and a generator into a Power Purchase Agreement (PPA);
- To set minimum standards or requirements for PPAs;
- The facilitation of the full recovery by the buyer of all costs efficiently incurred by it under, or in connection with, a PPA including a reasonable return based on the risks assumed by the buyer thereunder and to ensure transparency and cost reflectivity in the determination of electricity tariffs; and
- The provision of a framework for implementation of an IPP procurement programme and the relevant agreements concluded.

The act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated.

10.16 Protection of Public Information Act, 2013 (Act 4 of 2013) as amended

The Protection of Public Information Act, 2013 (Act 4 of 2013) as amended (POPIA), recognises the Constitutional requirement that everyone has a right to privacy. Ultimately the act promotes "the protection of personal information processed by public and private bodies; to introduce certain conditions so as to establish minimum requirements for the processing of personal information; to provide for the establishment of an Information Regulator to exercise certain powers and to perform certain duties and functions in terms of this act and the Promotion of Access to Information Act, 2000 (Act 2 of 2000) as amended (PAIA); to provide for the issuing of codes of conduct; to provide for the rights of persons regarding unsolicited electronic communications and automated decision making; to regulate the flow of personal information across the borders of the Republic; and to provide for matters connected therewith".

Due to the requirements around the PPP, SIVEST will process and capture information aligned to the POPIA and always obtain consent from I&APs for information to be gathered, stored and distributed for the purpose of this project only.

Prepared by:



10.17 Renewable Energy Development Zones (REDZs) and Strategic Transmission Corridors

The Strategic Environmental Assessment (SEA) for Wind and Solar PV Energy in South Africa (CSIR, 2015) originally identified eight formally gazetted Renewable Energy Development Zones (REDZs) that are of strategic importance for large-scale wind and solar PV development in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy, as well as associated Strategic Transmission Corridors (STCs), including the rollout of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution.

- REDZs for large-scale wind and solar PV development;
- associated STCs which support areas where long-term electricity grid will be developed;
- process of EIA to be followed and reduced decision-making timeframe for processing of applications for EA in terms of the NEMA; and
- acceptance of routes which have been pre-negotiated with all landowners as part of applications for EAs for powerlines and substations.

In addition to the eight formally gazetted REDZs mentioned above, the Phase 2 SEA for Wind and Solar PV Energy in South Africa (2019) identified three additional REDZs (namely REDZ 9, REDZ 10 and REDZ 11) that are of strategic importance for large scale wind and solar PV energy development. These REDZs were published under GN No. 786, Government Gazette No. 43528 of 17 July of 2020, and were officially gazetted under GN No. 144, Government Gazette No. 44191 of 26 February 2021.

REDZ Number	Name	Applicability of REDZ
REDZ 1	Overberg	Large-scale wind and solar photovoltaic energy facilities
REDZ 2	Komsberg	Large-scale wind and solar photovoltaic energy facilities
REDZ 3	Cookhouse	Large-scale wind and solar photovoltaic energy facilities
REDZ 4	Stormberg	Large-scale wind and solar photovoltaic energy facilities
REDZ 5	Kimberley	Large-scale solar photovoltaic energy facilities
REDZ 6	Vryburg	Large-scale solar photovoltaic energy facilities
REDZ 7	Upington	Large-scale solar photovoltaic energy facilities
REDZ 8	Springbok	Large-scale wind and solar photovoltaic energy facilities
REDZ 9	Emalahieni	Large scale solar photovoltaic energy facilities
REDZ 10	Klerksdorp	Large scale solar photovoltaic energy facilities
REDZ 11	Beaufort West	Large scale wind and solar photovoltaic energy facilities

Table 21: The SEA for Wind and Solar PV Energy in South Africa (Phase 1 and Phase 2) (CSIR, 2015; CSIR, 2019) identified the following eleven geographic areas for REDZs

It should be noted that the proposed PV plant is not located within any of the above-mentioned REDZs formally gazetted in South Africa for the purpose of development of solar and wind energy generation facilities. The proposed development is, however, located within the Central Power Corridor (refer to the figure below). Ultimately, the proposed development is subject to a S&EIR process in terms of the EIA Regulations.

Lion Thorn Solar PV Facility 145 (PTY) LTD





Figure 29: Formally gazzetted REDZs in South Africa and the proposed Lion Thorn PV Plant location in relation to the REDZs

10.18 Additional Relevant Legislation

- White Paper on the Energy Policy of the Republic of South Africa (1998)
- Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended;
- Road Safety Act, 1996 (Act 93 of 1996) as amended;
- National Environmental Management Air Quality Act, 2004 (Act 39 of 2004) as amended;
- National Environmental Management Waste Act, 2008 (Act 59 of 2008), as amended;
- Development Facilitation Act, 1995 (Act 67 of 1995) as amended;
- The Hazardous Substances Act, 1973 (Act 15 of 1973) as amended;
- Water Services Act, 1998 (Act 108 of 1998) as amended;
- Municipal Systems Act, 2000 (Act 32 of 2000) as amended;
- Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970) as amended;
- Mineral and Petroleum Resource Development Act, 2002 (Act 28 of 2002), as amended;
- Industrial Policy Action Plan 2018/19 2020/21
- IRP for Electricity 2010-2030: Update Report 2019
- National Development Plan (NDP) 2030 (2012)
- New Growth Path Framework (NGPF), 2010
- White Paper on Renewable Energy (2003)
- North-West Provincial Development Plan (2013)
- Renewable Energy Strategy for the North-West Province (2012)
- DKKDM Integrated Development Plan (IDP) 2017/18 2021/22

Lion Thorn Solar PV Facility 145 (PTY) LTD



• MLM IDP 2013-2016 (Amendments based on the 2016 Annual Report)

11. KEY DEVELOPMENT STRATEGIES AND GUIDELINES

A Socio-Economic Assessment, dated July 2023, was undertaken by Urban-Econ Development Economists (Pty) Ltd (Urban-Econ).

A policy review plays an integral role in the early stages of a development. The review establishes whether the development is aligned with the goals and aspirations of the developmental policies of a country. This chapter provides a policy review to highlight issues that could jeopardise the development of the Lion Thorne solar PV facility in accordance with the relevant policies.

The following policies and strategic documents were identified as applying to the study areas:

- National:
 - Industrial Policy Action Plan 2018/19 2020/21
 - Integrated Resource Plan (IRP) for Electricity 2010-2030: Update Report 2019
 - National Development Plan 2030 (2012)
 - National Energy Act (No. 34 of 2008)
 - New Growth Path (2010)
 - White Paper on Renewable Energy (2003)
- Provincial:
 - North-West Provincial Development Plan (2013)
 - Renewable Energy Strategy for the North-West Province 2012
- Local:
 - Dr Kenneth Kaunda District Municipality Integrated Development Plan 2017/18 -2021/22
 - Maquassi Local Municipality Integrated Development Plan (IDP) 2013-2016 (Amendments based on the 2016 Annual Report)

11.1 National and Provincial Policies

The national and provincial policies are discussed in the table below.

Relevant policy	Key Policy Objectives
NATIONAL POLIC	IES
Industrial Policy Action Plan 2018/19 – 2020/21 (IPAP2)	 IPAP2 sets itself the objective of enhancing the productive capabilities of the economy. IPAP aims to increase the economy's production level while producing more complex and high-value-added products with greater efficiency. South Africa's historical dependence on fossil fuels for energy generation has resulted in the government pledging to reduce the country's greenhouse gas emissions over the coming decades. IPAP2 envisions achieving these objectives through: ✓ Infrastructure-driven industrialisation aimed at sustaining and building public and economic infrastructure. ✓ Resource-driven industrialisation enables the leveraging of the green industries.

Table 22: Relevant National Provincial Policies for the Lion ThornSolar PV Facility

Prepared by:



Lion Thorn Solar PV Facility 145 (PTY) LTD

Relevant policy	Key Policy Objectives
	 Stronger alignment of industrial policies and programmes with investment and export-promotion programmes focused on increasing aggregate domestic demand. A strong commitment to supporting emerging black industrial entrepreneurs. Promoting more competitive exports Strengthening the localisation of public procurement Minimising regulatory and red tape measures Meeting the challenges of technological change The proposed development aligns with the IPAP2 through its plans to develop infrastructure within the green economy. (Department of Trade and Industry, 2018)
Integrated Resource Plan (IRP) for Electricity (2010 – 2030)	 The IRP provides for the disaggregation of renewable energy technologies to differentiate and display solar PV, concentrated solar power, and wind options. A review of the IRP shows that the accelerated roll-out of renewable energy (RE) technologies must be allowed and promoted to derive the benefits of the localisation of these RE technologies. Moreover, it emphasises the establishment of a solar PV programme. The following policy considerations assisted in arriving at this version of the IRP: ✓ The installation of RE technologies brought forward to accelerate a local industry. To provide for the uncertainties associated with the cost of renewables and fuels, a nuclear fleet was included. The emissions constraint of 275 million tons of carbon dioxide per year after 2024 was maintained. Energy efficiency demand-side management measures were maintained. The proposed development is somewhat in alignment with the IRP for electricity strategy through its role in accelerating renewable energy in South Africa.
National Development Plan 2030 (NDP, 2012)	 The NDP aims to address South Africa's developmental challenges of poverty and inequality by 2030. Key aspects deemed necessary to enhance social cohesion, reduce poverty and raise living standards include: Creating jobs and livelihoods Expanding infrastructure Transforming urban and rural spaces Transitioning to a low-carbon economy Improving education and training Providing quality health care Building a capable state Fighting corruption and enhancing accountability Transforming society and uniting the nation The proposed Lion Thorne solar PV facility is moderately in alignment with the NDP through its potential to create employment and its plans to expand infrastructure. (National Planning Commission, 2012)

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:

SiVEST

Relevant policy	Key Policy Objectives
New Growth Path (2010)	 The New Growth Path aims to ensure that jobs and decent work are at the centre of economic policy. The NGP has identified several job drivers and priority sectors that should be focused on over the coming years. These include: ✓ Infrastructure investment ✓ Prioritising efforts to support employment in the main economic sectors, including the Green Economy ✓ Spatial development ✓ Fostering rural development and regional integration Seizing the potential of new economies Investing in social capital and public services The proposed development shows alignment with the New Growth Path regarding its aim to invest in infrastructure and the potential to increase employment within the green economy.
White Paper on	The White Paper elaborates on the South African government's policy principles
Renewable Energy (2003)	 and strategic goals and objectives for the promotion and implementation of the RE sector in the country. The White Paper, which supplements the White Paper on Energy Policy, identifies the long- and medium-term potential of RE in South Africa. The White Paper seeks: ✓ To promote, enhance and develop technologies for the implementation of sustainable renewable energy. To raise public awareness of the benefits and opportunities of renewable energy. To develop, implement, maintain, and continuously improve an effective legislative system to promote the implementation of renewable energy. To promote the implementation of sustainable renewable energy. To promote the implementation of sustainable renewable energy. To promote the implementation of sustainable renewable energy through the establishment of appropriate financial instruments. The proposed development shows alignment with the White Paper through its objective of promoting the implementation of sustainable renewable energy.
PROVINCIAL POL	
North-West Provincial Development Plan (2013)	North-West is a province that significantly depends on non-renewable sources and experiences pollution and environmental degradation. The North-West Provincial Development Plan (2013) therefore acknowledges that energy provision is a concern in some areas, given that the mining sector consumes a great portion of the available electricity. The specific targets for the development plan regarding RE are to: ✓ Increase the population with access to electricity from 84% in 2011 to 95% by 2030, with non-grid options available for the rest ✓ Increase RE consumption to 37% by 2030 • Ensure that 67% of households have a solar water heater installed The actions set out to achieve this are:

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:

SiVEST

Project No.18086DescriptionProposed 200MWac Lion Thorn Solar Energy Facility and associated InfrastructureRevision No.1.0

Relevant policy	Key Policy Objectives
	\checkmark Develop energy infrastructure and service provision
	\checkmark Expand RE with special reference to solar power
	\checkmark Increase energy efficiency (reduce demand)
	The proposed project fulfils the operation and maintenance of the PV plant's aims and is fully aligned with the North West Provincial Development Plan. (North West Planning Commission, 2013)
	The Renewable Energy Strategy for the North-West Province 2012 argues that the
	generation of clean energy is one of the responses to climate change and it is a way to meet the commitments of the Kyoto Protocol. The objectives of the strategy are to:
	✓ Improve the NWP's environment
Renewable	\checkmark Reduce the NWP's contribution to adverse climate change
Energy Strategy	✓ Alleviate energy poverty
for the North-	\checkmark Promoting economic development and job creation in the province
West Province 2012	✓ Developing its green economy
	The proposed development is strongly aligned with Renewable Energy Strategy for the North-West Province through its potential to contribute to the mentioned strategic objectives.
	(DEDECT, 2012)

11.2 District and Local Municipalities

The local policies are discussed in the table below.

Table 23:	Relevant	District a	and Loca	l Municipal	Policies	for the Lion	Thorn So	olar PV	Facility
14510 20.	literation	Biothot		i mannoipai	1 0110100				

Relevant policy	Key Policy Objectives
	The DKKDM IDP 2017/18 - 2021/22 identifies the comparative advantage of electricity
	provision and production that the region has in the provincial context. The integrated
	development plan aims to support the constitutional obligations of local government
Dr Kenneth Kaunda	through the following strategic objectives:
District Municipality	
Integrated	\checkmark To promote physical infrastructure development
2017/18 -2021/22	\checkmark To promote socio-economic development
	\checkmark To provide environmental health services
	To ensure disaster risk management
	To ensure municipal excellence
	To provide integrated Public Transport within the District

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:

SiVEST

Relevant policy	Key Policy Objectives
	To provide integrated waste management facilities
	The proposed project is somewhat aligned with the DKKDM IDP. The proposed project will develop infrastructure and contribute to the social and economic development of the community by producing sustainable energy for the community.
	(Dr. Kernieth Kaulua District Municipality, 2017)
	line MHLM IDP, 2013 - 2016 (latest available IDP) recognises that the municipality's electricity network has aged. The IDP aims to support the constitutional obligations of local government through the following strategic objectives:
Maquassi Local Municipality Integrated Development Plan (IDP) 2013-2016 (Amendments based on the 2016 Annual Report)	 ✓ Provision of basic services and infrastructure development ✓ Local economic development Municipal transformation and institutional development Municipal financial viability Good governance and public participation. The proposed project is therefore somewhat aligned with the MHLM IDP. The proposed project will contribute to providing electricity, which is considered a basic service, as well as contribute to the local economic development of MHLM.
	(Maquassi Hills Local Municipality, 2013)

The review of relevant legislation, policies and documentation pertaining to the proposed development indicates that the establishment of the solar farm and associated infrastructure is supported at a national, provincial, and local levels, and that the proposed project will contribute positively towards several targets and policy aims.

12. NEED AND DESIRABILITY

A Socio-Economic Assessment, dated July 2023, was undertaken by Urban-Econ Development Economists (Pty) Ltd (Urban-Econ).

12.1 South Africa's Energy Economy

In South Africa, the energy sector is at the heart of economic and social development. The energy sector contributes significantly to the economy, and it is essential for job creation, economic growth, and improved living standards. According to the National Development Plan (NDP), South Africa will have an energy sector that supports economic growth and development by investing in energy infrastructure by 2030. As of 2016, coal is the dominant energy source in South Africa, accounting for 80% of the country's electricity generation. Other major sources of energy in South Africa include crude oil and petroleum products (14%), natural gas (3%), nuclear (3%), and renewables (11%).

Lion Thorn Solar PV Facility 145 (PTY) LTD



The South African government is committed to diversifying the country's energy mix and reducing its reliance on coal. The government has set a target of 100% renewable energy for electricity generation by 2050. To achieve this target, the government is investing in renewable energy projects, such as solar and wind power. The energy sector is facing a number of challenges, including climate change, energy security, and energy poverty. The government is working to address these challenges by investing in renewable energy, promoting energy efficiency, and ensuring that everyone has access to reliable and affordable energy.

12.1.1 Energy Provision Crisis

South Africa has endured recurring power interruptions known as load shedding for years. Eskom, the nation's primary provider of electricity, first announced in 2007 that it was unable to provide power to the entire country simultaneously due to deteriorating infrastructure (The culture trip, 2019). Eskom continues to implement

national blackouts as of July 2022 as it struggles to meet the national energy demand. The increasing strain on infrastructure has led to South Africans experiencing daily power outages of up to nine hours, which is referred to as stage 6 load shedding (BBC News, 2022). These outages have affected many people and businesses across the nation. Some of the most prominent impacts of the current energy crisis include (Generator Parts, 2022):



Source: Eye Witness News

- Production loss and subsequent GVA reduction: Since the majority of businesses rely on electricity for lighting as well as powering machinery and other equipment required for daily operations, the outages have undermined their ability to function at full capacity.
- Declining profits and subsequent loss of employment: When there is a substantial drop in production, there is also a significant fall in profits. This, in turn, leads to businesses not being able to pay employees.
- Increased poverty: This is due to loss of employment and thus reduced living standards.
- Theft and burglary: These are as a result of loss of employment as well as the failure of burglar alarms and other forms of security during power outages.

For South Africa to have enough generating, transmission, and distribution capacity, it has been estimated that the country will need to spend close to R 1.2 trillion by 2030. According to Eskom's Former CEO, Mr André de Ruyter, RE is the quickest and most cost-effective method to fix the country's electricity crisis (BusinessTech, 2022).

12.1.2 Renewable Energy as a Solution

As South Africa's energy crisis worsens, renewable energy has gained popularity as a potential solution (Creamer Media, 2022). The 2003 White Paper on Renewable Energy is one of the policy documents that established the framework for the promotion of renewable energy in South Africa. It encourages the move to renewable energy in order for the country to transition to a low carbon economy (Department of Mineral Resources and Energy, 2003). Renewable energy is created from naturally replenishing and endless sources. The different kinds of renewable energy include:

- bioenergy;
- geothermal energy;
- hydrogen;

Prepared by:



Lion Thorn Solar PV Facility 145 (PTY) LTD

- hydropower;
- marine energy;
- wind energy; and
- solar energy

Renewable energy has several benefits that impact the economy, ecology, national security, and human health. Some of the more prominent benefits include (U.S. Department of Energy, 2022):

- enhanced resilience, security, and dependability of the country's national electricity grid;
- generation of jobs in the renewable energy sectors; and
- reduced air pollution and carbon emissions from energy generation.

The potential for renewable energy use is abundant in South Africa, notably for wind and solar energy. According to the International Renewable Energy Agency (International Renewable Energy Agency, 2019), there is potential for wind power development across more than 80% of the country's territory with the possibility of reaching about 67 000 gigawatts. The country also has an abundance of solar energy potential with an annual sunshine duration of about 2 500 hours while the daily solar radiation intensity is between 4.5 kilowatt hours/square metre and 6.6 kWh/m². Despite the immense potential for exploiting renewable energy, the amount of electricity produced from these sources is still very modest (Green Finance & Development Center, 2019). The map below depicts the Photovoltaic Yield Tracking and solar irradiance potential in the proposed location for the Lion Thorn Solar PV facility and its surrounding areas.



Figure 30: Photovoltaic Yield tracking of Study Area (source Mappable, adapted by Urban Econ)

As can be seen in the map above, the study area is in a region with a fairly moderate PV yield. As a result, the installation of a Lion Thorn 200MW Solar PV seems to be fair given the need for more renewable energy sources and the region's moderate potential for solar energy. There are areas with higher PV in the area however, the moderate potential is expected to work for the development fairly. It is still crucial however to consider all of the impacts that could result from the construction of the proposed site. The impacts related to the construction of the Lion Thorn 200MW Solar PV and associated infrastructure will be examined further in the EIA report.

Prepared by:



Lion Thorn Solar PV Facility 145 (PTY) LTD

12.2 Need and Desirability Assessment

Aspect	Comment
The socio-economic	The strategic national, provincial, and local-level documents focus on
context of the area based	improving the lives of communities by promoting decent work and
on strategic documents	economic development, improving and expanding infrastructure and
	prioritising renewable energy concerns.
	The proposed Lion Thorn Solar PV, with its potential to create
	employment opportunities and contribute to the green economy, appears
	to be in line with the objectives outlined in these strategic documents. By
	investing in renewable energy infrastructure, the project aligns with the
	goal of transitioning to cleaner and more sustainable energy sources.
Spatial characteristics	The proposed location for the Lion Thorn solar PV facility is situated on
	land surrounded by various farms and has limited infrastructure besides
	electrical powerlines. The site benefits from convenient accessibility, as it
	is connected to local roads that link to the N12 which will serve as the
	primary route for the construction and operation of the facility. As a
	security measure, a fence will be constructed to enclose the designated
	area.
	The chosen site presents minimal risks, given the nature of the solar
	energy project. However there in some infrastructure present on site and
	around namely telecommunication towers and electric powerlines which
	may be affected by the proposed project. Moreover, it is worth noting that
	the site is situated on land with a moderate potential for photovoltaic (PV)
	energy generation
Equitable impacts in the	The proposed Lion Thorn solar PV facility is expected to have both short-
short and long term as well	and long-term impacts on economic and social sustainability. One of the
as social and economically	positive identified impacts relates to its potential to provide employment
sustainable considerations	opportunities to some of the region's households in the short term (during
	construction of the facility) and over the long term (during its operations).
	The proposed development will also contribute to enhancing energy
	resilience as it will support renewable energy development.
Creation of residential and	The proposed development is expected to create employment
employment opportunities	to work closer to their homes in the short and long term. Though skills
different communities	conspilition still pood to be approached it is expected that most permanent
unerent communities	capabilities still need to be assessed, it is expected that most permanent
Discouragement of urban	The development has the notential to sustain local employment levels
sprawl and contribute to	providing continued job opportunities for the community. While some
compaction/densification	unemployed individuals from the local municipalities may choose to
compaction/action/cation	migrate to urban areas in search of opportunities, it is important to note
	that this migration is not directly linked to the development itself
Encouragement of	The proposed development is a solar PV facility thus encouraging the
environmentally	sustainable use of renewable energy. By harnessing solar power the
sustainable land	facility aims to contribute to the reduction of carbon emissions and the
	conservation of natural resources. Furthermore, the utilisation of clean

 Table 24: Need and Desirability Assessment

Prepared by:

SiVEST

Project No.18086DescriptionProposed 200MWac Lion Thorn Solar Energy Facility and associated InfrastructureRevision No.1.0

Lion Thorn Solar PV Facility 145 (PTY) LTD

Aspect	Comment
development practices and	and renewable energy aligns with the global shift towards a more
processes	sustainable future. The environmental specialists may provide additional
	guidance on further environmental benefits and drawbacks that the Lion
	Thorn site may have.
Consideration of special	The location of the proposed solar PV project has moderate PV yield,
locational factors that	making it an appropriate site for solar PV facilities. In addition, the land is
might favour the specific	currently unutilised and thus available for development.
location	
Impact on the sense of	The proximity of the proposed location to the nearby farms and Kgakala
history, sense of place, and	township may have visual impacts on residents, which will be further
heritage of the area and the	examined in the visual report. The development of the Lion Thorn solar
socio-cultural and cultural-	PV facility site is anticipated to stimulate economic activity, leading to new
historic characteristics and	developments and increased business opportunities. However, the influx
sensitivities of the area	of job seekers may also contribute to a potential increase in crime rates
	within the area.
Limitations of current	This study is based only on the material provided by the client and
knowledge (gaps,	secondary research. No interviews with the many affected parties were
uncertainties, and	done (either those directly or indirectly affected); this raises the level of
assumptions)	uncertainty as not all risks could be thoroughly investigated. Information
	from interested and affected parties will be obtained during the Public
	Participation Process.
Availability of labour able to	As indicated in Chapter 4, most of the residents have low-medium skills.
take up the job	The employment opportunities will be for people of various skill levels
opportunities provided by	during both the construction and the operation of the proposed Lion Thorn
the development of the Lion	Solar PV. Most of the opportunities will be for low-semiskilled people thus
Thorn site and associated	the population will reasonably meet the requisite capabilities
infrastructure	
The location of job	As discussed in Chapter 4, the majority of residents in the area possess
opportunities versus the	low to medium skill levels. The employment opportunities associated with
location of impacts	the construction and operation of the proposed Lion Thorn site will cater
	to individuals with diverse skill levels. A significant portion of these
	opportunities will be suitable for low to semi-skilled individuals, ensuring
	that the local population can reasonably meet the required capabilities.
Socio-economic impacts of	The proposed development is anticipated to have both positive and
the development based on	negative socio-economic impacts. The construction and operation of the
the socio-economic	Lion Thorn solar PV facility site will stimulate the economy, leading to
context	increased household income and tax revenue. It will generate temporary
	employment during the construction phase and provide long-term,
	sustainable employment during operations. Furthermore, the project's
	focus on renewable energy will contribute to sustainable practices.
	Additionally, the facility has the potential to support the growth of small
	businesses in the area, further benefiting the local economy.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Project No.18086DescriptionProposed 200MWac Lion Thorn Solar Energy Facility and associated InfrastructureRevision No.1.0

13. DETAILS OF PROCESS FOLLOWED TO REACH THE PREFERRED OPTION

13.1 Details of Alternatives

As per Chapter 1 of the EIA Regulations, feasible and reasonable alternatives are required to be considered during the EIA process. Alternatives are defined as *"different means of meeting the general purpose and requirements of the activity"*. These alternatives may include the:

- property on which or location where it is proposed to undertake the activity;
- type of activity to be undertaken;
- design or layout of the activity;
- technology to be used in the activity;
- operational aspects of the activity; and
- option of not implementing the activity.

Each of these alternatives are discussed in relation to the proposed development in the sections to follow.

13.1.1Location/ Site Alternatives

There are several factors which are favourable for the placement of the SEF at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, solar resource, site accessibility and current landuse. The project site and placement for the SEF has been identified based on the following:

- The site falls within a moderated to high solar radiation area which allows for the maximisation of solar energy received.
- The proposed project is adjacent to approved SEFs and associated infrastructure.
- The grid connection potential based in proximity to existing transmission and energy infrastructure recently approved in the area, i.e. Leeubosch Traction Substation nearby.
- The site is located directly adjacent to the regional route R 502.
- The relatively flat topography of the proposed development site and it's the availability for use for an alternative energy generation.
- The terrain is flat which allows for optimisation of the layout and minimum interference with respect to shadows between individual solar infrastructure.
- The proposed activity falls within an area with low agricultural potential.
- Ground conditions are considered suitable with reduced construction cost.
- In terms of the local and regional planning, there is a clear emphasis in support of renewable energy that aligns with the project planning, although the project area is not located in a REDZ

Therefore no location/ site alternatives are being considered for the proposed SEF and associated infrastructure.

13.1.2The type of activity to be undertaken

No other activity alternatives have been considered. Renewable Energy developments in South Africa are highly desirable from a social, environmental and development perspectives respectively. The importance of renewable energy has been outlined in **Section 10** and **11** above highlighting national, district and local support. The solar resource in this area along with the rapid advancements in solar energy technology efficiency serves as further motivations for the proposed development.



Lion Thorn Solar PV Facility 145 (PTY) LTD

South Africa is under immense pressure to provide clean sources of electricity generating capacity in order to reduce the current electricity demand from aging and polluting coal-fired power stations. With the global focus on climate change, the government is under severe pressure to explore alternative energy sources in addition to coal-fired power stations. Although solar energy is not the only solution to solving the energy crisis in South Africa, it is a suitable sustainable solution to the energy crisis and this project could contribute to addressing the problem. This project will thus aid in achieving South Africa's goals in terms of sustainability, energy security, mitigating energy cost risks, local economic development and national job creation.

13.1.3The technology to be used in the activity

The importance of renewable energy has been outlined in **Section 10** and **11** above highlighting national, district and local support. The solar resource in this area advocates for the use of Solar PV technology in order to generate energy (refer **Section 12**). Advancements in Solar PV technology presents a renewable and sustainable way for countries like South Africa to generate low cost energy from a natural resource.

13.1.4Design or Layout of the Activity

Specialist studies identified the environmental constraints upfront. Based on the specialist sensitivities, a preliminary layout has been designed to avoid sensitive areas as far as possible. The preliminary layout will be assessed during the EIA phase and further refined following seasonal site visits from the various specialists. Should any additional constraints be identified from the various specialists these will be incorporated into the final layout.

13.1.5No – Go Option

The 'no-go' alternative is the option of not undertaking the proposed SEF project. Hence, if the 'no-go' option is implemented, there would be no further development. This alternative would result in no additional environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the EIA process.

13.2 Details of PPP Undertaken

PPP is the cornerstone of any EIA. The principles of the NEMA as well as the EIA Regulations govern the EIA process, including PPP. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment, and ensuring the participation of previously disadvantaged people, women and the youth. All documents relating to the PPP have been included in **Appendix 5**.

The aim of the EIA Process is to collect the issues, concerns and queries of I&APs. The main objective is to:

- Inform the stakeholders about the proposed project and the EIA process to be followed;
- Provide opportunity to all parties to exchange information and express their views and concerns;
- Obtain contributions from stakeholders (including the client, consultants, relevant authorities and the public) and ensure that all issues, concerns and queries raised are fully documented;
- Evaluate the issues raised and identify the significant issues; and
- Provide comment on how these issues are to be assessed as part of the EIA process.

Lion Thorn Solar PV Facility 145 (PTY) LTD



13.2.1 Identification of Key Stakeholder and I&AP's

Liaison with the relevant authorities plays a crucial role in the successful completion of any EIA process. In addition to the CA, DFFE/ DEDECT, key stakeholders, the local municipality as well as other potentially affected I&APs, including adjacent property owners and dwellers, are identified.

This list will be updated as the project progresses and based on responses received.

13.2.2Responsibilities of I&APs

Members of the public who want to participate in the assessment process need to register and are referred to as I&AP's. Registered I&AP's are entitled to comment, in writing, on all written submissions to the authority and to raise any issues that they believe may be significant, provided that:

- Comments are submitted within the timeframes set by the CA or extensions of timeframes agreed to by the applicant, EAP and CA.
- A copy of the comments submitted directly to the CA is served on the applicant or EAP.
- The I&AP discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

13.2.3 Steps taken to notify Key Stakeholders and Potential I&APs

The comment period during the scoping phase was implemented according to the EIA Regulations, 2014 (as amended). The comment periods which have been implemented at this stage of the scoping phase (as set out by the EIA Regulations, 2014) are as follows:

• Comment and review period for the Draft Scoping Report (DSR): 30 days.

As stipulated in the EIA Regulations, 2014 (as amended), the DSR will undergo a 30-day comment and review period from the 10 August 2023 until the 9 September 2023 (excluding public holidays). Any I&APs and key stakeholders that wish to register on the project's database or comment on the DSR are encouraged to contact SiVEST Environmental Division at the contact details provided.

13.2.3.1 Notification of EIA process to be Undertaken

- Issuing of the notifications and initial landowner consultation (circulated to potential I&APs and the local area in general). Proof will be included in FSR.
- Placement of site notices in English and Afrikaans (as per regulations) were placed along the entrance road to the application site and around the site itself on **12 July 2023** (proof included in in Appendix 5).
- Notification letters were sent via e-mail or sms (where cell phone numbers/ email address was available, proof will be included in the FSR).
- Public notification of the S&EIR process was advertised in a local newspaper, namely Stellalander Newspaper, on 9 August 2023 as required according to Regulation 41(2)(c) of the EIA Regulations. Proof of advertisement will be included in the FSR.

Lion Thorn Solar PV Facility 145 (PTY) LTD



13.2.3.2 Availability of Report for Review

- The report is available on SiVESTs website for review/ download and review.
- Electronic copies of the report are made available to parties via a secure digital link emailed upon request for the documentation.
- CDs/ Flash drive are posted, as requested.
- A tablet with the DSR is located and available at the following locations:
 - Maquassi Hills Library, 56 Smuts Street, Leeudoringstad, North West.

13.2.4 Details of notification of Landowners

Regulation 39(1) of the EIA Regulations states that "if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an EA in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land".

The applicant is not the owner or the person in control of the land on which the proposed SEF is proposed, therefore the landowner consent was sought and has been included as part of the EA application.

13.2.5Summary of Issues Raised

Issues, comments and concerns raised during the public participation process to date will be captured in the Comments and Response Report (C&RR). The C&RR will provide a summary of the comments received and issues raised by I&APs and key stakeholders, as well as the responses provided. This information will be used to feed into the evaluation of environmental and social impacts and will be taken into consideration when compiling the FSR.

13.3 Potential Impacts Identified

The SiVEST Impact Assessment method, attached as **Appendix 7**, will be utilised to assess the following potential impacts identified during this Scoping Phase and is presented in the following sections.

The method to be used in the impact assessment determines significance (can be both positive and negative) of an impact by multiplying the value of the environmental system or component affected by the magnitude of the impact on that system or component (System or Component Value x Impact Magnitude).

In this method, all significant impacts on the natural or biophysical environment are assessed in terms of the overall impacts on the health of ecosystems, habitats, communities, populations and species. Thus, for example, the impact of an increase in stormwater runoff generated by a development can only be assessed in terms of the impact on the health of the affected environmental systems.

Similarly, all significant impacts on the social and socio-economic environment are assessed in terms of the overall impacts to the quality of life, health and safety of the affected population, communities and/or individuals, with the exception of impacts on resources that are assessed on their own.

The following potential impacts have been identified for the proposed project.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:


13.3.1 Planning Phase

Environmental Aspect	Potential Impact During Planning	Proposed Mitigation
Agricultural	None identified	None Identified
Avifaunal	None identified	None Identified
Aquatic	None identified	None Identified
Geotechnical	None identified	None Identified
Terrestrial Biodiversity	None identified	None Identified
Heritage (Archaeological, Paleontological, Cultural Landscape)	 Disturbance of delineated burial ground Further disturbance and loss of delineated LSA site 	 Implement a chance to find procedures in case where possible heritage finds are uncovered. The burial site should be demarcated with a 50 m no-go-buffer-zone and the graves should be avoided and left in situ. If the site is going to be impacted directly and the graves need to be removed a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with SAHRA under the NHRA and NHA. No further palaeontological studies are required, however a protocol for chance finds is required.
Social	None Identified	None Identified
Visual	None Identified	None Identified

13.3.2Construction Phase

Environmental Aspect	Potential Impact During Construction	Proposed Mitigation
Agriculture	• Soil erosion and degradation	 A system of storm water management, which will prevent erosion on and downstream of the site, will be an inherent part of the engineering on site. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there. Any excavations done during the construction phase, in areas that will be revegetated at the end of the construction phase, must separate the upper 20 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it remains at the surface. Topsoil should only be stripped in

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Environmental Aspect	Potential Impact During Construction	Proposed Mitigation
		areas that are excavated. Across the majority of the site, including construction lay down areas, it will be much more effective for rehabilitation, to retain the topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re- spread after cutting, so that there is a covering of topsoil over the entire cut surface. It will be advantageous to have topsoil and vegetation cover below the panels during the operational phase to control dust and erosion.
Avifaunal	Displacement due to habitat loss	recommendations of the botanical study must be strictly implemented, especially as far as limitation of the construction footprint and rehabilitation of disturbed areas is concerned. * Construction activity should be restricted to the immediate footprint of the infrastructure. * All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. * All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction. * Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
	 Displacement due to disturbance associated with establishment, and construction 	Conduct a pre-construction inspection (avifaunal walk-through) of the final SEF layout, to identify any species that may be breeding on the authorised development site or within the immediate surrounds to ensure that any impacts likely to affect breeding species (if any) are adequately managed. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. Measures to control noise should be applied according to current best practice in the industry
	• Entrapment and entanglement in perimeter fencing	Construction of a single perimeter fence is recommended
Aquatic/ Freshwater	 Infilling, excavation and/or modification of water resources during construction. Erosion and/or sedimentation of water resources due to catchment/site land clearing and landcover disturbance during construction. 	• Construction of the proposed surface infrastructure may result in disturbance to the natural buffer zone surrounding the freshwater ecosystems which may result in the reduction of surface roughness. This can be mitigated by ensuring that no

Prepared by:



Environmental Aspect	Potential Impact During Construction	Proposed Mitigation
	 Erosion and/or sedimentation of water resources due to temporary flow diversion during construction. Pollution of wetlands/vadose zones due to the mishandling of hazardous substances and/or improper maintenance of machinery during construction e.g. oil and diesel leaks and spills. Fragmentation of water resources as a result of construction activities within and surrounding the rivers / streams and wetlands. Removal or alteration of vadose zone flow paths feeding water resources. 	concentrated runoff from the surface infrastructure construction area enters the freshwater ecosystems.
Geotechnical	 Disturbance and removal of rock and soil Soil Erosion 	 Design access roads, platforms and post locations to minimise earthworks and levelling. The design must be based on intrusive investigation results and high resolution ground contour information. Correct topsoil and spoil management. Avoid development in any preferential drainage paths. Temporary berms and drainage channels to divert surface runoff where needed. Landscape and rehabilitate disturbed areas timeously (e.g. regressing). Use designated access and laydown areas only to minimise disturbance to surrounding areas.
Terrestrial Biodiversity	 Loss, degradation or fragmentation of provincially and national protected vegetation through direct clearing for panels, access roads. Habitat transformation and fragmentation for fauna Loss of threatened and protected ecosystems 	 Restrict impact to development footprint only and limit disturbance in surrounding areas. Undertake regular monitoring to detect alien invasions early so that they can be controlled. Monitor surfaces for erosion, repair and/or upgrade, where necessary. Further mitigation to be provided during the EIA phase once the seasonal site visit has been undertaken.
Heritage (Archaeological, Paleontological, Cultural Landscape)	• Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	 During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.

Prepared by:



Environmental Aspect	Potential Impact During Construction	Proposed Mitigation
		 An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified. Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted. The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource. The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered. Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.
Visual/ Landscape	• Dust generated during construction activities will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the site, during the decommissioning period.	 Limit vegetation clearance and the footprint of decommissioning to what is absolutely essential. Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. Keep stockpiled aggregate and sand covered to minimise dust generation. Keep site tidy.
Social	 Temporary stimulation of the provincial economy and growth in the regional GVA Temporary employment creation in local communities Temporary change to the sense of place Temporary increase in crime and social conflicts associated with influx (or removal) of people Impact on the environment 	Mitigation measures to be provided during EIA phase

13.3.3 Operational and Maintenance Phase

Environmental Aspect	Potential Impact During Operation	Proposed Mitigation
Agriculture	Loss of land utilised for stock grazing	The PV panels will not necessarily totally exclude agricultural production. The area

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Environmental Aspect	Potential Impact During Operation	Proposed Mitigation
	 The development will provide a positive economic impact on the farm. The income generated by the farming enterprises through the lease of the land to the energy facility is highly likely to exceed the potential agricultural income from the site. It will diversify the farm's income sources and provide reliable and predictable income that is independent of variable agricultural economic factors such as weather, agricultural markets and agricultural input costs. 	can still be used to graze sheep that will, in addition, be protected against stock theft within the security area of the facility.
Avifaunal	• Collision Mortality (PV arrays):	 Solar panels to be treated with antireflective coating The PV panels should spend as little time as possible time in a vertical position as this presents a greater collision hazard. Single axis tracking will be utilized. An operational monitoring programme, that includes carcass searches to provide an indication of fatality rates as a result of collisions, and if there are any spatial, temporal or conditional patterns to the frequency of collisions. Immediate mitigatory action to be taken upon record of first SCC collision mortality. If repeated (<5) collision impacts of non-SCC are recorded once the SEF is operational, it is recommended that an avifaunal specialist investigate the mortalities and provide recommendations for site-specific mitigation to be applied reactively. Most importantly, operational monitoring should highlight if mitigation (i.e. modifications to the panel design to reduce the illusionary characteristics of the panels) is required to reduce impacts to acceptable levels
	 Nest building on PV infrastructure: 	 If repeated quality of supply impacts are recorded once the SEF is operational, it is recommended that these impacts be assessed by a suitably qualified avifaunal specialist and site-specific mitigation be applied reactively

Prepared by:

Sivest 🔡

Environmental Aspect	Potential Impact During Operation	Proposed Mitigation
Aquatic/ Freshwater	 Accidental direct impacts to water resources during operational repair and maintenance. Erosion and/or sedimentation of water resources due to catchment alterations and stormwater management system. Erosion and/or sedimentation of water resources due to flow concentration associated with watercourse crossings and channel diversions / modifications. Pollution of water resources due to the mishandling of hazardous substances and/or improper maintenance of machinery during operation e.g. oil and diesel leaks and spills. Removal or alteration of vadose zone flow paths feeding water resources. 	 No indiscriminate driving through the freshwater ecosystems may be permitted. Use must be made of the existing freshwater ecosystem crossings only. Unnecessary disturbances surrounding the perimeter of the surface infrastructure must be avoided. Vehicles used in the development site must be regularly washed (within a nonpermeable area or off-site) to avoid the dispersal of seeds on any alien or invasive species into the freshwater ecosystems. Ensure that routine inspections and monitoring of any instream infrastructure are undertaken to manage the establishment of indigenous vegetation and reduce the presence of any alien or invasive plant species; and Monitoring for the establishment for alien and invasive vegetation species must be undertaken, specifically at the road crossings and surface infrastructure areas. Should alien and invasive plant species be identified, they must be removed and disposed of as per an alien and invasive species control plan and the area must be revegetated with suitable indigenous vegetation.
Geotechnical	Soil Erosion	 Maintain access roads including drainage features. Monitor for erosion and remediate and rehabilitate timeously.
Terrestrial Biodiversity Heritage	 Establishment and spread of alien invasive plant species due disturbance vectors Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with powerlines and PV panels Maintenance around the PV facility will need to occur, particularly with the control of encroaching vegetation. Maintenance within the protected and sensitive ecosystems could result in edge effects, and establishment of alien and invasive species Displacement and/or disturbance of fauna communities 	 Undertake regular monitoring to detect alien invasions early so that they can be controlled. Monitor surfaces for erosion, repair and/or upgrade, where necessary. The burial site should be demarcated with a
(Archaeological, Paleontological, Cultural Landscape)	Disturbance of delineated burial ground	 50 m no-go-buffer-zone and the graves should be avoided and left in situ. Implementation of the recommendations included in the VIA
Visual/ Landscape	Light spillage and visual intrusion of large PV panels	Lights at night managementPanels less than 4 m in height.

Prepared by:

SiVEST

Environmental Aspect	Potential Impact During Operation	Proposed Mitigation
Social	 Employment creation in local communities Local economic development benefits Impact on the environment Change in sense of place 	 Mitigation measures to be provided during EIA phase

13.3.4Decommissioning Phase

Environmental Aspect	Potential Impact During Decommissioning	Proposed Mitigation
Agricultural	none identified	•
Avifaunal	Displacement as a result of disturbance:	 Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. Measures to control noise should be applied according to current best practice in the industry
Aquatic/ Freshwater	 Infilling, excavation and/or modification of water resources during construction. Erosion and/or sedimentation of water resources due to catchment/site land clearing and landcover disturbance during construction. Erosion and/or sedimentation of water resources due to temporary flow diversion during construction. Pollution of wetlands/vadose zones due to the mishandling of hazardous substances and/or improper maintenance of machinery during construction e.g. oil and diesel leaks and spills. Fragmentation of water resources as a result of construction activities within and surrounding the rivers / streams and wetlands. Removal or alteration of vadose zone flow paths feeding water resources. 	• Refer to construction mitigation measures
Geotechnical – Soil Erosion	 Disturbance and removal of rock and soil Soil erosion 	 Restore natural site topography. Landscape and rehabilitate access roads and disturbed areas timeously (e.g. regressing. Temporary berms and drainage channels to divert surface runoff where needed Use designated access and laydown areas only to minimise disturbance to surrounding areas.
Terrestrial Biodiversity	• Decommissioning phase impacts are anticipated to be the same as the construction and operation phase impacts	mitigation measures for the construction and operation phase must be followed .

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Environmental Aspect	Potential Impact During Decommissioning	Proposed Mitigation
Heritage (Archaeological, Paleontological, Cultural Landscape)	 Disturbance of delineated burial ground Further disturbance and loss of delineated LSA site 	 Implement a chance to find procedures in case where possible heritage finds are uncovered. If large quantities of LSA remains are discovered during decommissioning, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. The burial site should be demarcated with a 50 m no-go-buffer-zone and the graves should be avoided and left in situ. During the decommissioning phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented. Implementation of the Chance Fossil Finds Protocol. Implementation of the recommendations included in the VIA
Visual/ Landscape	 Dust generated during decommissioning activities will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the site, during the decommissioning period. 	 Limit vegetation clearance and the footprint of decommissioning to what is absolutely essential. Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. Keep stockpiled aggregate and sand covered to minimise dust generation. Keep site tidy.
Social	None identified	None identified

13.3.5Cumulative

The proposed SEF is located adjacent to several other SEFs within 35 km. SiVEST undertook every effort to obtain the information (including specialist studies, BA/ S&EIR and EMPrs) for other surrounding developments. The information that could be obtained for the surrounding planned RE developments was taken into account as part of the cumulative impact assessment.

The SEFs that were considered are indicated in the table and figure below:

Table 25: SEF within	35km radius
----------------------	-------------

Project	Status	Reference number
Leeumax Solar PV Facility	Approved	(Ref No: NWP/EIA/96/2022)
Leeuwbosch 1 Solar PV Facility	Approved	(Ref No: NWP/EIA/42/2021)
Leeuwbosch 2 Solar PV Facility	Approved	(Ref No: NWP/EIA/45/2021)
Leeudoringstad Solar PV Substation	Approved	(Ref No: NWP/EIA/43/2021)
Proposed Leeuwbosch Powerline Grid	Pending	

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



Wildebeestkuil 1 Solar PV Facility	Approved	(Ref No: NWP/EIA/44/2021)
Wildebeestkuil 2 Solar PV Facility	Approved	(Ref No: NWP/EIA/46/2021)
Bokamoso PV SEF	Approved	14/12/16/3/3/2/559
Noko Solar Plant	Approved	14/12/16/3/3/1/2474
Orkney PV SEF	Approved	14/12/16/3/3/2/954
Wolmaransstad SEF	Approved	14/12/16/3/3/2/716



Figure 31: RE Projects within 35km of the Lion Thorn SEF



Environmental Aspect	Potential Impact	Proposed Mitigation	
Agricultural	• Regional loss (including by degradation) of future agricultural production potential	 It should also be noted that renewable energy development can only be located in fairly close proximity to a substation that has available capacity. This creates cumulative impact in such places. However, this is acceptable because it also effectively protects most agricultural land in the country from renewable energy development because only a small proportion of the country's total land surface is located in close enough proximity to an available substation to be viable for renewable energy development. The PV panels will not necessarily totally exclude agricultural production. The area can still be used to graze sheep that will, in addition, be protected against stock theft within the security area of the facility. The proposed development will have the wider societal benefits of generating additional income and employment in the local economy. In addition, the proposed development will contribute to the country's urgent need for energy generation, particularly renewable energy that has much lower environmental and agricultural impact than existing, coal powered energy generation. All renewable energy development in South Africa decreases the need for coal power and thereby contributes to reducing the large agricultural impact that open cast coal mining has on highly productive agricultural land throughout the coal mining areas of the country. 	
Avifaunal	none provided	to be assessed during the EIA phase	
Aquatic	none provided	to be assessed during the EIA phase	
Geotechnical	None specified	Гала <u>в</u> страница ст	
	Cumulative impact on indigenous natural vegetation	 Implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. 	
Terrestrial	Cumulative impacts due to spread of	Undertake regular monitoring to detect alien invasions early so that they can be controlled	
Biodiversity	declared weeds and	Post-decommissioning monitoring should continue for an	
Diodiversity	alien invader plants	appropriate length of time to ensure that future problems are	
		avoided.	
		be required.	
Heritage	none provided	to be assessed during the EIA phase	
Visual	none provided	to be assessed during the EIA phase	
Social	 none provided 	to be assessed during the EIA phase	

13.4 Concluding Statement

No activity alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view. Solar energy installations are more suitable for the site because of the good solar resource. The choice of technology selected for the SEF was based on environmental constraints as well as technical and economic considerations.

Prepared by:



Lion Thorn Solar PV Facility 145 (PTY) LTD

The full site area has been assessed by the specialists in their respective specialist studies. All constraints identified to date as indicated in the sensitivity mapping below will be taken into account and the preliminary layout will be amended where necessary to inform the proposed layout for the SEF. This proposed layout will then be taken forward for assessment in the DEIR phase.



Figure 32: Preliminary specialist sensitivities (to be further updated taking into account the specialist sensitivities and included in the DEIR)





Figure 33: Preliminary layout with sensitivities (to be further updated taking into account the specialist sensitivities and included in the DEIR)

14. PLAN OF STUDY FOR EIA

This PoSEIR, which explains the approach to be adopted to conduct the EIR for the proposed Lion Thorn SEF Project, was prepared in accordance with Appendix 2 of the EIA Regulations.

The purpose of the EIR Phase is to:

- determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- describe the need and desirability of the proposed activity, including the need and desirability of the
 activity in the context of the development footprint on the approved site as contemplated in the accepted
 scoping report;
- identify the location of the development footprint within the approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- determine the:
 - nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



- degree to which these impacts:
 - can be reversed;
 - may cause irreplaceable loss of resources, and
 - can be avoided, managed or mitigated;
- identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;
- identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;
- identify suitable measures to avoid, manage or mitigate identified impacts; and
- identify residual risks that need to be managed and monitored.

The EIR Phase consists of the following processes:

- Finalization of specialist studies that provide additional information/ assessments required to address the issues raised in the Scoping Phase.
- Undertaking of a PPP process where findings of the EIR Phase are communicated and discussed with I&APs and responses are documented.
- An assessment process whereby inputs are presented in an FEIR that is submitted for review and decision-making to DFFE/ DEDECT.

14.1 Tasks to be Undertaken

The EIR Phase will be informed by the Scoping Phase. The following steps will be undertaken as part of the EIR Phase:

- The preliminary layout will be further investigated and updated in order to avoid or minimize negative impacts and maximize potential benefits;
- Environmental impact statements regarding the potential significance of residual impacts, taking into account proposed mitigation measures will be provided in the EIR Phase;
- An EMPr covering construction and decommissioning phases of the proposed development will be prepared. This will include an EMPr for the facility. The EMPr will include input from specialists and will incorporate recommendations for mitigation and monitoring.

14.2 Description of Alternatives to be Considered and Assessed

The EIR Phase will include a detailed analysis of the proposed layout for the project which will include environmental (with specialist input) and technical evaluations. Any additional alternatives identified through this process will be reported on in the DEIR.

14.2.1 Location Alternatives

As mentioned in the sections above, no location alternatives are being considered for the Lion Thorn SEF as the site was selected prior to the commencement of the EIA process based on its location and limited to the land available to the applicant.

14.2.2 Layout Alternatives

The preliminary layout that was prepared for the Lion Thorn SEF has been informed by Specialist Sensitivities. The preliminary layout will be assessed during the EIA phase and further refined following seasonal site visits

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



from the various specialists. Should any additional constraints be identified from the various specialists these will be incorporated into the final layout.



Figure 34: Preliminary site layout

14.2.3 Technology Alternatives

No technology alternatives will be considered. In terms of wind energy, the climatic conditions show that there is not a suitable wind resource for a wind facility. The solar resource in this area advocates for the use of Solar PV technology in order to generate energy. Advancements in Solar PV technology present a renewable and sustainable way for countries like South Africa to generate low cost energy from a natural resource.

14.2.4No-go Alternatives

The option of not implementing the activity, or the "no-go" alternative and associated potential impacts, have been discussed in the sections above and will be assessed further during the EIA phase.

14.3 Specialist Studies

The following specialist studies have been undertaken for the project and the significant environmental aspects identified will be further assessed in the EIR Phase:

- Desktop Geotechnical Assessment;
- Agricultural compliance statement and site sensitivity verification;

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



- Aquatic/ Freshwater Assessment;
- Terrestrial Biodiversity (including Animal and Plant Species) Assessment.
- Avifaunal Assessment;
- Socio-Economic Assessment;
- Cultural Heritage, Archaeological and Palaeontological Assessment; and
- Landscape/ Visual Assessment;

The preliminary findings of the specialist studies have been included in the Scoping Phase of this project.

While the summer season for avifaunal and biodiversity is generally from October to January, the avifaunal and biodiversity specialist survey will be undertaken in September. Following discussions with the specialists, this is not seen as a limitation, based on their experience in the area as well as preexisting data collected from surveys for properties directly adjacent to Lion Thorn.

The associated Impact Assessment tables will be included in the draft EIA report. Should the need for additional specialist studies be identified through the consultation process, these studies will be commissioned in the EIA Phase to further advise on the potential impacts that may arise from the proposed development. The specialist studies may identify further opportunities and constraints as associated with the site and the proposed development.

The specialists have undertaken the following scope of work:

Table 26: Specialist Scope of Work

Scope of Work

Specialists were requested to provide one (1) Scoping Phase Report and/or Compliance Statement that provides an assessment of the proposed Lion Thorn SEF and associated infrastructure.

During the EIR Phase, specialists will be required to update the Scoping Phase Report to provide a review of their findings in accordance with revised site layouts, to assess and rate significant impacts with mitigation measures and to address any comments or concerns arising from the PPP.

The specialist report must include an explanation of the terms of reference applicable to the specialist study. The NEMA prescribes Procedures for the Assessment and Minimum Criteria for Reporting on the Identified Environmental Themes in terms of Sections 24(5)(A) and (H) and 44, GN No. 320 and 1150, and where inapplicable, Appendix 6 of the EIA Regulations. These procedures must be considered.

Where a specialist assessment is required and no specific environmental theme protocol has been prescribed, the required level of assessment must be based on the findings of the Site Sensitivity Verification and must comply with Appendix 6 of the EIA Regulations; and any relevant legislation and guidelines deemed necessary

Where relevant, a table must be provided at the beginning of the specialist report, listing the requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations and cross reference these requirements with the relevant sections in the report.

14.4 EIA Methodology

The EIA Methodology assists in evaluating the overall effect of a proposed activity on the environment, and vice versa. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis, refer to **Appendix 7** for the EIA methodology to be adopted.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



14.5 Consultation with Competent Authority, Key Stakeholders and I&APs

SiVEST will undertake the following:

- Submission of application form to obtain EA reference number.
- The DSR will be made available for comment to potential I&APs, key stakeholders and the authorizing authority.
- After the DSR has been made available for comment within the public domain, comments will be incorporated into the CRR and FSR.
- The FSR will then be submitted to the DFFE for review and decision-making.
- The DEIR will be made available for comment to I&APs, key stakeholders and the authorizing authority.
- After the DEIR has been made available for comment within the public domain, comments will be incorporated into the CRR and Final Environmental Impact Report (FEIR) for submission to the DFFE
- Notify Registered I&APs of the decision.
- Apart from the above-mentioned occasions, further consultation with authorities will occur whenever necessary.

14.6 PPP to be undertaken for the EIR Phase

PPP forms a critical component of the EIA process, as it provides all I&APs with an opportunity to learn about a project, but more importantly to understand how a project will impact on them. The following will be undertaken during the EIR Phase.

14.6.1 Maintenance of Register of I&APs

The Register of I&APs will be updated as and when necessary during the execution of the EIA process.

14.6.2 Review of DEIR

A 30-day PPP period will be provided to I&APs to review the DEIR. Copies of the DEIR will be provided to the regulatory and commenting authorities as well. The DEIR will also be available for download on a link to be provided.

All parties on the Register of I&APs will be notified via email, sms or fax of the opportunity to review the DEIR, the review period and the process for submitting comments on the report.

All comments received from I&APs and the responses thereto will be included in the FEIR, which will be submitted to DFFE/ DEDECT for review and decision-making.

14.6.3 Public Meetings/ Consultation during the PPP

No public meetings are proposed at this stage. Virtual meetings, if required, will be conducted using an appropriate platform agreeable to all parties (such as Zoom, Skype or Microsoft Teams).

14.6.4 Inclusion of Comments into the FEIR

A CRR will be compiled and included in the FEIR, which will record the date that issues were raised, a summary of each issue, and the response of the team to address the issue. The FEIR with all comments included will be submitted to DFFE/ DEDECT for review and approval.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:



14.6.5Notification of Decision

All Registered I&APs will be notified via email, sms or fax after having received written notice from DFFE/ DEDECT on the final decision of the application. These notifications will include the process required to lodge an appeal against the decision, as well as the prescribed timeframes in which documentation should be submitted.

15. EAP DECLARATION

The declarations, CV's and qualifications for the EAPs responsible for the preparation of this report have been attached in **Appendix 1**.

16. INFORMATION REQUIRED BY CA (IF APPLICABLE)

currently n/a.

17. CONCLUSION

This Scoping Report was compiled to meet the requirements of NEMA, with the primary aim of informing I&APs of the proposed project and allowing for an opportunity to comment on the project and the plan of study for the EIA Phase.

This Scoping Report has covered activities and findings related to the scoping process for the proposed Lion Thorn SEF project. Professional experience, specialist knowledge, relevant literature and local knowledge of the area have all been used to identify the potential issues associated with the proposed project. There is no guarantee that all the potential impacts arising from the proposed SEF project have been identified within the Scoping Phase, however the report provides an outline of the established measures that were taken to best identify all the potential impacts.

Based on the findings of the specialists and the potential impacts identified to date, the layout will be further refined based on specialist seasonal surveys and assessment as well as the outcomes of the PPP of the Scoping Phase. The final layout will then be assessed by all specialists in the EIA Phase.

18. WAY FORWARD

The DSR is currently circulated for PPP for a period of 30 days (excluding public holidays) from **10 August** until **09 September 2023**.

All comments received will be responded to in a CRR, which will be circulated prior to submission of the FSR to the decision-making authority, namely the DFFE. Comments received on the report will be taken into consideration, incorporated into the report (where applicable) and will be used when ccompiling the Final Scoping and the Draft EIA Repor.

All I&APs and key stakeholders are invited to register in order to be kept informed throughout the process. To register and/or obtain additional information, please submit your name, contact details (telephone number,

Prepared by:



Lion Thorn Solar PV Facility 145 (PTY) LTD

postal address and email address) and the interest which you have in the application to the SiVEST Environmental Division, as per the details below:

Contact: Hlengiwe Ntuli PO Box 2921, RIVONIA, 2128 Phone: (011) 798 0600 E-mail: sivest_ppp@sivest.com Fax: (011) 803 7272 Website: <u>www.sivest.com</u>

Please reference 'Lion Thorn SEF' in your correspondence, should your comments be project specific. SiVEST shall keep all Registered I&APs/ key stakeholders informed of the EIA process.

Lion Thorn Solar PV Facility 145 (PTY) LTD

Prepared by:





SiVEST Environmental Division

4 Pencarrow Crescent, La Lucia Ridge Office Estate, Umhlanga Rocks, 4320 PO Box 1899, Umhlanga Rocks, 4320 KwaZulu-Natal, South Africa

Tel +27 31 581 1500 Email <u>info@sivest.com</u> <u>www.sivest.com</u>

Contact Person: Michelle Email: micheller

Michelle Nevette michellen@sivest.com