

BASIC ASSESSMENT REPORT

Draft – 13 August 2021

DEVELOPMENT OF A POWER LINE FOR
THE GAMMA SOLAR POWER PLANT
NEAR VRYBURG, NORTH WEST
PROVINCE



ENVIRONAMICS



PROJECT DETAIL

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GLOSSARY OF TERMS AND ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
CEA	Cumulative Effects Assessment
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DoE	Department of Energy
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EP	Equator Principles
EPFI	Equator Principles Financial Institutions
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
GNR	Government Notice Regulation
I&AP	Interested and affected party
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
Mitigate	Activities designed to compensate for unavoidable environmental
MW	Megawatt
NEMA	National Environmental Management Act No. 107 of 1998
NERSA	National Energy Regulator of South Africa
NWA	National Water Act No. 36 of 1998
PPP	Public Participation Process
PV	Photovoltaic
REIPPP	Renewable Energy IPP Procurement Process
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
VU	Vegetation Unit



CONTEXT FOR THE DEVELOPMENT

According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fuelled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmentally responsible development, the impacts of climate change and the need for sustainable development. The use of renewable energy technologies, as one of a mix of technologies needed to meet South Africa's future energy consumption requirements has been enshrined in the Integrated Resources Plan (2010 -2030, as amended), which forms part of the national Department of Mineral Resources and Energy (DMRE) (previously known as Department of Energy (DoE) long-term strategic planning and research process.

The Gamma Solar Power Plant received an Environmental Authorisation (EA) from the Department of Forestry, Fisheries and the Environment (DFFE), previously known as the Department of Environmental Affairs (DEA), on 29 November 2016 (ref.: 14/12/16/3/3/2/917). The primary rationale for the proposed solar photovoltaic (PV) facility is to add new generation capacity from a renewable energy source to the national electricity mix and to aid in achieving the goal of 42% share of all new installed generating capacity being derived from renewable energy forms, as targeted by DMRE (Integrated Resource Plan Update 2010-2030). The IRP also identifies the preferred generation technologies required to meet the expected demand growth up to 2030 and incorporates government objectives including affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources and localisation and regional development. In terms of the Integrated Resource Plan Update (2019 IRP Update, 2010-2030), over the short term (of the next two or three years), clear guidelines arose; namely to continue with the current renewable bid programme with additional annual rounds of 1000 MW PV, with approximately 8.4GW of the renewable energy capacity planned to be installed from PV technologies over the next twenty years.

The proposed project is intended to form part of the Department of Mineral Resources and Energy's (DMREs) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. The REIPPP Programme aims to secure 14 725 Megawatts (MW) of new generation capacity from renewable energy sources, while simultaneously diversifying South Africa's electricity mix. According to the 2021 State of the Nation Address, Government will soon be initiating the procurement of an additional 11 800 MW of power from renewable energy, natural gas, battery storage and coal in line with the Integrated Resource Plan 2019 and fulfilling their commitments under the United Nations Framework Convention on Climate Change and its Paris Agreement which include the reduction of greenhouse gas emissions. Eskom, our largest greenhouse gas emitter, has committed in principle to net zero emission by 2050 and to increase its renewable capacity.

In order for the authorised Gamma Solar Power Plant (SPP) to connect to the national grid Gamma Solar Power Plant (RF) (Pty) Ltd. is proposing the development of grid connection infrastructure to enable the evacuation of power generated from the authorised solar plant to the national grid (refer to Figure A for the locality map). The infrastructure proposed development consists of a single-circuit 132kV power line, with the associated infrastructure required for the operation of the authorised facility. If the Gamma SPP is selected as a preferred bidder by the Department of Mineral Resources and Energy (DMRE), it is expected to reach Financial Close by latest December 2021. The authorisation



of this proposed power line is a necessity in terms of the authorisation requirements. As such, this Basic Assessment process and Application for Environmental Authorisation is for the development of a 132kV overhead power line connecting the Gamma SPP to the existing Mookodi-Magopela 132kV power line.



EXECUTIVE SUMMARY

Like many other small and developing municipalities in the country, the Naledi Local Municipality, within which the Impala Solar Power Plant is proposed, faces a number of challenges in addressing the needs and improving the lives of the community. The Draft Integrated Development Plan (2020-2021) of the Dr Ruth S. Mompoti District Municipality¹ states that it is the vision of the municipality to be a developmental district, where service delivery is prioritised and optimised in a sustainable manner. The municipality aims to achieve their key strategic goals, such as delivering quality basic services (i.e. electricity, water and sanitation) to their communities, stimulating local economic growth and to ensure sound financial management and viability within the municipality. The Naledi Local Municipality's Integrated Development Plan (2018-2019) vision is to provide sustainable, quality, and equitable services to their community through enhancing revenue, effective use of available resources, promoting infrastructure and socio-economic development. Naledi Local Municipality has conceptualised strategic objectives, such as to create an environment conducive for local economic development, to promote transparency, to foster good corporate culture and to accelerate the provision of basic services, in order to achieve their vision. The development of the Impala Solar Power Plant will contribute to the realisation of the vision and mission of the respective local and district municipalities that will be affected by the proposed development.

The Gamma SPP was issued with an EA for the development of a 115MW photovoltaic solar facility and associated infrastructure on the Remaining Extent of Portion 4 of the farm Champions Kloof 731, Registration Division HN, North West situated within the Naledi Local Municipality area of jurisdiction (within the larger Dr Ruth Segomotsi Mompoti District Municipality). The town of Vryburg is located approximately 12km north-west of the authorised SPP. The total footprint of the SPP project is approximately 285 hectares (including supporting infrastructure on site).

This Application for Environmental Authorisation and Basic Assessment process is for the connection of an approved project to the national grid via a single-circuit 132kV overhead power line. This new power line will connect the SPP to the existing Mookodi-Magopela 132kV power line located south-west of the proposed development, on the opposite side of the N18. For this Basic Assessment a larger grid connection corridor has been identified within which the power line route will be placed. The corridor is 100m wide and ~4,5km in length, and was assessed within this BA Report. A 132kV substation (1ha in extent) and service road associated with the power line is also included as part of the development (required associated infrastructure). The grid connection corridor will cross over the Harts River as well as the N18.

In terms of the National Environmental Management Act (Act 107 of 1998), with specific reference to Sections 24 and 24D, as read with GNR 324-327, as amended (2017), Environmental Authorisation is required for the Power Line as part of the Gamma SPP. The following listed activities have been

¹ The Naledi Local Municipality falls within the Dr Ruth S. Mompoti District Municipality.



identified with special reference to the proposed development and is listed in the EIA Regulations (as amended):

- Activity 11(i) (GN.R. 327): *“The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.”*
- Activity 12(ii)(a)(c) (GN.R. 327): *“The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more (a) within a watercourse or (b) within 32 meters of a watercourse, measured from the edge of a watercourse.”*
- Activity 19 (GN.R. 327): *“The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse”*
- Activity 27 (GN.R. 327): *“The clearance of 1 hectares or more, but less than 20 hectares of indigenous vegetation.”*
- Activity 4(h)(iv) (GN.R 324): *“The development of a road wider than 4 metres with a reserve less than 13,5 metres, in the North West Province, within a Critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.”*
- Activity 12(h)(iv) (GN.R 324): *“The clearance of an area of 300 square meters or more of indigenous vegetation in the North West Province, within a Critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.”*

Being listed under Listing Notice 1 and 3 (Regulation 327 and 324) implies that the development is considered as potentially having a potential impact on the environment. Subsequently a ‘basic assessment process’ is required as described in Regulations 19 - 20. Environamics has been appointed as the independent consultant to undertake the Basic Assessment (BA) for the grid connection infrastructure on behalf of Gamma Solar Power Plant (RF) (Pty) Ltd.

Regulation 19 of the EIA Regulations (2017) requires that a Basic Assessment Report (BAR) must contain the information set out in Appendix 1 of the Regulations or comply with a protocol or minimum information requirements relevant to the application as identified and gazetted by the Minister in a government notice. Appendix 1 of GNR326 requires that the environmental outcomes, impacts and residual risks of the proposed activity be set out in the BAR. It has been determined through the BA process that the proposed development will have a net positive impact for the area and will subsequently ensure the optimal utilisation of resources and land, specifically where the affected landowner is experiencing challenges and limitations in terms of the current agricultural land use. All negative environmental impacts can be effectively mitigated through the recommended mitigation measures and no residual negative impacts are foreseen. The potentially most significant environmental impacts associated with the development are briefly summarized below:

Impacts during the construction phase:

Construction of the power line will potentially result in the following impacts: habitat destruction and fragmentation, soil erosion and sedimentation, air, soil and water pollution, spread and establishment



of alien invasive species, faunal impacts, impact on watercourses, displacement and disturbance of avifauna species, impacts to heritage objects, generation of waste, socio-economic impacts and safety and security impacts.

The impacts expected to occur during the construction phase will mainly have a significance of low and negligible with some impacts being considered as medium (with mitigation). No impacts of a high significance are expected to occur.

Impacts during the operational phase:

The proposed power line, substation and associated servitude will require routine maintenance work throughout the operational phase. The negative impacts are generally associated with visual impacts, avifauna impacts, soil impacts and social impacts. The operational phase will have a direct positive impact through local employment and business opportunities, skills development and training, and the development of infrastructure for the generation of clean, renewable energy. The significance of the expected impacts is considered to be medium and low, with no impacts of a high significance expected to occur (this being with the implementation of mitigation).

Impacts during the decommissioning phase:

The photovoltaic solar energy facility has a lifespan of between 20 and 30 years from where the project and its associated infrastructure will be decommissioned or upgraded. If the solar plant is not decommissioned the power line and the substation is expected to have a lifespan of more than 40 years (with maintenance) and the infrastructure will only be decommissioned once it has reached the end of life, or if no longer required. Upon decommissioning, the power line and substation would be disassembled, and the components removed from site. The physical environment will benefit from the decommissioning of the infrastructure since the site will be restored to its natural state. During the decommissioning phase the following impacts are foreseen: erosion, impacts to fauna and flora and fauna and the generation of waste.

Cumulative impacts:

Cumulative impacts could arise as other similar projects are constructed in the area. According to the Energy Blog's database only one other solar PV plant has been granted preferred bidder status within close proximity to the proposed Impala Solar Power Plant, namely the Waterloo Solar Park with a capacity of 75MW, near Vryburg, North West Province. The Waterloo Solar Park is operational since November 2020. However, according to the Department of Forestry, Fisheries and the Environments (DFFE) database twenty (20) other solar plants have been proposed in relative close proximity to the proposed activity, the potential for cumulative impacts may therefore exist. The potentially most significant cumulative impact during the construction phase relate to the loss or fragmentation of habitats, impacts on avifauna, temporary employment and the impact of construction workers on local communities and influx of job seekers. The potential cumulative effects during the operational phase relate to visual impacts, avifauna impacts and the development of infrastructure for the generation of clean, renewable energy. During the decommissioning phase, the generation of waste and visual intrusion may result in cumulative impacts.

In accordance with the EIA Regulations, this BAR evaluates and rates each identified impact, and identifies mitigation measures which will be required in order to ensure the avoidance of negative



residual risks. The report also considers potential positive impacts and enhancement measures to increase the significance of the positive impacts. This BAR also contains information that is necessary for the competent authority (DFFE) to consider the application and to reach a decision contemplated in Regulation 20.

1 INTRODUCTION

This section aims to introduce the Basic Assessment Report (BAR) and specifically to address the following requirements of the regulations:

Appendix 1. (3) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-(a) details of:

- (i) the EAP who prepared the report; and
- (ii) the expertise of the EAP, including a curriculum vitae.

1.1 LEGAL MANDATE AND PURPOSE OF THE REPORT

Regulations No. 326, 327, 325 and 324 (of 07 April 2017) promulgated in terms of Section 24(5) and 44 of the National Environmental Management Act, (107 of 1998) determine that an BA process should be followed for certain listed activities, which might have a detrimental impact on the environment. According to Regulation No. 326 the purpose of the Regulations is: “...to regulate the procedure and criteria as contemplated in Chapter 5 of the Act relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to environmental impact assessment, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto”.

The EIA Regulations No. 324 & 327 outline the activities for which a BA process should apply. The following listed activities with special reference to the proposed activity is relevant to the proposed development:

Table 1.1: Listed activities

Relevant notice:	Activity No (s)	Description of each listed activity as per project description:
GNR. 327, 07 April 2017	Activity 11(i)	<ul style="list-style-type: none">• “The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.”• The development of a 132kV single-circuit power line (and 132kV Substation) is required to enable the connection of the authorised Gamma SPP (DFFE ref.: 14/12/16/3/3/2/917) to the national grid network. A 100m wide and ~4,5km long grid connection corridor is being assessed for the placement of the power line route and substation. The power line is proposed to connect into the existing Mookodi-Magopela 132kV power line.



<p>GNR. 327, 07 April 2017</p>	<p>Activity 12(ii)(a)(c)</p>	<ul style="list-style-type: none"> • <i>“The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more (a) within a watercourse or (b) within 32 meters of a watercourse, measured from the edge of a watercourse.”</i> • The power line requires the development of a service road and pylon infrastructure which will exceed 100 square meters in extent. Surface water features, including wetlands and rivers, are present within the grid connection corridor that will need to be crossed by the service road
<p>GNR. 327, 07 April 2017</p>	<p>Activity 19</p>	<ul style="list-style-type: none"> • <i>“The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse”</i> • The power line requires the development of a service road. Surface water features, including wetlands and drainage channels, are present within the grid connection corridor that will need to be crossed by the service road. This will require the removal and moving of soils of more than 10 cubic meters.
<p>GNR. 327, 07 April 2017</p>	<p>Activity 27</p>	<ul style="list-style-type: none"> • <i>“The clearance of 1 hectares or more, but less than 20 hectares of indigenous vegetation.”</i> • The development of the 132kV substation proposed as part of the project will require the clearance of 1 hectare of indigenous vegetation.
<p>GNR. 324, 07 April 2017</p>	<p>Activity 4(h)(iv)</p>	<ul style="list-style-type: none"> • <i>The development of a road wider than 4 metres with a reserve less than 13,5 metres, in the North West Province, within a Critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.”</i> • A service road will be required during the construction and operational phase of the project.
<p>GNR. 324, 07 April 2017</p>	<p>Activity 12(h)(iv)</p>	<ul style="list-style-type: none"> • <i>“The clearance of an area of 300 square meters or more of indigenous vegetation in the (h) North West within (iv) areas within a Critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.”</i> • The power line, substation and the associated service road will require more than 300 square meters of vegetation clearance. Surface water features, including wetlands and rivers, are present within the grid connection corridor that will need to be crossed by the service road.



Being listed under Listing Notices 1 and 3 implies that the proposed activity is considered as potentially having a potential impact on the environment. Subsequently a 'basic assessment process' is required as described in Regulations 19 - 20. According to Appendix 1 of Regulation 326, the objective of the basic assessment process is to, through a consultative process:

- 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;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed alternatives;
- Through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine —
 - The nature, significance, consequence, extent, duration and probability of the impacts occurring; and
 - degree to which these impacts-
 - can be reversed;
 - may cause irreplaceable loss of resources, and
 - can be avoided, managed or mitigated; and
- Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to —
 - Identify and motivate a preferred site, activity and technology alternative;
 - Identify suitable measures to avoid, manage or mitigate identified impacts; and
 - Identify residual risks that need to be managed and monitored.

This report is the Draft Basic Assessment Report (DBAR) to be submitted to the Department of Forestry, Fisheries and the Environment (DFFE), who is the decision-making authority on the projects as the proposed development relates to the Integrated Resource Plan. According to Regulation 326 all registered I&APs and relevant State Departments must be allowed the opportunity to review the report. The draft BAR has been made available to registered I&APs and all relevant State Departments. They have been requested to provide written comment on the draft BAR within 30 days of receiving notification of its availability for review and comment. All issues identified during this review period will be documented and compiled into a Comments and Response Report as part of the Final BAR, and will be addressed in the Final BAR, as relevant.



1.2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Environamics was appointed by the applicant as the independent EAP to conduct the BA and prepare all required reports. All correspondence to the EAP can be directed to:

Contact person: Carli van Niekerk
Postal Address: 14 Kingfisher Street, Tuscany Ridge Estate, Potchefstroom, 2531
Telephone: 082 220 8651 (Cell)
Electronic Mail: carli@environamics.co.za

Regulation 13(1)(a) and (b) determines that an independent and suitably qualified and experienced EAP should conduct the BA process. In terms of the independent status of the EAP a declaration is attached as Appendix A to this report. The expertise of the EAP responsible for conducting the EIA is also summarized in the curriculum vitae included as part of Appendix A.

1.3 DETAILS OF SPECIALISTS

Table 1.2 provides information on the specialists that have been appointed as part of the BA process. Regulation 13(1)(a) and (b) determines that an independent and suitably qualified, experienced and independent specialist should conduct the specialist study, in the event where the specialist is not independent, a specialist should be appointed to externally review the work of the specialist as contemplated in sub regulation (2), must comply with sub regulation 1. In terms of the independent status of the specialists, their declarations are attached as Appendix D to this report. The expertise of the specialists is also summarized in their respective curriculum vitae's.



Table 1.2: Details of specialists

Study	Prepared by	Contact Person	Postal Address	Tel	e-mail
Terrestrial Biodiversity, Plant and Animal Species Impact Assessment	AGES	Mari van der Westhuizen	PO Box 2526, Polokwane 0700	Tel: (015) 291 1577	mvdwesthuizen@ages-group.com
Wetland Impact Assessment	iAfrica	Dr Andries Gouws & Dr Leslie Brown	PO Box 2526, Polokwane 0700	Tel: (012) 346 5307	index@iafrica.com
Avifaunal Impact Assessment	African Insights	Dr A. J. Williams	PO Box 19896 Noordbrug Potchefstroom 2522	Cell: 082 214 3738	capeokapi@gmail.com
Heritage Screener (including archaeology and palaeontology)	CTS Heritage	Jenna Lavin	16 Edison Way, Century City, Cape town	Cell: 087 073 5739	jenna.lavin@ctsheritage.com
Visual Impact Assessment	Phala Environmental Consultants	Marelie Botha	30 Fouche Street Steynsrus 9515	Cell: 082 493 5166	Phala.env@gmail.com



1.4 STATUS OF THE BA PROCESS

The BA process is conducted strictly in accordance with the stipulations set out in Regulations 19 – 20 and Annexure 1 of Regulation No. 326. Table 1.3 provides a summary of the BA process and future steps to be taken. It can be confirmed that to date:

- A pre-application meeting request and public participation plan was submitted on 4 August 2021 to the DFFE.
- The DFFE accepted the public participation plan in an email dated 11 August 2021.
- A site visit was conducted on 5 - 6 August 2021.
- An application for a Basic Assessment Process and the draft BAR was submitted on 13 August 2021.
- The draft Basic Assessment report has been made available for review and comment from 13 August to 13 September 2021.

It is envisaged that the BA process should be completed within approximately six months of submitting the Draft BAR, i.e. by January 2022 – see Table 1.3.

Table 1.3: Project schedule

Activity	Prescribed timeframe	Timeframe
Submit public participation plan	-	4 August 2021
Public Participation Plan Approval		11 August 2021
Site visit	-	5 & 6 August 2021
Specialist reports	-	11 August 2021
Submit application form & Draft BAR	-	13 August 2021
Public participation	30 Days	13 August – 13 September 2021
Submit Final BAR	90 Days	September 2021
Decision	107 Days	December 2021
Appeal period	20 Days	January 2022



1.5 STRUCTURE OF THE REPORT

This report is structured in accordance with the prescribed contents stipulated in Appendix 1 of Regulation No. 326. It consists of seven sections demonstrating compliance to the specifications of the regulations as illustrated in Table 1.4.

Table 1.4: Structure of the report

Requirements for the contents of a BAR as specified in the Regulations		Section in report
Appendix 1. (3) - A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-		
(a)	details of - (i) the EAP who prepared the report; and ii) the expertise of the EAP, including a curriculum vitae.	1
(b)	the location of the activity, including- (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	2
(c)	a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	
(d)	a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and (ii) a description of the activities to be undertaken including associated structures and infrastructure.	
(e)	a description of the policy and legislative context within which the development is proposed including: (i) An identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) How the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks and instruments;	3
(f)	a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	4
(g)	A motivation for the preferred site, activity and technology alternative.	5



<p>(h)</p>	<p>a full description of the process followed to reach the preferred alternative within the site including –</p> <p>(i) details of all the alternatives considered;</p> <p>(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;</p> <p>(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.</p> <p>(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</p>	
	<p>(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;</p> <p>(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</p> <p>(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;</p> <p>(viii) the possible mitigation measures that could be applied and level of residual risk;</p> <p>(ix) the outcomes of the site selection matrix;</p> <p>(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and</p> <p>(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;</p>	6
<p>(i)</p>	<p>a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including -</p> <p>(i) a description of all environmental issues and risks that were identified during the EIA process; and</p> <p>(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.</p>	
<p>(j)</p>	<p>an assessment of each identified potentially significant impact and risk, including-</p> <p>(i) cumulative impacts;</p> <p>(ii) the nature, significance and consequences of the impact and risk;</p>	



	(iii) the extent and duration of the impact and risk;	
	(iv) the probability of the impact and risk occurring;	
	(v) the degree to which the impact and risk can be reversed;	
	(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and	
	(vii) the degree to which the impact and risk can be mitigated;	
(k)	where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	6
(l)	an environmental impact statement which contains-	
	(i) a summary of the key findings of the environmental impact assessment;	
	(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and	
	(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	8
(m)	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;	
(n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Not applicable
(o)	a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	
(p)	a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	8
(q)	where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;	Not applicable
(r)	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 interested and affected parties (I&APs);	
	(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and	Appendix A to the report



	(iv) any information provided by the EAP to I&APs and any responses by the EAP to comments or inputs made by I&APs; and	
(s)	where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Not applicable
(t)	any specific information that may be required by the CA; and	Not applicable
(u)	any other matters required in terms of section 24(4)(a) and (b) of the Act.	Not applicable



2 ACTIVITY DESCRIPTION

This section aims to address the following requirements of the regulations:

<p>Appendix 1. (3) A BAR (...) must include-</p> <p>(b) the location of the activity, including-</p> <ul style="list-style-type: none"> (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties; <p>(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is-</p> <ul style="list-style-type: none"> (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken; <p>(d) a description of the scope of the proposed activity, including-</p> <ul style="list-style-type: none"> (i) all listed and specified activities triggered and being applied for; (ii) a description of the associated structures and infrastructure related to the development.
--

2.1 THE LOCATION OF THE ACTIVITY AND PROPERTY DESCRIPTION

The activity entails the development of a 132kV overhead power line and substation connecting the authorised Gamma SPP to the existing Mookodi-Magopela 132kV power line. The grid connection corridor currently under assessment for the placement of the power line route, and substation, and to be submitted for authorisation, is 100m wide and ~4,5km long. The grid connection corridor will cross several farms, the Harts River as well as the N18 and falls within the Naledi Local Municipality of the Dr Ruth Segomotsi Mompati District Municipality, North West Province (refer to Figure A). Various properties are affected by the grid connection corridor. Refer to Figure B for the Regional Map of the project.

The project entails the development of an overhead power line of approximately 4,5km to be constructed within a 100m wide corridor – refer to table 2.1 for general site information.

Table 2.1: General site information

Description of affected farm portions	<ul style="list-style-type: none"> • Portion 2 of the farm Hartsboom No. 734 • Portion 1 of the farm Hartsboom No. 734
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	<ul style="list-style-type: none"> • Portion 10 of the Farm Champions Kloof No. 731 • Portion 9 of the Farm Champions Kloof No.731 • Portion 5 of the Farm Champions Kloof No. 731 • Remaining Extent of Portion 4 of the Farm Champions Kloof No. 731
21 Digit Surveyor General codes	<ul style="list-style-type: none"> • Portion 2 of the farm Hartsboom No. 734 <ul style="list-style-type: none"> ○ TOHN00000000073400002 • Portion 1 of the farm Hartsboom No. 734 <ul style="list-style-type: none"> ○ TOHN00000000073400001 • Portion 10 of the Farm Champions Kloof No. 731 <ul style="list-style-type: none"> ○ TOHN00000000073100010 • Portion 9 of the Farm Champions Kloof No.731 <ul style="list-style-type: none"> ○ TOHN00000000073100009 • Portion 5 of the Farm Champions Kloof No. 731 <ul style="list-style-type: none"> ○ TOHN00000000073100005 • Remaining Extent of Portion 4 of the Farm Champions Kloof No. 731 <ul style="list-style-type: none"> ○ TOHN00000000073100000
Photographs of the site	Refer to the Plates
Type of technology	132 kV single-circuit overhead power line
Structure Height	Power lines ~32m
Length of the power line	Approximately 4,5km
Grid connection corridor width	Approximately 100m
Substation capacity	132kV
Substation footprint	1 hectare
Servitude width	Approximately 40m
Surface area to be covered	Approximately 25 hectares



The grid connection corridor runs directly to the south-west and crosses the Harts River and N18, which is in a rural area and characterised by farms and linear infrastructure (i.e., roads, railway lines and power line infrastructure). The site survey revealed that the site is currently used for of grazing for cattle and game – refer to plates 1-35 for photographs of the grid connection corridor.

2.2 ACTIVITY DESCRIPTION

The proposed development will trigger the following activity:

Table 2.2: Listed activities

Relevant notice:	Activity No (s)	Description of each listed activity as per project description:
GNR. 327, 07 April 2017	Activity 11(i)	<ul style="list-style-type: none"> “The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.” The development of a 132kV single-circuit power line (and 132kV Substation) is required to enable the connection of the authorised Gamma SPP (DFFE ref.: 14/12/16/3/3/2/917) to the national grid network. A 100m wide and ~4,5km long grid connection corridor is being assessed for the placement of the power line route and substation. The power line is proposed to connect into the existing Mookodi-Magopela 132kV power line.
GNR. 327, 07 April 2017	Activity 12(ii)(a)(c)	<ul style="list-style-type: none"> “The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more (a) within a watercourse or (b) within 32 meters of a watercourse, measured from the edge of a watercourse.” The power line requires the development of a service road and pylon infrastructure which will exceed 100 square meters in extent. Surface water features, including wetlands and rivers, are present within the grid connection corridor that will need to be crossed by the service road
GNR. 327, 07 April 2017	Activity 19	<ul style="list-style-type: none"> “The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse”



		<ul style="list-style-type: none"> The power line requires the development of a service road. Surface water features, including wetlands and drainage channels, are present within the grid connection corridor that will need to be crossed by the service road. This will require the removal and moving of soils of more than 10 cubic meters.
GNR. 327, 07 April 2017	Activity 27	<ul style="list-style-type: none"> <i>“The clearance of 1 hectares or more, but less than 20 hectares of indigenous vegetation.”</i> The development of the 132kV substation proposed as part of the project will require the clearance of 1 hectare of indigenous vegetation.
GNR. 324, 07 April 2017	Activity 4(h)(iv)	<ul style="list-style-type: none"> <i>“The development of a road wider than 4 metres with a reserve less than 13,5 metres, in the North West Province, within a Critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.”</i> A service road will be required during the construction and operational phase of the project.
GNR. 324, 07 April 2017	Activity 12(h)(iv)	<ul style="list-style-type: none"> <i>“The clearance of an area of 300 square meters or more of indigenous vegetation in the (h) North West within (iv) areas within a Critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.”</i> The power line, substation and the associated service road will require more than 300 square meters of vegetation clearance. Surface water features, including wetlands and rivers, are present within the grid connection corridor that will need to be crossed by the service road.

2.3 ACTIVITIES ASSOCIATED WITH THE POWER LINE

For the Gamma SPP to connect to the electrical grid requires transformation of the voltage from 480V to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480V and this is fed into step up transformers to 132kV. A substation has been authorised to step the voltage up to 132kV, after which the power will be evacuated into the national grid via the new proposed substation and the power line. The Mookodi-Magopela 132kV is a feasible connection to the national grid.



- Construction Phase:

The proposed 132kV overhead power line will be approximately 4,5km long and will be constructed within the identified grid connection corridor. The minimum vertical clearance to buildings, poles and structures not forming part of the power line must be 3.8m, while the minimum vertical clearance between the conductors and the ground is 6.7m. The minimum distance between trees and shrubs and any bare phase conductor of a 132kV power line must be 4m, allowing for the possible sideways movement and swing of both the power line conductor and the tree or shrub. The structure to be utilised for the power line towers will be informed by the local geotechnical and topographical conditions as well as by specific requirements from Eskom.

The construction of the proposed overhead power line and substation will take approximately 12 months to complete. Following the Commercial Operation Date (COD) of the authorised Gamma SPP, the applicant will hand over the powerline and the associated infrastructure (i.e., substation and service road) to Eskom Holdings SOC Ltd (Eskom) to operate and maintain. This is in line with Eskom's well-established Self Build Grid Connection Strategy for Renewable Energy Projects developed under the REIPPP Procurement Programme.

- Operation Phase:

The proposed power line and associated servitude will require routine maintenance throughout the operation period.

- Decommissioning Phase:

The photovoltaic solar power plant has a lifespan of between 20 and 25 years from where the facility and its associated infrastructure will be decommissioned or upgraded. If the solar plant is not decommissioned the power line is expected to have a lifespan of more than 40 years (with maintenance) and the infrastructure will only be decommissioned once it has reached the end of life, or if no longer required. Upon decommissioning, the power line would be disassembled, and the components removed from site, and recycled where possible, in line with the Environmental Management Programme EMPr).

2.4 LAYOUT DESCRIPTION

The grid connection corridor follows the limitations of the site and aspects such as environmentally sensitive areas, roads, fencing and servitudes – refer to Figure 1 below. The total surface area proposed for the power line route is approximately 15 hectares in extent. The proposed route of the power line is the shortest route from the authorised on-site substation to the existing Mookodi-Magopela 132kV power line and is the preferred alternative for the developers based on the line distance and willingness of the land owners. A final layout plan is included as Figure H in the report.



Figure 2.1: Proposed 100m power line corridor being assessed for authorisation

Table 2.3 provides the coordinate points for the proposed power line corridor which is being put forward for Environmental Authorisation.

Table 2.3: Coordinates

Power line corridor		
Point	Latitude	Longitude
1	27° 3'28.23"S	24°47'31.39"E
2	27° 3'26.50"S	24°47'37.06"E
3	27° 3'40.27"S	24°47'35.73"E
4	27° 3'43.99"S	24°47'43.79"E
5	27° 4'37.15"S	24°45'27.07"E
6	27° 4'44.54"S	24°45'27.29"E
7	27° 4'19.81"S	24°45'26.15"E
8	27° 5'0.64"S	24°45'27.81"E
9	27° 4'19.65"S	24°45'4.88"E
10	27° 5'0.87"S	24°45'4.81"E
Gamma/Khumbu Substation		
Point	Latitude	Longitude
A	27° 3'23.74"S	24°47'29.05"E
B	27° 3'21.80"S	24°47'35.85"E
C	27° 3'26.31"S	24°47'37.59"E



D	27° 3'28.43"S	24°47'30.81"E
Protea Collector Substation		
Point	Latitude	Longitude
A	27° 4'47.37"S	24°45'7.73"E
B	27° 4'47.50"S	24°45'13.19"E
C	27° 4'50.73"S	24°45'13.14"E
D	27° 4'50.65"S	24°45'7.69"E



Figure 2.2: Map indicating coordinate points as related to Table 2.3 above

2.5 SERVICES PROVISION

The following sections provides information on services required on the site e.g., water, sewage, refuse removal, and electricity.

2.5.1 Water

Adequate provision of water will be a prerequisite for the development. Water for the proposed development will most likely be obtained from ground water resources, or alternatively from the local municipality. The Local Municipality has issued a letter confirming that they are able to provide water for the construction and operation phases of the development. The Department of Water and Sanitation has been asked to confirm the water resource availability in the relevant catchment management area in order to ensure sustainable water supply. The EAP has appointed a Wetland / Riparian Impact Assessment Specialist as part of the team. Part of this Basic Assessment process will be to determine if there are further water use authorisation (WUA)



required for the power line, substation and service road. A WUA application will be submitted to the Department of Water and Sanitation and in line with DWS's procedure for similar projects, an assessment of the application for water use authorisation will only be finalised in the event that the project proponent has been appointed as a preferred bidder by the Department of Mineral Resources and Energy (DMRE).

The grid connection corridor is located within the C32 quaternary catchment and is situated in the Upper Orange Water Management Area. Drainage occurs as sheet-wash into the drainage channels within the corridor that eventually drains into the major river namely the Orange River that occurs to the south of the corridor.

Drinking water supplied will comply with the SANS:241 quality requirements and it is noted that the Letsemeng Local Municipality remains the Water Service Authority in that area of jurisdiction. Water saving devices and technologies such as the use of dual flush toilets and low-flow taps, the management of storm water, the capture and use of rainwater from gutters and roofs would be considered by the developer. Furthermore, indigenous vegetation will be used during landscaping and the staff will be trained to implement good housekeeping techniques.

2.5.2 Storm water

To avoid soil erosion, it is recommended that the clearing of vegetation be limited. Storm water management and mitigation measures are included in the Environmental Management Programme (EMPr) – refer to Appendix F.

2.5.3 Sanitation and waste removal

Portable chemical toilets will be utilized, that will be serviced privately or by the local municipality. Waste will be disposed at a licensed landfill site. The construction- and hazardous waste will be removed to licensed landfill sites accepting such kinds of wastes. During the operational phase household waste will be removed to a licensed landfill site by a private contractor or by the local municipality.

2.6 Decommissioning of the facility

The operating period will be 20 years from the commencement date. Thereafter two rights of renewal periods of 40 years and 20 years will be relevant. It is anticipated that new PV technologies and equipment will be implemented, within the scope of the Environmental Authorisation, when influencing the profitability of the solar facility. The implementation of new technologies and equipment at the solar power plant, which the power line will cater for, will also then extend the operation of the power line.

A likely extension of the plant's lifetime would involve putting new, more efficient, solar panels on the existing structures. If, for whatever reason the plant halts operations, the Environmental Authorisation and contract with the landowner will be respected during the decommissioning phase.



The rehabilitation of the site would form part of the decommissioning phase. The aim would be to restore the land to its original form (or as close as possible). The rehabilitation activities would include the following:

- Removal of all structures and rubble;
- Breaking up compaction where required, loosening of the soil and the redistribution of topsoil; and
- The surface will be restored to the original contours and hydro seeding will take place.



3 LEGISLATIVE AND POLICY CONTEXT

This section aims to address the following requirements of the regulations:

Appendix 1. (3) A BAR (...) must include-

(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.

3.1 INTRODUCTION

Environmental decision making with regards to solar PV plants and associated infrastructure (including the associated grid connection infrastructure) is based on numerous policy and legislative documents. These documents inform decisions on project level environmental authorisations issued by the National Department of Forestry, Fisheries and the Environment (DFFE) as well as comments from local and district authorities. Moreover, it is significant to note that they also inform strategic decision making reflected in IDPs and SDFs. Therefore, to ensure streamlining of environmental authorisations it is imperative for the proposed activity to align with the principles and objectives of key national, provincial and local development policies and legislation. The following acts and policies and their applicability to the proposed development are briefly summarised:

- The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA]
- The National Energy Act, 2008 (Act 34 of 2008)
- National Water Act, 1998 (Act No. 36 of 1998)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999)
- Conservation of Agricultural Resources Act, 1983 (Act No. 85 of 1983)
- The National Forests Act, 1998 (Act 84 of 1998)
- The White Paper on the Energy Policy of the Republic of South Africa (1998)
- The White Paper on Renewable Energy (2003)
- Integrated Resource Plan (IRP) for South Africa (2010-2030)
- National Development Plan of 2030
- National Infrastructure Plan of South Africa
- New Growth Path Framework



- North West Provincial Spatial Development Framework (PSDF) (2012)
- Strategic Environmental Assessment (SEA) for wind and solar PV Energy in South Africa (2014)
- Dr Ruth s. Mompati District Municipality Draft Integrated Development Plan (IDP) 2020-2021 (2020)
- Naledi Local Municipality Final Integrated Development Plan 2018-2019 (2019)
- Naledi Local Municipality Spatial Development Framework (2018)

Based on the fact that the proposed power line is necessary grid infrastructure for the operation of an authorised solar power plant, the legislative and policy documents of the solar power plant are also deemed relevant to the proposed power line.

The key principles and objectives of each of the legislative and policy documents are briefly summarised in tables 3.1 and 3.2 to provide a reference framework for the implications for the proposed activity.



3.2 LEGISLATIVE CONTEXT

Table 3.1: Legislative context for the construction of photovoltaic solar plants and the associated grid connection infrastructure

LEGISLATION	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The Constitution of South Africa (Act No. 108 of 1996)	National Government	1996	<p>The Constitution is the supreme law of the Republic and all law and conduct must be consistent with the Constitution. The Chapter on the Bill of Rights contains a number of provisions, which are relevant to securing the protection of the environment. Section 24 states that “everyone has the right to (a) an environment that is not harmful to their health or well-being and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that – (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The Constitution therefore, compels government to give effect to the people’s environmental right and places government under a legal duty to act as a responsible custodian of the country’s environment. It compels government to pass legislation and use other measures to protect the environment, to prevent pollution and ecological degradation, promote conservation and secure sustainable development.</p> <p>The development of the Gamma SPP and power line and the aspects related thereto considers the creation of an environment which is not harmful or degraded through the implementation of appropriate mitigation measures.</p>
The National Environmental Management Act (Act No. 107 of 1998)	National and Provincial Department of Forestry, Fisheries and the Environment	1998	<p>NEMA provides for co-operative governance by establishing principles and procedures for decision-makers on matters affecting the environment. An important function of the Act is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management. Some of the principles in the Act are accountability; affordability; cradle to grave management; equity; integration; open information; polluter pays; subsidiary;</p>



waste avoidance and minimisation; co-operative governance; sustainable development; and environmental protection and justice.

The mandate for EIA lays with the National Environmental Management Act (107 of 1998) and the EIA Regulations No. 324, 325, 326, and 327 promulgated in terms of Section 24 of NEMA. The EIA Regulations determine that an Environmental Authorisation is required for certain listed activities, which might have a detrimental effect on the environment.

The BA process undertaken for the power line as part of the Gamma SPP is in-line with the requirements of NEMA for the Application for Environmental Authorisation.'

The National Energy Act (Act No. 34 of 2008)	Department of Mineral Resources and Energy	2008	One of the objectives of the National Energy Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar: "To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (...); to provide for (...) increased generation and consumption of renewable energies..." (Preamble).
The National Water Act (Act No. 36 of 1998)	Department of Water and Sanitation (DWS)	1998	Considering that the Gamma SPP is proposed to make use of PV technology and the solar resource for the generation of electricity, the proposed project is in-line with the Act Sustainability and equity are identified as central guiding principles in the protection, use, development, conservation, management and control of water resources. The intention of the Act is to promote the equitable access to water and the sustainable use of water, redress past racial and gender discrimination, and facilitate economic and social development. The Act provides the rights of access to basic water supply and sanitation, and environmentally, it provides for the protection of aquatic and associated ecosystems, the reduction and prevention of pollution and degradation of water resources.



As this Act is founded on the principle that National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, a person can only be entitled to use water if the use is permissible under the Act. Chapter 4 of the Act lays the basis for regulating water use.

The site falls within the C32B quaternary drainage region, this drainage region falls under Zone K, which refers to the amount of water that may be taken from the ground water resource, per hectare.

Also, should a water use license be required for the project, the National Water Act will be applicable in terms of obtaining the relevant license.

National Environmental Management: Waste Act (Act No. 59 of 2008)	Department of Forestry, Fisheries and the Environment (DFFE)	2008	NEMWA has been developed as part of the law reform process enacted through the White Paper on Integrated Pollution and Waste Management and the National Waste Management Strategy (NWMS). The objectives of the Act relate to the provision of measures to protect health, well-being and the environment, to ensure that people are aware of the impact of waste on their health, well-being and the environment, to provide for compliance with the measures, and to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to health and well-being.
			Regulations No. R921 (of 2013) promulgated in terms of Section 19(1) of the National Environmental Management: Waste Act (59 of 2008) determine that no person may commence, undertake or conduct a waste management activity listed in this schedule unless a license is issued in respect of that activity. It is not envisaged that a waste permit will be required for the proposed development.
National Environment	Department of Forestry, Fisheries	2004	The object of this Act is to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air in the Republic; the prevention of air pollution



Management: Air Quality Act (Act No. 39 of 2004)	and the Environment (DFFE)	and ecological degradation; and securing ecologically sustainable development while promoting justifiable economic and social development.
		Regulations No. R248 (of 31 March 2010) promulgated in terms of Section 21(1)(a) of the National Environmental Management Act: Air Quality Act (39 of 2004) determine that an Atmospheric Emission License (AEL) is required for certain listed activities, which result in atmospheric emissions which have or may have a detrimental effect on the environment. The Regulation also sets out the minimum emission standards for the listed activities. It is not envisaged that an Atmospheric Emission License will be required for the proposed development.
The National Heritage Resources Act (Act No. 25 of 1999)	South African Heritage Resources Agency (SAHRA) and the Free State Provincial Heritage Resources Authority	<p>The Act aims to introduce an integrated and interactive system for the management of heritage resources, to promote good governance at all levels, and empower civil society to nurture and conserve heritage resources so that they may be bequeathed to future generations and to lay down principles for governing heritage resources management throughout the Republic. It also aims to establish the South African Heritage Resources Agency together with its Council to coordinate and promote the management of heritage resources, to set norms and maintain essential national standards and to protect heritage resources, to provide for the protection and management of conservation-worthy places and areas by local authorities, and to provide for matters connected therewith.</p> <p>The Act protects and manages certain categories of heritage resources in South Africa. For the purposes of the Heritage Resources Act, a “heritage resource” includes any place or object of cultural significance. In this regard the Act makes provision for a person undertaking an activity listed in Section 28 of the Act to notify the resources authority. The resources authority may request that a heritage impact assessment be conducted if there is reason to believe that heritage resources will be affected.</p>



				A case file has been opened on SAHRIS for the Impala Solar Power Plant and all relevant documents were submitted for their comments and approval. The Heritage Impact Assessment undertaken for the solar power plant is included as Appendix D5 to this BAR.
Conservation of Agricultural Resources Act (Act No. 85 of 1983)	National Provincial Government	and	1983	<p>The objective of the Act is to provide for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.</p> <p>Consent will be required from the Department of Agriculture, Forestry and Fisheries (now known as the Department of Forestry, Fisheries and the Environment) in order to confirm that the proposed development is not located on high potential agricultural land and to approve the long-term lease agreement.</p>
The National Forests Act, 1998 (Act 84 of 1998)	Department of Forestry, Fisheries and the Environment (DFFE)	of	1998	<p>The purposes of this Act are to:</p> <ul style="list-style-type: none">(a) promote the sustainable management and development of forests for the benefit of all;(b) create the conditions necessary to restructure forestry in State forests;(c) provide special measures for the protection of certain forests and trees;(d) promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes.(e) promote community forestry;(f) promote greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination. <p>Section 12(1) read with s15(1) of the NFA stated that the Minister may declare a particular tree, group of trees, woodland; or trees belonging to a particular species, to be a protected tree, group of trees, woodland or species. A list of protected tree species was gazetted in GN 635 of 6 December 2019. The effect of the declaration is that no person may (a) cut, disturb, damage or destroy; or (b) possess, collect, remove, transport, export, purchase, sell, donate or in any</p>



				<p>other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except under a license granted by the Minister; or in terms of an exemption published by the Minister in the Gazette.</p> <p>A Terrestrial Biodiversity, Plant and Animal Impact Assessment has been undertaken for the Gamma Power Line and is included in Appendix D1 of this BAR.</p>
Free State Nature Conservation Ordinance, 1969 (Act 8 of 1969)	Free State Province Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA)	1969		<p>The Act provides for the conservation of fauna and flora and the hunting of animals causing damage and for matters incidental thereto. This includes wild animals, fish, indigenous plants, as well as nature reserves. The Act also provides for the permitting of the disturbance of such species.</p> <p>A Terrestrial Biodiversity, Plant and Animal Impact Assessment has been undertaken for the proposed power line and is included in Appendix D1 of this BAR.</p>

3.3 POLICY CONTEXT

Table 3.2: Policy context for the construction of solar PV plants and the associated grid connection infrastructure

POLICY	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The White Paper on the Energy Policy of the Republic of South Africa	Department of Mineral Resources and Energy	1998	<p>The White Paper on the Energy Policy of the Republic of South Africa establishes the international and national policy context for the energy sector, and identifies the following energy policy objectives:</p> <ul style="list-style-type: none"> • Increasing access to affordable energy services • Improving energy governance • Stimulating economic development • Managing energy-related environmental and health impacts • Securing supply through diversity • Energy policy priorities



The White Paper sets out the advantages of renewable energy and states that Government believes that renewables can in many cases provide the least cost energy service, particularly when social and environmental costs are included. The White Paper acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country's renewable energy resource base is extensive and many appropriate applications exist.

The White Paper notes that renewable energy applications have specific characteristics that need to be considered. Advantages include:

- Minimal environmental impacts in operation in comparison with traditional supply technologies; and
- Generally lower running costs, and high labour intensities.

Disadvantages include:

- Higher capital costs in some cases;
- Lower energy densities; and
- Lower levels of availability, depending on specific conditions, especially with sun and wind based systems.

The Gamma SPP and power line is in line with this policy as it proposes the generation of renewable energy from the solar resource.

The White Paper on Renewable Energy	Department of 2003 Mineral Resources and Energy	This White Paper on Renewable Energy supplements the <i>White Paper on Energy Policy</i> , which recognizes that the medium and long-term potential of renewable energy is significant. This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.
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The White Paper notes that while South Africa is well-endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels. The medium-term (10-year) target set in the White Paper is: *10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW)* (Executive Summary, ix).

The Gamma SPP is in line with this paper as it proposes the generation of renewable energy from the solar resource.

Integrated Resource Plan (IRP) for South Africa	Department of Mineral Resources and Energy	2010-2030	<p>The Integrated Resource Plan for Electricity for South Africa of 2010–2030 (further referred to as the IRP) is a “living plan” which is expected to be revised and updated continuously as necessary due to changing circumstances. According to the Summary of the plan the current IRP for South Africa, which was originally initiated by the Department of Energy (DoE) in June 2010 (the Department is now known as Department of Mineral Resources and Energy), led to the Revised Balanced Scenarios (RBS) for the period 2010–2030.</p> <p><i>“This scenario was derived based on the cost-optimal solution for new build options (considering the direct costs of new build power plants), which was then “balanced” in accordance with qualitative measures such as local job creation”. In addition to all existing and committed power plants, the RBS included 11,4 GW of renewables, which relates to the proposed Gamma SPP. In 2010 several changes were made to the IRP model. The main changes in the IRP were the disaggregation of renewable energy technologies to explicitly display solar photovoltaic (PV), concentrated solar power (CSP), and wind options”</i> (RSA, 2011a).</p> <p>The summary of the IRP further explains that traditional cost-optimal scenarios were developed based on the previously mentioned changes in the IRP. This resulted in the Policy-Adjusted IRP, which stated that:</p>
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“The installation of renewables (solar PV, CSP and wind) has been brought forward in order to accelerate a local industry;

To account for the uncertainties associated with the costs of renewables and fuels, a nuclear fleet of 9,6 GW is included in the IRP;

The emission constraint of the RBS (275 million tons of carbon dioxide per year after 2024) is maintained; and

Energy efficiency demand-side management (EEDSM) measures are maintained at the level of the RBS” (RSA, 2011a:6).

“The Policy-Adjusted IRP includes the same amount of coal and nuclear new builds as the RBS, while reflecting recent developments with respect to prices for renewables. In addition to all existing and committed power plants (including 10 GW committed coal), the plan includes 9,6 GW of nuclear; 6,3 GW of coal; 17,8 GW of renewables; and 8,9 GW of other generation sources” (RSA, 2011a:6).

The IRP highlights the commitments before the next IRP. The commitments pertaining to the purpose of the proposed project in renewable energy is:

“Solar PV programme 2012-2015: In order to facilitate the connection of the first solar PV units to the grid in 2012 a firm commitment to this capacity is necessary. Furthermore, to provide the security of investment to ramp up a sustainable local industry cluster, the first four years from 2012 to 2015 require firm commitment.”

“Solar PV 2016 to 2019: As with wind, grid upgrades might become necessary for the second round of solar PV installations from 2016 to 2019, depending on their location. To trigger the associated tasks in a timely manner, a firm commitment to these capacities is necessary in the next round of the IRP at the latest. By then, the assumed cost decreases for solar PV will be confirmed” (IRP, 2011a:17).



In conclusion the IRP recommends that an accelerated roll-out in renewable energy options should be allowed with regards to the benefits of the localization in renewable energy technologies (RSA, 2011a). It is however important to take note that since the release of the IRP in 2011 there has been a number of developments in the energy sector of South Africa. Therefore, the IRP has been updated and were open for comments until March of 2017. The new IRP of 2019 was formally published in October 2019. The draft IRP of 2018 was open for comments until the end of October 2018. For the revision scenario, analysis was conducted, and the results thereof are included in the draft IRP of 2018. The results revealed that for the period ending 2030 that: *“The committed Renewable Energy Independent Power Producers Programme, including the 27 signed projects and Eskom capacity rollout ending with the last unit of Kusile in 2022, will provide more than sufficient capacity to cover the projected demand and decommissioning of plants up to approximately 2025”; “Imposing annual build limits on renewable energy will not affect the total cumulative capacity and the energy mix for the period up to 2030”; and “the scenario without renewable energy annual build limits provides the least-cost option by 2030”* (RSA, 2018:34).

Lastly, the draft IRP of 2018 also included the scenario analysis for the period post 2030. Here it was observed that: *“Imposing annual build limits on renewable energy will restrict the cumulative renewable installed capacity and the energy mix for this period; adopting no annual build limits on renewables or imposing a more stringent strategy to reduce greenhouse gas emissions implies that no new coal power plants will be built in the future unless affordable cleaner forms of coal-to-power are available; and the scenario without renewable energy annual build limits provides the least-cost option by 2050”* (RSA, 2018:34–35).

In the final IRP of 2019 key considerations were taken into account together with required actions to be taken for the IRP of 2019 to be credible. In terms of renewable energy technologies like solar and wind, the IRP stated that *“The application of renewable build limits ‘smooths out’ the capacity allocations for wind and solar PV which provides a constant pipeline of projects to investment; this addresses investor confidence”*. The decision stated against this key consideration is to *“retain the current annual build limits*



on renewables (wind and PV) pending the finalization of a just transition plan” (RSA, 2019:46). Hereby the IRP also recognises renewable technologies’ potential to diversify the electricity mix, create new industries and job opportunities and localize across the value chain (RSA, 2019:13).

The Gamma SPP is in line with this plan as it proposes the generation of renewable energy from the solar resource and will contribute to the energy mix of the country as set out in this plan

National Development Plan of 2030	The Presidency: National Planning Commission	-	<p>The National Development Plan aims to “eliminate poverty and reduce inequality by 2030” (RSA, undated). In order to eliminate or reduce inequality, the economy of South Africa needs to grow faster in order to benefit all South Africans. In May 2010 a draft national development plan was drafted, which highlighted the nine (9) key challenges for South Africa. The highest priority areas according to the plan are considered to be the creation of employment opportunities and to improve the quality of national education. In this regard, the plan sets out three (3) priority areas, namely to raise employment by a faster growing economy, improve the quality of education, and to build the capability of the state in order to play a more developmental and transformative role. One of the key challenges identified was that the economy is unsustainably resource intensive and the acceleration and expansion of renewable energy was identified as a key intervention strategy to address this challenge.</p> <p>The development of the Gamma SPP will contribute to the intervention strategy as identified within the plan.</p>
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National Infrastructure Plan of South Africa	Presidential Infrastructure Coordinating Commission	2012	<p>In the year 2012 the South African Government adopted a National Infrastructure Plan (hereafter referred to as the Plan). The aim of this Plan is to transform the economic landscape, while strengthening the delivery of basic services and creating new employment opportunities. This Plan also supports the integration of African communities, and also sets out the challenges and enablers that our country needs in order to respond to the planning and development of infrastructure with regards to fostering economic growth (RSA, 2012). The Plan has developed eighteen (18) strategic integrated projects (further referred to as SIPs). These SIPs stretches over all nine (9) provinces, covering social and economic infrastructure, and projects that enhances development and growth. Of the eighteen (18), five (5) are geographically</p>
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focused, three (3) spatial, three (3) energy, three (3) social infrastructure, two (2) knowledge, one (1) regional integration, and one (1) water and sanitation focussed. The three (3) SIPs according to the Plan, which are energy focused and correlate to the proposed project (including the solar power plant which the power line is required to cater for) are as follow:

- SIP 8: Green energy in support of the South African economy;
- SIP 9: Electricity generation to support socio-economic development; and
- SIP 10: Electricity transmission and distribution for all.

SIP 8 according to the Plan *“support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the IRP 2010 and support bio-fuel production facilities”*. The purpose of SIP 9 according to the Plan is to *“accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances”*. SIP 9 should also monitor the implementation of major projects such as new power stations like Medupi, Kusile and Ingula. Lastly, SIP 10’s aim is to *“expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development”* (RSA, 2012:20).

The Gamma SPP is in line with this plan as it proposes the generation of renewable energy from the solar resource which supports socio-economic development and will contribute to meeting the electricity demand of the country as set out in this plan.

New Growth Path Framework	Department of Economic Development	-	The New Growth Path was developed after 16 years of South Africa’s democracy, to respond to emerging opportunities and risks while building on policies. This framework provides a dynamic vision on how to collectively achieve a more developed, equitable and democratic society and economy. This framework mainly reflects the commitment of the South African Government to create employment opportunities for its people in all economic policies (RSA, 2011b).
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This framework sets out the markers for job creation and growth and also identify where there are viable changes in the character and structure of production, in order to create a more inclusive, greener economy on the long-term. It is stated in the framework that in order for this framework to reach its objectives, the Government is committed to:

- Identify the possible areas of employment creation; and
- Develop a policy to facilitate employment creation especially with regards to social equity, sustainable employment and growth in the creation of employment activities (RSA, 2011b).

This framework also identifies investments in five key areas, one of which is energy. This framework also states that the green economy is a priority area, which includes the construction and investment of renewable energy technologies like solar (RSA, 2011b). In this regard it will also assist creating employment opportunities over the medium- and long-term.

Considering that the construction of and investment in renewable energy is a key are identified within the framework, the Gamma SPP is considered to be in-line with the framework.

Climate Change Bill	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	2018	<p>On 08 June 2018 the Minister of Environmental Affairs published the Climate Change Bill (“the Bill”) for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa’s sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The following objectives are set within the Bill:</p> <ul style="list-style-type: none">• Provide for the coordinated and integrated response to climate change and its impacts by all spheres of government in accordance with the principles of cooperative governance;• Provide for the effective management of inevitable climate change impacts through enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to building social, economic, and environmental resilience and an adequate national adaptation response in the context of the global climate change response;
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- Make a fair contribution to the global effort to stabilise greenhouse gas concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe and in a manner that enables economic, employment, social and environmental development to proceed in a sustainable manner.

Gamma SPP comprises a renewable energy generation facility and would not result in the generation or release of emissions during its operation.

Strategic Integrated Projects (SIPs)	The Presidential Infrastructure Coordinating Committee	2010 - 2030	The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have five core functions: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration. SIP 8 and 9 of the energy SIPs supports the development of the solar energy facility:
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- SIP 8: Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010 – 2030) and supports bio-fuel production facilities.
- SIP 9: Electricity generation to support socio-economic development: The proposed Springbok Solar Power Plant is a potential SIP 9 Project as electricity will be generated and social and economic upliftment, development and growth will take place within the surrounding communities. It would become a SIP 9 project if selected as a Preferred Bidder project by the Department of Energy. SIP 9 supports the acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances.

Gamma SPP could be registered as a SIP project once selected as a preferred bidder under the REIPPP Programme. The project would then contribute to the above-mentioned SIPs.



Strategic Environmental Assessment (SEA) for wind and solar PV Energy in South Africa	Department of Forestry, Fisheries and the Environment	2014	<p>The then Department of Forestry, Fisheries and the Environment (DFFE) has committed to contribute to the implementation of the National Development Plan and National Infrastructure Plan by undertaking Strategic Environmental Assessments (SEAs) to identify adaptive processes that integrate the regulatory environmental requirements for Strategic Integrated Projects (SIPs) while safeguarding the environment. The wind and solar photovoltaic (PV) SEA was accordingly commissioned by DEA in support of SIP 8, which aims to facilitate the implementation of sustainable green energy initiatives.</p> <p>This SEA identifies areas where large scale wind and solar PV energy facilities can be developed in terms of SIP 8 and in a manner that limits significant negative impacts on the environment, while yielding the highest possible socio-economic benefits to the country. These areas are referred to as Renewable Energy Development Zones (REDZs).</p> <p>The REDZs also provide priority areas for investment into the electricity grid. Currently one of the greatest challenges to renewable energy development in South Africa is the saturation of existing grid infrastructure and the difficulties in expanding the grid. Proactive investment in grid infrastructure is the likely to be the most important factor determining the success of REDZs. Although it is intended for the SEA to facilitate proactive grid investment in REDZs, such investment should not be limited to these areas. Suitable wind and solar PV development should still be promoted across the country and any proposed development must be evaluated on its own merit.</p>
North West Provincial Spatial Development Framework (PSDF)	North West Provincial Government	2012	<p>The North West PSDF is a policy document that promotes a ‘developmental state’ in accordance with national and provincial legislation and directives. It aligns with the North West Provincial Growth and Development Strategy which has committed the North West to ‘building a prosperous, sustainable and growing provincial economy which reduces poverty and improves social development’.</p> <p>The PSDF includes comprehensive plans and strategies that collectively indicate which type of land-use should be promoted in the Province, where such land-use should take place, and how it should be implemented and managed. In broad terms, the PSDF:</p>



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- Adopt a holistic approach to spatial development in order to minimise the long-term negative impacts of current land use or development decisions.
 - Ensure that spatial planning serves national, provincial and/or local interest.
 - Support the long-term adequacy or availability of physical, social and economic resources to support or carry development.
 - Protect existing natural, environmental, and cultural resources.
 - Ensure that land which is currently in agricultural use would only be reallocated to other uses where real need exists, and prime agricultural land should remain in production.
 - Support mining as a vital economic driver in the province without jeopardizing the biodiversity value of the environment.
 - Adopt a climate change strategy that will provide for responsible actions to curb the effect of global warming and climate change.

The Spatial Challenges and Opportunities provide the crucial components that underlie sustainable development, i.e., need for basic infrastructure and development for the poor, economic growth and development, environmental conservation, and improved livelihoods. These spatial development priorities form the basis for guiding specific decisions regarding the desired spatial development and arrangement of broad land uses within North West and investment and development spending.

The PSDF provides Spatial Framework and Development Strategies that will manage future growth and associated change in a way that protects and enhance the use of natural resources, biodiversity, and lifestyle values. This requires a highly sustainable pattern of development based on the efficient utilisation of land and infrastructure, supported by management decisions over ad hoc and dispersed forms of development.



The PSDF builds upon achievements and learns from mistakes of the past, reacts to the challenges of our time, incorporates the traditional knowledge of the people of the North West, and builds upon international best-practice and technology.

The development of the Gamma SPP is in-line with the framework based on the contributions and opportunities presented by a development of this nature.

Dr Ruth S. Mompoti District Municipality Draft Integrated Development Plan (IDP)	Dr Ruth S. Mompoti District Municipality	2020 - 2021	<p>The long-term vision of the Dr Ruth S Mompoti DM is: <i>“A Developmental district, where sustainable service delivery is optimised, prioritised and realised”</i>.</p> <p>The above stated vision defines what Dr Ruth S Mompoti DM would like to attain over medium to long-term, and for that achievement to effectively materialize, their mission is that: <i>“We provide efficient, effective and sustainable municipal service to the communities of the Dr Ruth Mompoti District Municipality”</i>.</p> <p>The SIPS provides an integrated framework for the delivery and implementation of social and economic infrastructure across the face of South Africa. Some of the SIPS’s include catalytic projects that can be used to fast-track growth, address unemployment and reduce poverty and inequality. Due to the various nature and geographic spatial locations, the municipality is only involved in a few of the SIPS. The municipality’s plans will be aligned with these SIPS in an effort to respond to national government’s service delivery initiatives. Furthermore, work is to be done to align key cross-cutting areas, namely human settlement planning and skills development in line with each of the Strategic Infrastructure Projects, especially:</p> <ul style="list-style-type: none">• Green Energy in support of the South African economy (SIP 8): Supporting sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010).• Electricity Generation to support socio-economic development (SIP 9): acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy; and addressing historical imbalances.
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Considering the plans for the alignment of the DM's plans with SIP 8 and SIP 9 it is confirmed that the Gamma SPP is in line with the plan.

Naledi Local Municipality **Local Municipality** **2018 - 2019** - The vision of the Naledi LM is "To provide basic, quality, sustainable and equitable services through effective and efficient governance and financial management."

Final Integrated Development Plan (IDP)

The Mission Statement is: "We will deliver adequate and sustainable services to our community by:

- Enhancing revenue and effective utilisation of resources
- Promoting radical socio economic and infrastructure development
- Instil corporate culture
- To have motivated and representative workforce with high ethical standards
- To apply good and transparent municipal governance (King iii)
- To render cost effective and sustainable services to all VTSD areas
- Adhering to Batho Pele Principles"

The vision and mission of the municipality have led to the conceptualisation of the following strategic objectives:

- To Promote Sound Financial Management and revenue enhancement
- To Promote transparency through good governance
- To Foster Good Relationships with stakeholders through effective Public Participation
- To Foster Good Corporate Culture
- To Accelerate the Provision of Basic Services
- To create an Environment conducive for Local Economic Development

The development of the Gamma SPP will contribute to the local economy of the area and therefore assist (albeit to a limited extent) to socio-economic growth.

Naledi Local Municipality **Local Municipality** **2018** - The Spatial Development Framework is an indicative plan showing the desired patterns of land use, direction of growth, special development areas and conservation-worthy areas. The SDF needs to be **Spatial**



Development Framework

informed by the vision of the municipal area, the development objectives, as well as the strategies and outputs identified by the IDP.

It is important that the SDF of Naledi Local Municipality is in line with the National Spatial Development Perspective, the Provincial Spatial Development Framework, and the District Spatial Development Framework in order to fully effect the aspirations of Spatial Planning within the Republic.

The normative principles put forward in the National Spatial Development Plan (2006) forms the bases on which spatial proposals are formalised. It also recognised that rapid economic growth that is sustained and inclusive, is a prerequisite for the achievement of other policy objectives, among which poverty alleviation is key. Yet, government has a constitutional obligation to provide basic services to all citizens wherever they reside. It is therefore imperative that government spending on fixed investment should be focussed on localities of economic growth and/or economic activities in order to create sustainable employment opportunities.

Social inequalities should be addressed by focusing on 'people' and not 'places'. In areas where there are both high levels of poverty and demonstrated economic potential, this could include fixed capital investment beyond basic services to exploit the potential of those localities (such as Vryburg and Stella). In localities with low demonstrated economic potential, government should, beyond the provision of basic services, concentrate primarily on human capital development by providing education, training and social transfers to relief poverty.

The restructuring of regional spatial distortions needs a clear set of policy directives in order to direct people to migrate towards areas with higher level of services and opportunities. Future settlement and economic development opportunities should therefore be channelled into activity corridors and nodes. Naledi Local Municipality should further capitalize on its locality on the Western frontier SDI as well as its importance as a 1st order centre for Dr Ruth S. Mompati District Municipality, according to the PSDF.

The development of the Impala Solar Power Plant will contribute to the local economy of the area and therefore assist (albeit to a limited extent) to socio-economic growth and the alleviation of poverty.



3.4 OTHER LEGISLATION

Other legislation mainly refers to the following:

- Planning legislation governing the rezoning process and approval of the layout plan.
- Design standards and legislation for services provision such as water, sewerage, electricity, etc.
- Municipal bylaws related to building plans, building regulations, etc.

3.5 RELEVANT GUIDANCE

The following guidance was considered in conducting the EIA:

- The Equator principles III (2013)²
- World Bank Group Environmental, Health and Safety General Guidelines (EHS Guidelines) (2007)
- Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007)
- International Finance Corporation's Policy on Environmental and Social Sustainability (2012)
- DEA. (2013). Draft National Renewable Energy Guideline. Department of Environmental Affairs, Pretoria, South Africa
- DEA, (2012), Guideline 5 – Final companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010
- DEA, (2012), Guideline 7 – Public participation in the Environmental Impact Assessment process
- DEA, (2012), Guideline 9 – Need and desirability
- DEAT, (2006), Guideline 3 – General guide to the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 4 – Public participation in support of the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 5 – Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations
- BirdLife, (2017). Best Practise Guidelines Birds & Solar Energy: Guidelines for assessing and monitoring the impact of solar power generating facilities on bird in southern Africa.

3.6 CONCLUSION

The Basic Assessment was undertaken in accordance with the EIA Regulations (2017) published in GNR 326, in terms of Section 24(5) and 44 of the NEMA as amended as well as all

² Although this report is not written in terms of the Equator Principles (EPs), it fully acknowledges that the EPs will need to be complied with should funding for the project be required.



relevant National legislation, policy documents, national guidelines, the World Bank EHS Guidelines, the IFC Performance Standards, and the Equator Principles.

The legislative and policy context plays an important role in identifying and assessing the potential social impacts associated with the proposed development. For this reason, the proposed development project will be assessed in terms of its fit with the key legislative, policy and planning documents discussed above.

The main findings of the review of the policy documents on all spheres of Government indicated that strong support was given towards renewable energy (and the associated infrastructure required for the operation of such developments), specifically PV solar energy and therefore it is concluded that there is support for the development of the power line proposed to cater for the Gamma SPP. The White Paper on the Energy Policy of the Republic of South Africa of 1998 stated that due to the fact that renewable energy resources operate from an unlimited resource base, i.e., the sun, renewable energy can increasingly contribute towards a long-term sustainable energy supply for future generations. This policy further highlights that due to the unlimited resources base of renewable energy in South Africa, renewable energy applications, like PV solar energy and associated infrastructure, are more sustainable in terms of social and environmental costs. The Integrated Resource Planning for Electricity for South Africa of 2010–2030, the National Infrastructure Plan of South Africa and the New Growth Path Framework all support the development of the renewable energy sector. In particular, the IRP also indicated that 43% of the energy generation in South Africa is allocated to renewable energy applications. On a District and Local level limited attention is given explicitly to renewable sources like PV solar energy, however the documents reviewed do make provision for increase energy supply and efficiency in improving the quality of lives in terms of efficient physical infrastructure as well as socio-economic growth. At Provincial, District and Local level the policy documents support the applications of renewables.

The review of the relevant policies and documents related to the energy sector therefore indicate that renewables, like solar energy and the establishment of solar energy facilities and associated infrastructure, including grid connection, are supported on all spheres of Government. The proposed power line for the Gamma SPP is therefore supported by the related policy and planning documents reviewed in this section of the report.



4 THE NEED AND DESIRABILITY

This section aims to address the following requirements of the regulations:

Appendix 1. (3) A BAR (...) must include-

(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;

4.1 THE NEED FOR THE PROPOSED ACTIVITY

The power line forms part of the required electrical infrastructure of the authorised Gamma SPP, and the proposed activity is a direct result of the growing demand for electricity and the need for renewable energy in South Africa. According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fuelled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmentally responsible development, the impacts of climate change and the need for sustainable development.

Over 90% of South Africa's electricity generation is coal based, the World bank estimates that these results in an annual, per capita carbon emission of ~8.9 tons per person. Based on 2008 fossil-fuel CO₂ emissions statistics released by the Carbon Dioxide Information Analysis Centre, South Africa is the 13th largest carbon dioxide emitting country in the world and the largest emitter in Africa (Boden, et al. 2011).

The primary rationale for the authorised SPP is to add new generation capacity from renewable energy to the national electricity mix and to aid in achieving the goal of 42% share of all new installed generating capacity being derived from renewable energy forms, as targeted by the Department of Mineral Resources and Energy (DMRE) (Integrated Resource Plan 2010-2030). The establishment of the photovoltaic solar facility will significantly contribute to achieving this objective and will also address some of the objectives identified by the Naledi Local Municipality's Integrated Development Plan such as creating an environment that is conducive for local economic development (IDP, 2018-2019).

The benefit of constructing the power line and thereby connecting the authorised Gamma SPP to the electricity grid outweighs any negative aspects relating to the construction and associated loss of land. The proposed project will facilitate the connection of the facility to the national grid thereby facilitating the transmission of renewable energy and upliftment of the local community through social economic development initiatives. This will have a positive impact at a local, regional and national level. Without the development of the proposed power line the operation of the Gamma SPP will not be possible.



4.2 THE DESIRABILITY OF THE PROPOSED ACTIVITY

The facility's contribution towards sustainable development and the associated benefits to society in general is discussed below. The desirability of the proposed power line is directly linked with the desirability of the Solar Power Plant that it will cater for.

- Lesser dependence on fossil fuel generated power - The deployment of the facility, and the required grid connection infrastructure, will have a positive macro-economic impact by reducing South Africa's dependence on fossil fuel generated power and assisting the country in meeting its growing electricity demand.
- Increased surety of supply - By diversifying the sources of power in the country, the surety of supply will increase. The power demands of South Africa are ever increasing and by adding solar power this demand can be met, even exceeded without increasing pollution in relation to the use of fossil fuels. The project has the potential of "securing" economic activity by assisting in removing supply constraints if Eskom generation activities result in a supply shortfall. When supply is constrained, it represents a limitation to economic growth. When a supply reserve is available, it represents an opportunity for economic growth.
- Local economic growth - The proposed project will contribute to local economic growth by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the North West Province. The project will likely encounter widespread support from government, civil society and businesses, all of whom see potential opportunities for revenues, employment and business opportunities locally. The development of the photovoltaic solar facility will in turn lead to growth in tax revenues for local municipalities and sales of carbon credits, resulting in increased foreign direct investment.
- Lower costs of alternative energy - An increase in the number of solar facilities commissioned will eventually reduce the cost of the power generated through solar facilities. This will contribute to the country's objective of utilising more renewable energy and less fossil fuel-based power sources. It will assist in achieving the goal to generate 14 725 MW of electricity from renewable energy as per the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme of the Department of Mineral Resources and Energy. The Government will soon be initiating the procurement of an additional 11 800 MW of renewable energy as stated during the 2021 State of the Nation Address.
- Reduction in greenhouse gas emissions - The additional power supplied through solar energy, proposed to be evacuated to the national grid via the proposed power line, will reduce the reliance on the combustion of fossil fuels to produce power. The South African electricity grid is predominantly coal-fired and therefore GHG emissions intensive (coal accounts for more than 92% of the fuel used in South Africa's electricity generation). The reduction of GHG emissions as a result of the project implementation will be achieved due to a reduction of CO₂ emissions from combustion of fossil fuel at the existing grid-connected power plants and plants which would likely be built in the absence of the project activity.



- CDM Project - A solar energy facility also qualifies as a Clean Development Mechanism (CDM) project (i.e., a financial mechanism developed to encourage the development of renewable technologies).
- Climate change mitigation - On a global scale, the project makes a contribution to greenhouse gas emission reduction and therefore contributes toward climate change mitigation.
- Reduced environmental impacts - The reduction in electricity consumed from the grid will not only result in a reduction in greenhouse gas emissions, but also the prevention of negative impacts associated with coal mining. For example, coal power requires high volumes of water, in areas of South Africa where water supply is already over-stretched and water availability is highly variable. Photovoltaic solar energy technology also does not produce the sulphur emissions, ash or coal mining concerns associated with conventional coal fired electricity generation technologies resulting in a relatively low level of environmental impacts. It is a clean technology which contributes toward a better-quality environment for employees and nearby communities.
- Social benefits - The project activity is likely to have significant long-term, indirect positive social impacts that may extend to a regional and even national scale. The larger scale impacts are to be derived in the utilisation of solar power and the experience gained through the construction and operation of the power plant (including the grid connection infrastructure). In future, this experience can be employed at other similar solar installations in South Africa.
- Provision of job opportunities - The main benefit of the proposed development operating in the area is that local companies or contractors will be hired for the duration of the construction period. The operational phase will provide permanent job opportunities to the local communities from the surrounding area since security guards and general labourers will be required on a full-time basis. Approximately 800 employment opportunities will be created during the construction phase and 55 during the operational phase - this number is the total number of opportunities for both the authorised Gamma SPP and the proposed power line.
- Indirect socio-economic benefits - The increase in the demand for services such as accommodation, transportation, security, general maintenance and catering will generate additional indirect socio-economic benefits for the local community members.
- Effective use of resources - The proposed development in this specific area will generate alternative land use income through rental for the energy, which will have a positive impact on agriculture. It will provide the farming enterprise with increased cash flow and rural livelihood, and thereby improve the financial sustainability of agricultural activities.
- Preferred location - The proposed grid connection corridor is considered to be the most feasible option for the location of this infrastructure, taking technical and



environmental issues into consideration. The proposed power line is approximately 4,5km long, and the proposed route of the power line is the shortest route from the on-site substation to the existing Mookodi-Magopela 132kV power line and is the preferred alternative for the developer.

- Cumulative impacts of low to medium significance – No cumulative impacts with a high residual risk have been identified. In terms of the desirability of the development of sources of renewable energy therefore, it may be preferable to incur a higher cumulative loss in such a region as this one, than to lose land with a higher environmental value elsewhere in the country.



5 DESCRIPTION OF ENVIRONMENTAL ISSUES

This section aims to address the following requirements of the regulations:

Appendix 1. (3) A BAR (...) must include-

- (g) A motivation for the preferred site, activity and technology alternative;
- (h) a full description of the process followed to reach the proposed preferred alternative, within the site, including –
 - (i) details of all the alternatives considered;
 - (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;
 - (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;
 - (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
 - (v) the impacts and risks identified for each alternative, including the nature significance, consequence, extent, duration and probability of the impacts including the degree to which these impacts –
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources; and
 - (cc) can be avoided, managed or mitigated;
 - (viii) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;
 - (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.
 - (vii) the possible mitigation measures that could be applied and level of residual risk;
 - (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 alternative development location within the approved site.

5.1 CONSIDERATION OF ALTERNATIVES

The DEAT 2006 guidelines on ‘assessment of alternatives and impacts’ proposes the consideration of four types of alternatives namely, the no-go, location, activity, and design



alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer and EAP, which in some instances culminates in a single preferred project proposal.

The grid connection corridor proposed for the development is considered to be the preferred alternative for development based on the location of the connection point into the national grid in relation to the authorised SPP, the need to identify the shortest and most feasible route for the connection and the need to consider the current environment and how disturbance within the landscape can be consolidated within an area (i.e. along an existing linear disturbance such as a road etc.) than rather being distributed throughout. The developer also considers the grid connection corridor as being preferred from a technical perspective.

The following sections explore different types of alternatives in relation to the proposed power line in more detail.

5.1.1 No-go alternative

This alternative considers the option of 'do nothing' and maintaining the status quo. The description provided in section 5.3 of this report could be considered the baseline conditions (status quo) to persist should the no-go alternative be preferred. The grid connection corridor and the surrounding areas is currently zoned for agricultural land uses. Should the proposed activity not proceed, the corridor will remain unchanged and will continue to be used for grazing for cattle and game etc. (refer to the photographs of the site). The purpose of the proposed 132kV power line is to connect the authorised Gamma SPP with the National Grid. If the status quo is maintained, the potential opportunity costs in terms of the successful operation of the SPP would be lost, since it will not be able to operate without the power line, which in turn will result in job losses and loss of economic growth in the area.

5.1.2 Location alternatives

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the power line. Only one route alternative is being considered, since this is considered as the most feasible and shortest route to connect the SPP to the National Grid. The proposed power line is approximately 4,5km long, and the proposed route of the power line is the shortest route from the authorised on-site substation to the National Grid. This option also ensures that the corridor does not cut through the centre of any farming properties but rather follows property borders.

5.1.3 Design and layout alternatives

The choice of pylon structure to be used for the power line will be determined in consultation with Eskom and does not significantly affect the environmental impacts of the proposed development as provision has already been made for the visual, avifauna, ecological and heritage impacts of erecting a power line. No defined structure has been confirmed at this stage and will depend on Eskom's technical requirements. The proposed 132kV line must be constructed according to the authorised standards for a power line approved by Eskom



Holdings SoC Ltd. The structure to be utilised for the power line towers will also be informed by the local geotechnical and topographical conditions. The following alternatives are considered with regards to the proposed structures:

Steel lattice towers:

The steel lattice towers provide the following advantages over the other tower types available:

- Enables multipath earthing which enhances the overall electrical performance of the power line.
- Is visually less obtrusive than the mono-pole options.
- Is more practicable than other options i.e. more cost effective and more practical to construct and maintain.
- Is safer to work on than the monopole and wood pole structures.
- Is more durable than the wood pole structures.

Steel monopoles:

The steel monopole is considered less suitable than the steel lattice towers for the following reasons:

- Is visually more intrusive than the lattice towers.
- Is more expensive than the lattice towers.
- Requires more steel than the lattice towers.
- Is more difficult to erect.
- Is not as safe to work on as the lattice towers.

Wood poles:

Wood pole structures are only used in extreme circumstances where a visual impact needs to be avoided. Wood pole structures may be cheaper to produce and to construct, but they have one tenth of the lifespan of the metal counterparts and are far more susceptible to weather conditions which makes them less efficient and practicable. The wood pole structure is also more susceptible to having the cross arms burnt off by electrical faults as well as being susceptible to deformation with height.

5.1.4 Technology alternatives

The power line will be constructed within the identified grid connection corridor towards the existing Canal Substation. The 132kV overhead power line is the only preferred alternative for the evacuation of the generated electricity due to the following reasons:

Overhead Transmission Lines - Overhead lines are less costly to construct than underground lines. Therefore, the preference with overhead lines is mainly on the grounds of cost. Overhead lines allow high voltage operations and the surrounding air provides the necessary



electrical insulation to earth. Further, the surrounding air cools the conductors that produce heat due to lost energy (Swingler et al, 2006).

The overall weather conditions in the North West Province is less likely to cause damage and faults on the proposed overhead transmission power line. Nonetheless, if a fault occurs, it can be found quickly by visual means using a manual line patrol. Repair to overhead lines is relatively simple in most cases and the line can usually be put back into service within a few days. In terms of potential impacts caused by overhead transmission lines include visual intrusion and threats to sensitive habitat (where applicable).

The choice of structure to be used for the power line will be determined in consultation with Eskom once the Engineers have assessed the geotechnical and topographical conditions and decided on a suitable structure which meets the prescribed technical requirements. The choice of structures to be used will not have any adverse impacts on the environment. The line will be constructed according to the authorised standards for a power line approved by Eskom Holdings SoC Ltd.

Underground Transmission Lines - Underground cables have generally been used where it is impossible to use overhead lines for example because of space constraints. Underground cabling of high voltage power lines over long distances is not considered a feasible or environmentally practicable alternative for the following reasons:

- Underground cabling will incur significantly higher installation and maintenance costs.
- It is more difficult and takes longer to isolate and repair faults on underground cables.
- There is increased potential for faulting at the transition point from underground cable to overhead power line.
- Underground cables require a larger area to be disturbed during construction and maintenance operations and hence have a bigger environmental disturbance footprint.
- Underground cabling requires the disturbance of a greater area when it comes to agriculture and other compatible land uses as the entire servitude becomes available for use as opposed to just the area around the towers.

The use of an underground power line is not feasible for the proposed project due to the length of the line, which is ~8km long.

The following alternatives may be considered for the overhead power line:

Single Circuit Overhead Power Line

The use of single circuit overhead power lines to distribute electricity is considered the most appropriate technology and has been designed over many years for the existing environmental conditions and terrain as specified by Eskom Specifications and best international practice. Based on all current technologies available, single circuit overhead power lines are considered the most environmentally practicable technology available for the distribution of power. This option is considered appropriate for the following reasons:



- More cost-effective installation costs
- Less environmental damage during installation
- More effective and cheaper maintenance costs over the lifetime of the power line.

The use of a single-circuit power line is preferred for the proposed project as it will meet the requirements to evacuate the generated solar electricity from the Gamma SPP to the national grid.

Double Circuit Overhead Power Line

Where sensitive environmental features are identified, and there is sufficient justification, Eskom will consider the use of double circuit (placing 2 power lines on either side of the same tower structure) to minimize impacts. However, the use of double-circuiting has a number of technical disadvantages:

- Faults or problems on one power line may mean that the other power line is also disabled during maintenance, and this will affect the quality of supply to an area. Larger and taller towers as well as more towers are required for double-circuit power lines.

The double-circuit overhead power line proves more feasible since the single circuit may not have the capacity to transmit the large amount of electricity generated from the plant and during maintenance the entire plant would not have to be off-line as one of the double circuit lines would still be able to supply electricity.

The use of a double-circuit power line is not currently being considered for the development by the developer.

5.2 PUBLIC PARTICIPATION PROCESS

The following sections provide detailed information on the public participation process conducted in terms of Regulations 39 to 44.

5.2.1 General

The public participation process was conducted strictly in accordance with Regulations 39 to 44. The following three categories of variables were taken into account when deciding the required level of public participation:

- The scale of anticipated impacts
- The sensitivity of the affected environment and the degree of controversy of the project
- The characteristics of the potentially affected parties

Since the scale of anticipated impacts is low, the low environmental sensitivity of the site and the fact that no conflict was foreseen between potentially affected parties, no additional



public participation mechanisms were considered at this stage of the process. The following actions have already been taken:

➤ Newspaper advertisement

Since the proposed development is unlikely to result in any impacts that extend beyond the municipal area where it is located, it was deemed sufficient to advertise in a local newspaper. An advertisement was placed in English in the local newspaper (Stellalander) on the 11 August 2021 (see Appendix C1) notifying the public of the BA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Environamics Environmental Consultants. I&APs were given the opportunity to raise comments within 30 days of the advertisement.

➤ Site notices

Site notices were placed on site in English on 5-6 August 2021 to inform surrounding communities and immediately adjacent landowners of the proposed development. I&APs were given the opportunity to raise comments by 6 September 2021. Photographic evidence of the site notices is included in Appendix C2.

➤ Hard and/or soft copies of report

Hard or soft copies of the report will be made available upon request (as relevant). Hard copies will be made available for review to any interested and affected party who may not have access to the Internet or email communication. The availability of the report was made known to all registered I&APs through email and other forms of communication such as WhatsApp and SMS. All hard copies of the report will be sanitized prior to it being posted or couriered, where relevant.

➤ Direct notification of identified I&APs

Identified and registered I&APs, including key stakeholders representing various sectors, have been directly informed of the proposed power line via registered post, telephone calls, WhatsApp and emails (as relevant). Registered I&APs have been notified of the availability of the draft BAR. I&APs have been requested to submit comments on the draft report within 30 days. For a complete list of I&APs see Appendix C3 to this report. All letters will be sanitized prior to it being posted, where relevant.

➤ Direct notification of affected and surrounding landowners and occupiers:

Written notices have been provided via registered post, WhatsApp or email (as relevant) to all affected and surrounding landowners and occupiers. The landowners were given the opportunity to raise comments within 30 days. All letters have been sanitized prior to it being posted (as relevant). For a list of affected and surrounding landowners see Appendix C3.

➤ Circulation of Draft Basic Assessment Report



As mentioned above, copies of the draft Basic Assessment report have been provided to all I&APs via registered post, couriers, Dropbox and/or email (as relevant). They have been requested to provide their comments on the report within 30 days. All issues identified will be documented and compiled into a Comments and Responses Report to be included as part of the Final Basic Assessment Report. Hard copies of the report will be sanitized prior to it being posted or couriered (as relevant).

➤ Circulation of decision and submission of appeals:

Notice will be given to all identified and registered I&APs of the decision taken by the DFFE. The attention of all registered I&APs will also be drawn to the fact that an appeal may be lodged against the decision in terms of the National Appeals Regulations. In accordance with the provisions of Regulation 4(1) of Government Notice No. 993, an appellant must submit the appeal to the appeal administrator, and a copy of the appeal to the applicant, any registered I&APs and any organ of state with interest in the matter within 20 days from the date that the notification of the decision was sent to the applicant by the competent authority.

5.2.2 Consultation process

Regulation 41 requires that the affected landowners, surrounding landowners, municipality, relevant ward councillor, any organ of state having jurisdiction in respect of any aspect of the activity and any other party as required by the competent authority should be given written notice of the activity. A complete list of all the consultees who received written notice as well as proof of correspondence is attached as Appendix C.

5.2.3 Registered I&APs

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

5.2.4 Issues raised by I&APs and consultation bodies

To date no comments have been received from consultation bodies. Any comments received during the circulation of the draft BAR will be summarised in the final BAR. The full wording and original correspondence will be included in Appendix C5.

5.3 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PREFERRED ALTERNATIVE

The following sections provide general information on the biophysical and socio-economic attributed associated with the preferred alternative.



5.3.1 Biophysical environment

The biophysical environment is described with specific reference to geology, soils, agricultural potential, vegetation and landscape features, climate, biodiversity and the visual landscape. A number of specialists were consulted to assist with the compilation of this chapter of the report – refer to the table 1.2.

The most notable features identified within the grid connection corridor is a wetland and a river crossing.

5.3.1.1 Geology, Soils, Land Use and Topography

The topography is characterised by slightly undulating plains. The proposed development land is used for livestock / game farming at present.

Geology is directly related to soil types and plant communities that may occur in a specific area (Van Rooyen & Theron, 1996). A Land type unit is a unique combination of soil pattern, terrain and macroclimate, the classification of which is used to determine the potential agricultural value of soils in an area. The land type unit represented within the study area include the Ag10 land type. The soils are characterised by Red-yellow apedal, freely drained soils, red, high base status, < 300 mm deep. The geology is andesitic to basaltic lava of the Ventersdorp Supergroup, sometimes overlain by calcrete. Quartzite (Vryburg Formation) and Dwyka tillite occur in places.

Most properties situated within a 500m radius of the power line corridor are being used for livestock and game farming. The corridor is used for livestock and game farming. The natural vegetation of the site is mostly intact.

5.3.1.2 Biodiversity and Vegetation

Critical Biodiversity and Ecological Support Areas

Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic.

The primary purpose of a map of Critical Biodiversity Areas and Ecological Support Areas is to guide decision-making about where best to locate development. It should inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. It is the biodiversity sector's input into multi-sectoral planning and decision-making processes (SANBI Biodiversity Advisor, 2017). The project area falls into ESA1 (Schaller & Desmet, 2015; North West Province of Rural, Environment and Agriculture Department, 2015). See Figure 5.1 below.

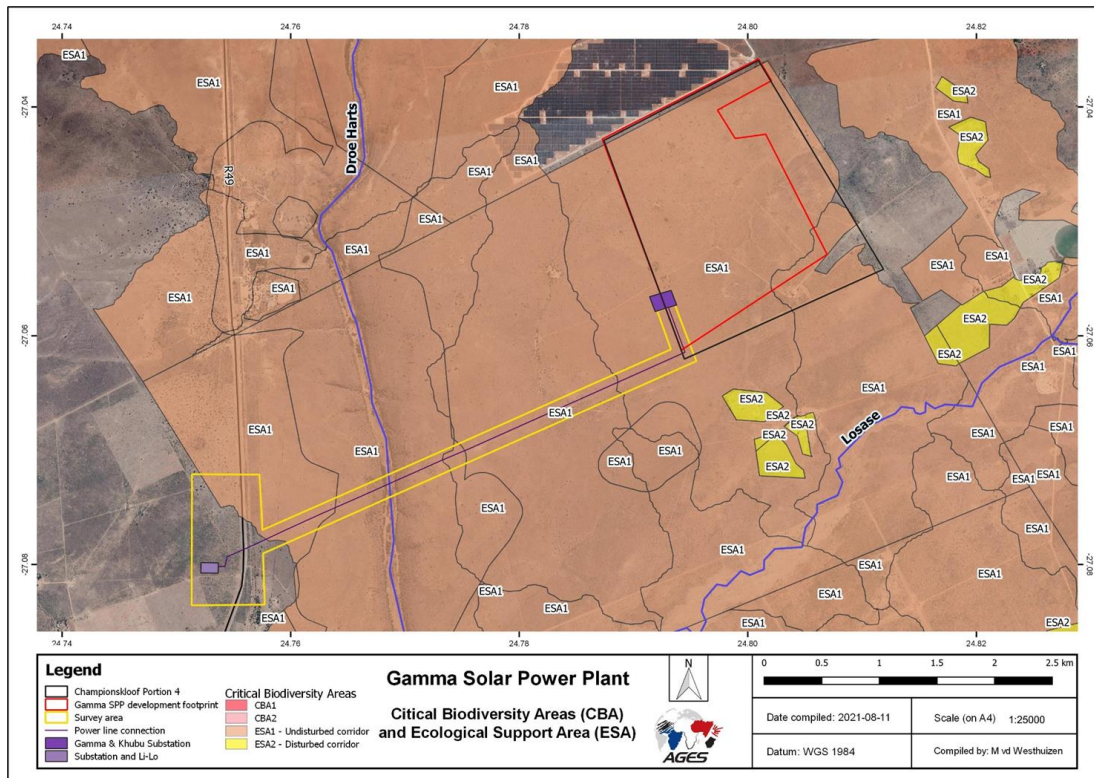


Figure 5.1: CBAs relevant to the grid connection corridor

Protected Areas (PA) and National Protected Area Expansion Strategy (NPAES)

Officially protected areas, either Provincially or Nationally that occur close to a project site could have consequences as far as impacts on these areas are concerned.

The National Protected Area Expansion Strategy (NPAES) sets targets for protected area expansion, provides maps of the most important areas for protected area expansion, and makes recommendations on mechanisms for protected area expansion. The project area does not fall into a National Protected Area Expansion Strategy (NPAES) area, but it is located 26 km east of the Molopo NPAES (Government of South Africa, 2008).

Nationally Threatened Ecosystems

The Biodiversity Act (Act 10 of 2004) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily to preserve witness sites of exceptionally high conservation value.

The current (first) phase of listing deals with threatened ecosystems in the terrestrial environment. The ecosystems listed in the current phase make up 9.5% of the country, with critically endangered and endangered ecosystems together accounting for 2.7% and vulnerable ecosystems a further 6.8%.

The mapping of terrestrial ecosystems was based on the South African vegetation map, national forest types recognized by DWAF, priority areas identified in a provincial systematic



biodiversity plan, or high irreplaceability forest patches or clusters systematic identified by DWAF (SANBI, 2011).

The project area is not located in a threatened ecosystem, it is however located 16 km north-east of the Vulnerable Mafikeng Bushveld, and 21 km west of the Vulnerable Schweizer-Reneke Bushveld (SANBI, 2011) Refer to the figure 5.2 below.

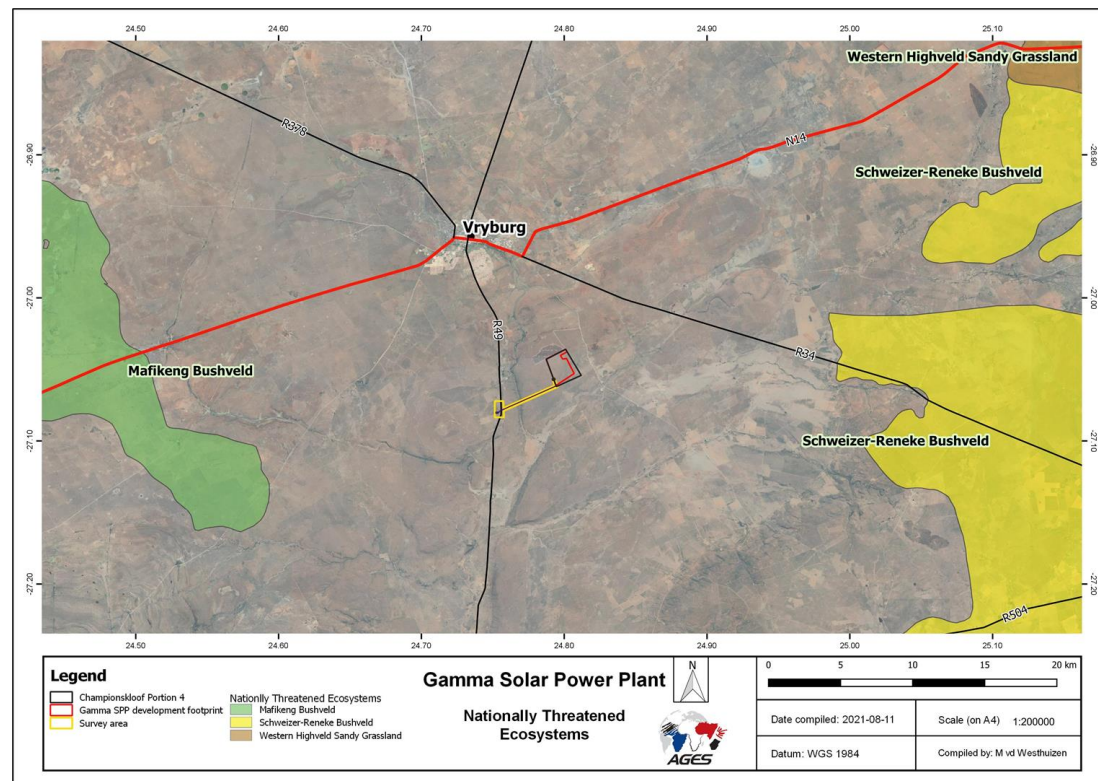


Figure 5.2: Project proximity to threatened ecosystems.

Vegetation

South Africa has been recognized as having remarkable plant diversity with high levels of endemism. South Africa hosts a wide range of ecosystems, including nine biomes, namely the Fynbos, Succulent Karoo, Desert, Nama-Karoo, Grassland, Savanna, Albany Thicket, Indian Ocean Coastal Belt and Forest Biomes (Mucina & Rutherford, 2006). The project area is situated in the Savanna biome (Mucina & Rutherford, 2006), which is characterised by a grassy ground layer and a distinct tree layer. The Savanna biome is an important biome throughout Africa and is also found in other continents including South-America, Australia and India (Mucina & Rutherford, 2006).

The three environmental factors playing the most important role in the vegetation composition are (1) low precipitation, which prevent the upper layer from dominating, (2) fires and (3) grazing, which keeps the grass layer dominant (Low & Rebelo, 1996). The Savanna biome is mostly used for grazing, but where the soil is deeper, crop production and the cultivation of subtropical fruit is practiced.

The project area is located in the Ghaap Plateau Vaalbosveld vegetation unt. Mucina and Rutherford (2006) describes the Ghaap Plateau Vaalbosveld as a flat plateau with a well-



developed shrub layer consisting mostly of *Tarchonanthus camphoratus* and *Vachellia karroo*. The open tree layer has *Olea europaea* subsp. *cuspidata*, *Vachellia tortilis*, *Ziziphus mucronata* and *Searsia lancea*. *Olea europaea* subsp. *cuspidata* is more important in the southern parts of the unit, while *Vachellia tortilis*, *Vachellia hebeclada* and *Senegalia mellifera* are more important in the north and part of the west of the unit. Much of the south-central part of this unit has a remarkably low cover of *Acacia* (*Vachellia* and *Senegalia*) species for an arid savanna and is dominated by the non-thorny *Tarchonanthus camphoratus*, *Searsia lancea*, and *Olea europaea* subsp. *cuspidata* (Mucina and Rutherford, 2006).

The **conservation status** of the Ghaap Plateau Vaalbosveld vegetation unit is **Least Concern** according to the newest Vegetation Map classification (**SANBI, 2018**).

A vegetation survey was completed in the project area. Seven different vegetation units were identified (Figure 4 below), namely:

- *Tarchonanthus camphoratus*– *Eragrostis rigidior* grassland – Variation A
- *Tarchonanthus camphoratus*– *Eragrostis rigidior* encroached grassland – Variation B
- *Tarchonanthus camphoratus*– *Eragrostis rigidior* encroached grassland – Variation C
- *Olea europaea* subsp. *cuspidata*– *Heteropogon contortus* grassland on slope
- *Searsia lancea* – *Setaria sphacelata* var. *sericea* riparian vegetation
- *Searsia lancea* – *Eragrostis rigidior* pan

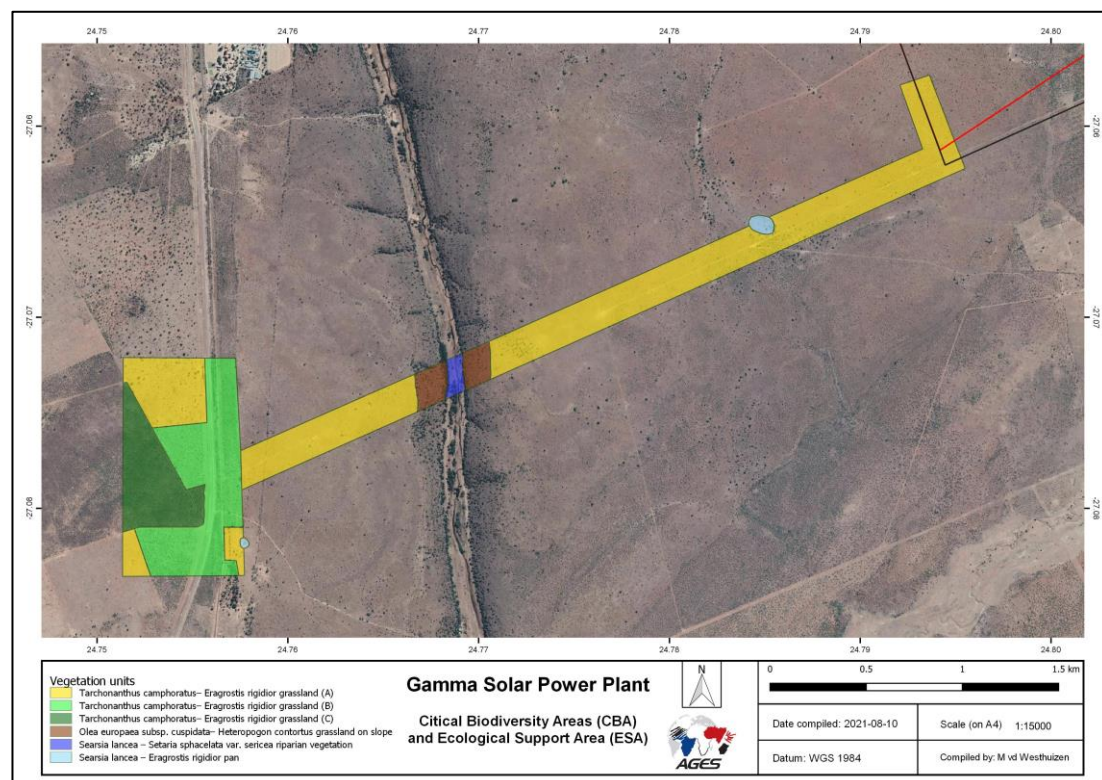


Figure 5.3: Project proximity to threatened ecosystems.



Plant Species

No nationally protected plants (NEMBA listed species, 2005) were recorded on site.

Only one plant that is protected according to North West Biodiversity Management Act No. 4 of 2016 was recorded at the project area, namely *Cheilanthes dolomiticola*. Care should be taken not to disturb this species.

Four endemic species were recorded, namely: *Ehretia rigida*, *Searsia tridactyla*, *Cheilanthes dolomiticola* and *Hermbstaedtia odorata*.

The protected trees *Vachellia erioloba* (Camel Thorn) and *Boscia albitrunca* (Shepherd's Tree) were recorded in the area where the proposed power line connection will be constructed.



Figure 5.4: The protected trees *Vachellia erioloba* (Camel Thorn) and *Boscia albitrunca* (Shepherd's Tree).

Fauna Species

Fauna species of conservation concern are listed if their distribution overlaps with the project area. An indication is given whether suitable habitat is present at the project area and what the probability is of it occurring on site.

Three Near Threatened fauna species may be present (medium probability) at the project area, based on their distribution and habitat requirements, namely the Leopard (*Panthera pardus*), the European Roller (*Coracias garrulus*) and the Giant Bullfrog (*Pyxicephalus adspersus*).

The Leopard has a wide habitat tolerance, including woodland, grassland savannah and mountain habitats but also occur widely in coastal scrub, shrubland and semi-desert. Densely wooded and rocky areas are preferred as choice habitat types (Child *et al.*, 2015)

European Rollers are hole-nesters, making use of natural cavities or abandoned excavated burrows of other species (e.g., Green Woodpecker *Picus viridis*) (Taylor *et al.*, 2015).

The Giant Bullfrog (*Pyxicephalus adspersus*) is known to breed in seasonal shallow grassy pans, vleis and other rain filled depressions in open flat areas of grassland or savanna (Du Preez and Carruthers, 2009).



These habitats units are present in the project area and all three of these species has a medium probability to be present. If these species area present, it is not foreseen that they will be seriously affected by the power line.

5.3.1.3 Surface Water Features

According to the Wetland Assessment (Appendix D2) Two wetland were identified:

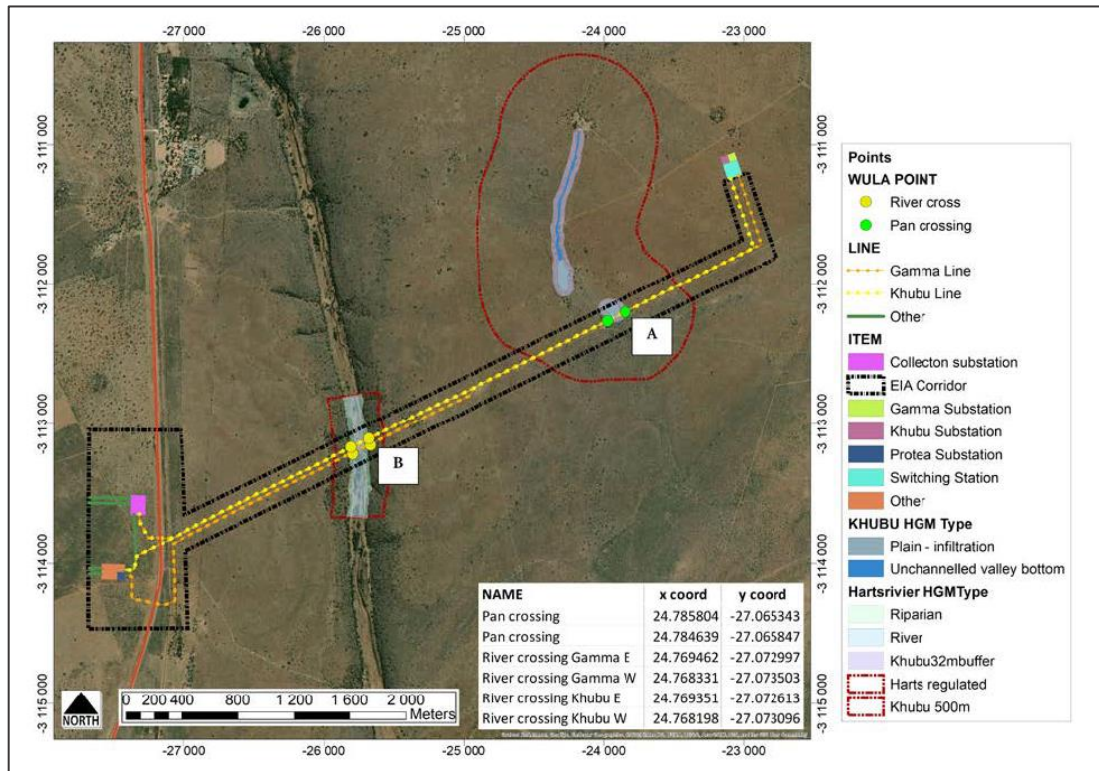


Figure 5.5: Delineated wetland: buffer and regulated areas

- (A) A wetland along the transmission line on Portion 5 of the farm Champions Kloof No. 731. The start is at 27.06531755° S, 24.78577680° E and the end at 27.06582975° S, 24.78461559° E.

Oakleaf, Rensburg and Sepane soils were identified in the depression on Portion 5. These are deep reddish and pale brown sands. Patches occur where clay accumulated that remains wet during the rainy season and was delineated as wetlands. The depression is directly in the path of the line and should be considered when placing the transmission line towers.

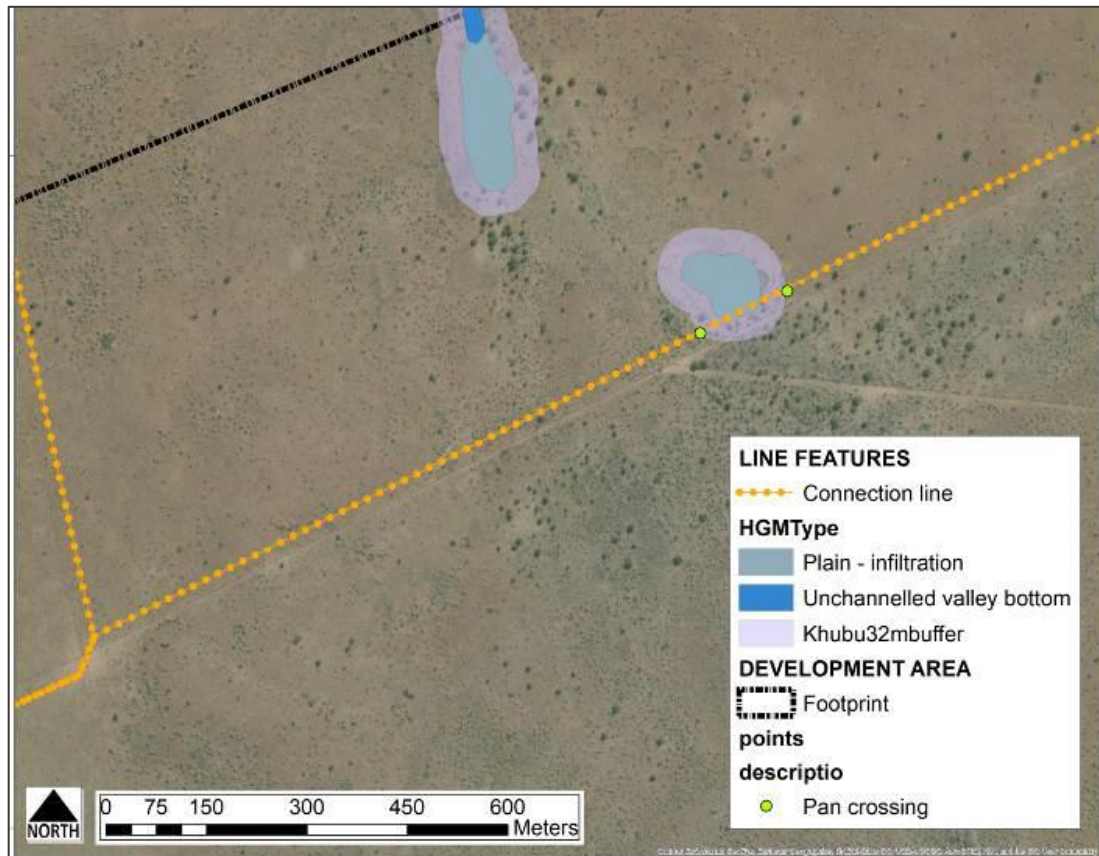


Figure 5.6: Pan at position A.

- (B) The Harts River is crossed on Portion 2. The line enters the riparian zone at 27.07301492° S, 24.76933934° E and exits the zone at 27.07355598° S, 24.76806732° E.

Glenrosa, Mispah and rocky outcrops occur along the banks of the Harts River. All the soils above the riparian zone are shallow with no properties that would suggest wet or waterlogged conditions. The riparian zone is delineated and is protected by NEMA and the Section 1 of the Water Act. This is also the ecological buffer proposed in terms of Section 21 of the Water Act.

The present ecological state of the depression and of the Harts River crossing is moderately modified.

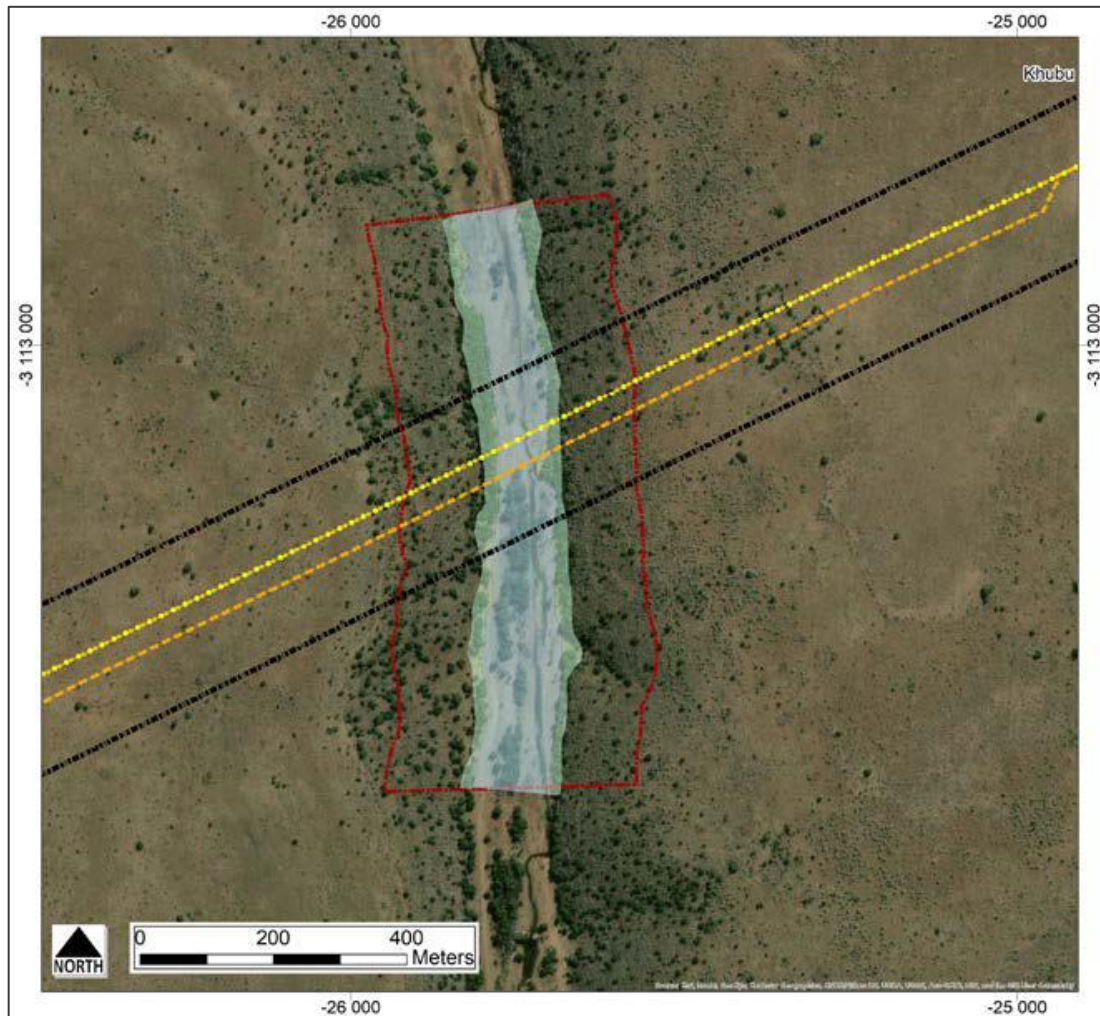


Figure 5.7: Wetland, riparian zone and regulated area. The buffer is the outer edge of the riparian zone.

The only land that exhibit wetland properties is the depression on Portion 5 of Champions Kloof. It is in reality a small depression that collects water during high rainfall events. While the site is dry for most of the year and the dominant plants are terrestrial, it is considered a wetland because it can be temperately saturated.

5.3.1.4 Avifauna

According to the Avifaunal Study (Appendix D3), ss proposed the line will leave from the southwestern corner of the Gamma SPP and run directly to link sub-station.

The line will run in a 40m wide right- of-way corridor that will be initially cleared and periodically maintained. Vegetation in this corridor will be kept in an early successional stage (Yahner et al. 2003). This will attract use by Northern Black Korhaans. Bustards and korhaans have heavy wing-loading and internationally are known to be of considerable risk from collision with power lines (Silva et al. 2010, Jenkins et al. 2010).

The route crosses the valley of the Harts River, an ephemeral stream which has cut a shallow valley. The valley acts as a commuting conduit for some birds moving between roosting and



foraging areas. The Harts River only flows during the summer rainy season following heavy regional rainfall. Although the valley is usually dry, the raised water table supports riparian vegetation. Riparian vegetation is thicker and more continuous than the surrounding vegetation and supports a higher incidence of birdlife.

Since the Harts River valley is a bird commuting route the power line must be marked with bird diverters at 5m intervals across the entire width of the valley (not just over the valley floor).

The region is semi-arid and its vegetation has been further impacted by heavy grazing from domestic stock. The overall effect on birds, especially the restricted access to water, has resulted in low diversity and numbers. This situation also applies to small mammals so the prey base for predators, including birds of prey, is correspondingly low. No birds of prey were recorded during the avifaunal surveys.

During the Gamma SPP avifaunal surveys only three species of birds listed in the latest Red Data Book (Taylor et al. 2015) were recorded. All three were in the special interest (not rated immediately threatened) category. These were two korhaans -the Red-crested and Northern Black- and the Burchell's Sandgrouse. Korhaans belong to the bustard family Otididae whose species are known to be at considerable risk to collision with powerlines. Sandgrouse are fast fliers, which gives them limited time to assess obstructions such as the fine earth wires of power lines, and often fly in small flocks. This can lead to higher collision incidents. Birds in both families primarily occur in open habitats in which they experience no natural obstructions when they are in flight. Both groups are of known potential collision risk with powerlines (Jenkins et al. 2010).

The Powerline will require a 40 m wide corridor. This corridor will be sustained by periodic clearance to allow maintenance vehicle access. It may provide preferred habitat for Northern Black Korhaans (a species of special interest in RDB

Within the corridor, but directly under the powerline there is an, unnamed, ephemeral. This shallow pan is dry through most of the year as seen during the avifaunal survey. It will only fill after heavy rains during the regional rainy season which is mid-summer. The pan is small in extent. Being shallow it dries out rapidly. Its small size will attract few waterbirds. Given its shallow nature, the duration of flooding will be brief and so unsuited for waterbird breeding or moulting (when waterfowl undergo flightless moult)

The proposed powerline poses no great threat to regional birdlife so the route is acceptable, but bird diverters should be placed on the lines in the area adjacent to the pan and where the lines traverse the Harts River watercourse.

5.3.1.5 Climate

According to the Wetland Assessment (Appendix D2) the site is located in the western portion of Northwest Province. It has a typical summer rainfall pattern, and the average annual rainfall is between 500mm and 550mm per year. The average monthly maximum of 32,9 OC is reached in January while the minimum of 4,5 OC is in July. Average wind speeds are around 8 km/h but can experience gusts of more than 15km/h or higher.

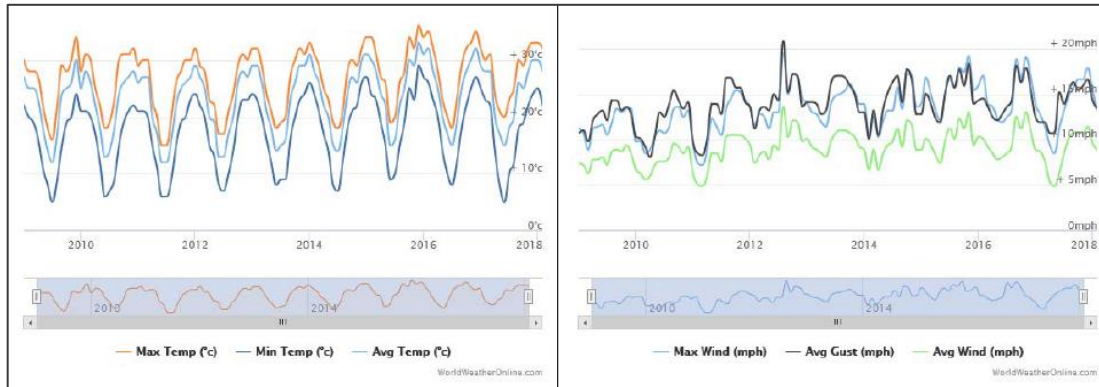


Figure 5.8: Temperature and wind statistics at Vryburg.

5.3.1.6 Visual landscape

According to the Visual Impact Assessment (Appendix D4), the proposed power line route drains towards the drains towards the Harts River.

The site is located in an area with a medium significance in elevation, meaning that the site is not located on a mountain or at the foot of a mountain, but has some significant difference in elevation. The preferred power line route is located at an above mean sea level (amsl) of approximately 1193m at the highest elevation and at an amsl of 1144m at the lowest elevation. The landform and drainage described above is unlikely to limit visibility, especially towards the south. The proposed development is unlikely to be visible from the town of Vryburg, due to the elevation and distance. Areas within 5km from the proposed development might have a clear view without taking existing screening into account.

Table 5.1 below reflects the visibility rating in terms of proximity on viewers of the Power Line. The distances were calculated according to experience, assumptions and opinion. The ZTV map (Figure 5.9) will give a clearer understanding of areas susceptible to line of sight for the Power Line.

Table 5.1: ZTV Visibility Rating in terms of Proximity to the Power Line.

Radius	Visual Receptors	Visibility rating in terms of proximity
0-5km	<ul style="list-style-type: none"> - Mookodi-Magopela 132kV power line. - Existing power line infrastructure. - Agricultural infrastructure. - Waterloo Solar Power Plant. - Agricultural infrastructure. - Farmsteads. - Cattle farming. - Game farming. - Cape to Cairo Railway line. - N18. - Harts River. - Amalia Gravel Road. 	Very High



	<ul style="list-style-type: none">- Tiger Kloof Educational Institution.	
5-10km	<ul style="list-style-type: none">- Existing Power Line Infrastructure.- Huhudi Informal Settlement.- R34.- N18.- Amalia Gravel Road.- Agricultural Developments.- Farmsteads.	High
10-15km	<ul style="list-style-type: none">- Existing Power Line Infrastructure.- Small portion of Vryburg (impact unlikely).- N18.- Amalia Gravel Road.- Agricultural Developments.- Farmsteads.	Medium
15-20km	<ul style="list-style-type: none">- R378 (Unlikely, due to distance).- N18.- Amalia Gravel Road.- Agricultural Developments.- Farmsteads.- Railway line.	Low (Unlikely)
20-25km	<ul style="list-style-type: none">- Agricultural Developments.- Existing Power Line Infrastructure.	Very Low (Unlikely)

The ZTV assessment did not take into account existing screening such as buildings and vegetation cover but rather the terrain's above mean sea level (AMSL) which indicates line of sight. The main visual receptors in the area are agricultural developments, with very few urban developments in the form of farmsteads, impacted by the proposed development.

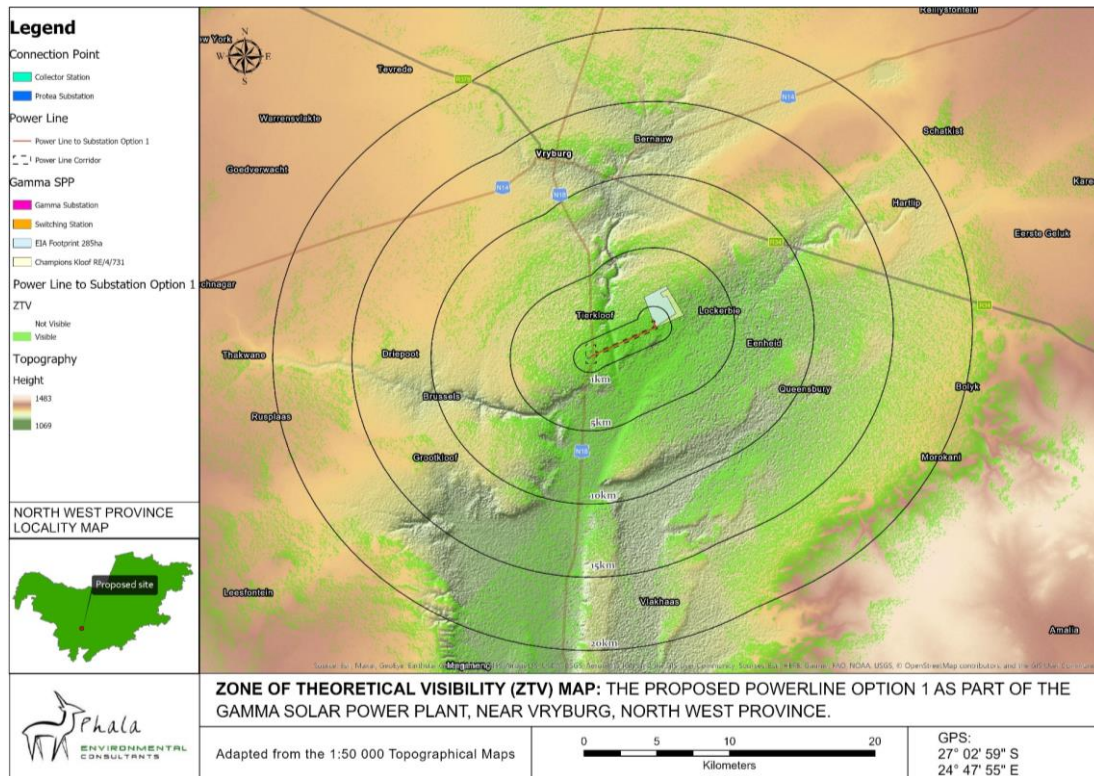


Figure 5.9: Zone of Theoretical Visibility (ZTV) for the Power Line – Hill shading.

5.3.1.7 Socio-economic conditions

The construction phase for an entire SPP will extend over a period of 12-18 months. The anticipated capital expenditure value of the proposed Impala SPP on completion will be approximately R1.5 billion. The construction phase in terms of employment will employ approximately 800 workers and of those employment opportunities likely to be generated, approximately 60% will accrue to low skilled workers, 25% to semiskilled workers, and 15% to skilled workers. It is anticipated that the operation of the project is likely to create between 35-99 employment opportunities, comprising of low-skilled, semi-skilled, and skilled opportunities. Employment opportunities include safety and security staff, operation and monitoring, and maintenance crew.

The Dr Ruth Segomotsi Mompoti DM (previously Bophirima District Municipality) is a Category C municipality located in the North West Province. It is bordered by Ngaka Modiri Molema and Dr Kenneth Kaunda DMs in the north, and John Taolo Gaetsewe DM in the south, which is a cross-boundary within the Northern Cape.

Dr Ruth S Mompoti DM is the largest district in the province covering an area of 43 764km² and making up almost half of its geographical area. The district municipality comprises five local municipalities: Naledi, Greater Taung, Kagisano-Molopo, Mamusa and Lekwa-Teemane and is one of four districts in the province, with poor rural areas, formerly situated in the former Bophuthatswana homeland. With the population situated in more than 470 villages and towns dispersed in a 250km radius (approximately 50km north to south and 200km east to west).



The municipality has a total population of 459 357 according to the 2016 Community Survey, living in 127 103 households of which 87% have access to electricity and 43% are female headed. The DM has an unemployment rate of 35,8% and a youth unemployment rate of 46% in 2011 which contributed to a Dependency ratio of 66.1 in 2016. The main economic sectors include: Community services (33.1%), agriculture (17.1%), finance (16.2%), trade (12.7%), transport (9%), manufacturing (4%), mining (3.2%), construction (3.2%).

The Naledi LM is a Category B municipality situated within the western part of the Dr Ruth Segomotsi Mompati District in the North West Province. It is bordered by the Ngaka Modiri Molema District in the north, Greater Taung in the south, Mamusa in the east, and Kagisano-Molopo in the west. It is the second largest of the five municipalities that make up the district, accounting for 16% of its geographical area at 7 030km². It is known as the Texas of South Africa because of the cattle breeding and agricultural activities that take place there. The LM consists of two towns, including Stella and Vryburg.

The LM has a total population of 68 803 according to the 2016 Community Survey, living in 20 692 households of which 80% have access to electricity, 83% have access to piped water and 35,5% are female headed. The LM had an unemployment rate of 26,1% and a youth unemployment rate of 35,5% in 2011 which contributed to a Dependency ratio of 52,1 in 2016, all of which are lower than that of the DM. The main economic sectors in the municipality are Agriculture and Hunting (27,8%). The majority of the population in this area also have no monthly income, therefore development initiatives should be directed towards them.

5.3.1.8 Cultural and heritage aspects

Archaeology and Built Environment Heritage

Vryburg town was established in 1882 as the capital town of the independent Boer Republic of Stellaland. During its short history, the small state became a focal point for conflict between the British Empire and the South African Republic, the two major players vying for control of the territory. After a series of claims and annexations, British fears of Boer expansionism led to its demise and, among other factors, set the stage for the Second Boer War. Before the proclamation of the republic, the area was under the control of competing Korana and Tswana groups, while the United Kingdom laid claim to it as a part of the emerging protectorate of British Bechuanaland. Two of the indigenous groups were under the leadership of chiefs Mankoroane and Montšioa, whom the British regarded as "friendly," and two others under the leadership of chiefs Moshette (a Motswana) and Massouw (a Korana). When a feud erupted between Mankoroane and another chief, each side resorted to recruiting volunteers, promising them land in return for their assistance. After a settlement was negotiated with mediation from the Transvaal Republic, large portions of Mankoroane's land were given to Boer mercenaries who had fought on his adversary's side, and the new inhabitants decided to declare independence and establish the Republic of Stellaland. During the Second Boer War, a concentration camp was established at Vryburg, however the location.

According to van Schalkwyk et al (2018, SAHRIS NID 510838) "Very little habitation of the central highveld area took place during Stone Age times. Tools dating to the Early Stone Age period are mostly found in the vicinity of larger watercourses, e.g., the Vaal River or the Harts



River and especially in sheltered areas such as at the Taung fossil site. During Middle Stone Age (MSA) times (c. 150 000 - 30 000 BP), people became more mobile, occupying areas formerly avoided. In many cases, tools dating to this period are found on the banks of the many pans that occur all over.” Van Schalkwyk (2018, SAHRIS NID 510838) notes that Later Stone Age artefacts and rock art are also known from the area. Iron Age people started to settle in the area in the 1500s. According to Van Schalkwyk (2018, SAHRIS NID 510838), “By the 16th century things changed, with the climate becoming warmer and wetter, creating condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the treeless plains of the Free State and North West Province.” including the proposed development area. “The earliest Iron Age settlers who moved into the North West Province region were Tswana-speakers such as the Tlhaping, Hurutshe, Fokeng, Kgatla and Rolong. In the region of the study area, it was mostly the booRapulana and booRatlou sections of the Rolong (Breutz 1959).”

Despite the overall archaeological sensitivity of the broader landscape, the archaeological survey conducted by Van Schalkwyk (2016, SAHRIS NID 362237) identified only one heritage resource of significance in his assessment for the authorised Gamma SPP. This site is described as “A small pan area where tools and flakes dating to the Middle Stone Age were identified. They were made from hardened shale. The material occurs all along the rim of the pan at a density of approximately one tool/flake per 10m².” Although the site identified by Van Schalkwyk (2016) is located well away from the proposed powerline corridor, there is an existing pan located within the powerline corridor which may be associated with similar Middle Stone Age artefacts. It is therefore recommended that a no-development buffer of 20m is implemented around the pan to ensure that any significant archaeological resources are not impacted. Furthermore, it is clear from the satellite imagery that a ruin of an old farmstead is located within the proposed powerline corridor (Figure 5.10). Although it is unlikely that the ruin itself has any cultural significance, it is possible that there are buried archaeological deposits located in proximity to the ruin, associated with the occupation of the farmstead. It is therefore recommended that a no-development buffer of 20m is implemented around the ruin to ensure that such buried archaeological deposits are not impacted by the proposed development. No pylon footings or access roads may be placed within these 20m buffers.



Figure 5.10: Archaeology. Heritage resources identified by the EAP during the walkdown of the line.

Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for the powerline development is underlain by sediments of very high palaeontological sensitivity (Figure 5.11).

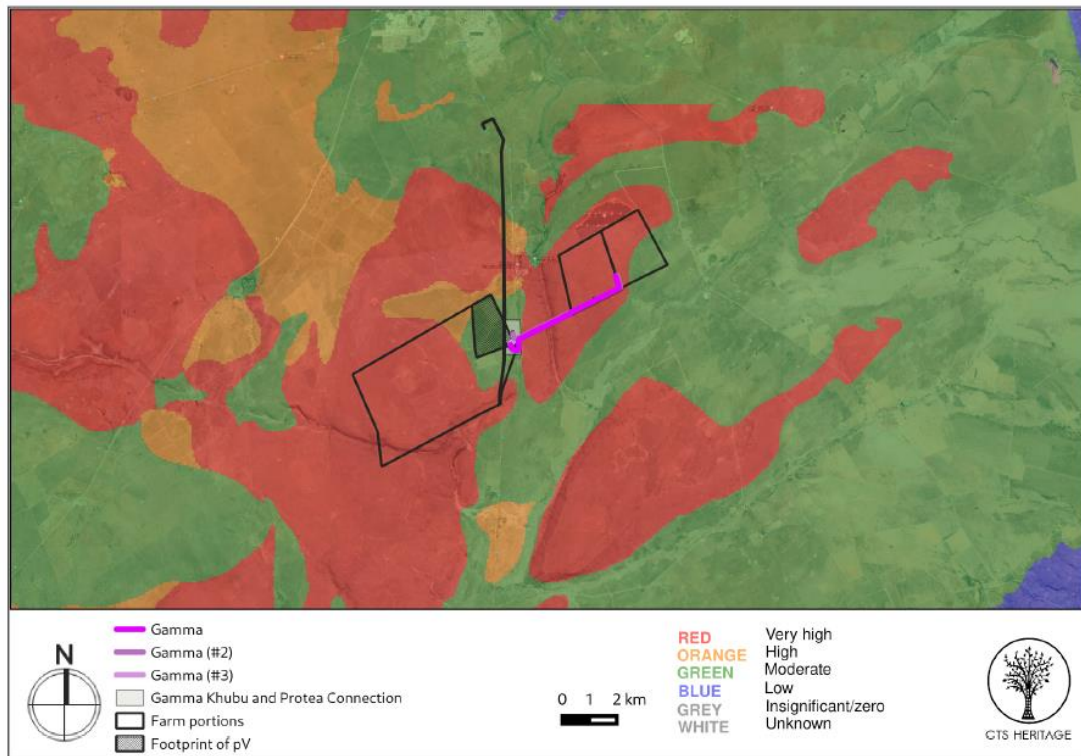


Figure 5.11: Palaeosensitivity Map. Indicating the fossil sensitivity underlying the study area.

Additionally, in a field assessment completed by the EAP, stromatolite fossils were identified within the proposed alignment corridor (Figure 5.12 to 5.13). According to the extract from the CGS 2724 Christiana Map, the development area for the proposed powerline is underlain by sediments of the Boomplaas and Clearwater Formations of the Ghaap Group. In 2016, Dr Almond completed a palaeontological assessment for the proposed Khubu and Gamma Solar Power Plants (SAHRIS ID 358386 and 358387). In his reports, Dr Almond notes that “Densely packed, well-preserved stromatolite assemblages are recorded within the Boomplaas Formation carbonate rocks in a small area of low-relief bedrock exposure just west of the farmstead. A range of stromatolitic growth forms is represented here. The Boomplaas Formation stromatolites recorded in the Vryburg area represent some of the oldest examples of these microbially-generated fossils in South Africa but they have yet to be comprehensively described while their stratigraphic and geographical distributions are poorly understood.”



Figure 5.12: Palaeontology. Fossils and Stromatolites identified by the EAP during the walkdown of the line.



Figure 5.13: Palaeontology. Stromatolites identified by the EAP during the walkdown of the line.

Dr Almond (2016) recommended that the Boomplaas Formation bedrocks be excluded from the solar plant footprint, with a buffer zone of 20 m. The ECO should ensure that this area is clearly demarcated (e.g., using security tape) during the construction phase to prevent



damage to the fossils by vehicles or personnel. It is similarly recommended that a final walkdown of the approved powerline route is conducted by a palaeontologist to identify and demarcate any exposures of the Boomplaas Formation stromatolites located within the powerline alignment. Further, it is recommended that any exposures identified through this process are demarcated with security tape and protected with a no-go buffer of 20m. No pylon footings or access roads may be placed within the 20m buffer.

5.4 SITE SELECTION MATRIX

Due to the nature of the proposed development, the location of the power line is largely dependent on technical and environmental factors such as topography of the site, access to the grid and capacity of the grid.

The grid connection corridor is considered favourable and suitable from a technical perspective due to the following characteristics:

- Site access: Access will be obtained from the Amalia Gravel Road an current site access to the Gamma SPP, as well as from the N18.
- Grid connection: In order for the PV facility to connect to the national grid a substation and single-circuit 132kV power line will be constructed within the identified corridor towards the existing Mookodi-Magopela 132kV power line. Available grid connections are becoming scarce and play a huge role when selecting a viable site.
- Environmental sensitivities: From an environmental perspective the proposed grid connection corridor is considered desirable due to limited environmental sensitivities in terms of vegetation, surface water and landscape features, climate, biodiversity and the visual landscape – refer to Section 5.3.1 of this report. Features that need to be avoided by the placement of infrastructure, mainly related to surface water features and no-go areas in terms of palaeontology and archaeology. Considering the nature of the proposed infrastructure (i.e., a power line which can span sensitive features), avoidance of the sensitive features will be possible with proper planning on the developer's side.

It is evident from the discussion above that the proposed grid connection corridor may be considered favourable and suitable in terms of these site characteristics. Also, based on the opportunities presented with the proposed routing of the power line (as per the grid connection corridor being assessed), which is the shortest route to complete the connection, no other grid connection corridor routes are being considered. Based on the above, no site selection matrix was therefore required to compare the corridor.

5.5 CONCLUDING STATEMENT ON ALTERNATIVES

When considering the information provided by the specialists with regards to current conditions of the proposed grid connection corridor, the preferred grid connection corridor emerges as preferred due to the fact that the proposed power line route is the shortest option for the connection and disturbance within the landscape and is preferred by Eskom and the developer.



In conclusion the preferred alternative entails the development of the ~4,5km power line on an identified corridor within various properties located between the Gamma SPP and Mookodi-Magopel 132kV power line. The preferred layout of the power line route is indicated in the attached layout plan to this BA report. It may be concluded that this is the only location that was assessed in detail for the proposed development.



6 DESCRIPTION OF THE IMPACTS AND RISKS

This section aims to address the following requirements of the regulations:

Appendix 1. (3)(i) A BAR (...) must include-

(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including-

(i) a description of all environmental issues and risks that were identified during the EIA process; and

(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.

(j) an assessment of each identified potentially significant impact and risk, including-

(i) cumulative impacts;

(ii) the nature, significance and consequences of the impact and risk;

(iii) the extent and duration of the impact and risk;

(iv) the probability of the impact and risk occurring;

(v) the degree to which the impact and risk can be reversed;

(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and

(vii) the degree to which the impact and risk can be mitigated;

(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;

6.1 SCOPING METHODOLOGY

The contents and methodology of the basic assessment report aimed to provide, as far as possible, a user-friendly analysis of information to allow for easy interpretation.

- Checklist (see section 6.1.1): The checklist consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts.
- Matrix (see section 6.1.2): The matrix analysis provides a holistic indication of the relationship and interaction between the various activities, development phases and the impact thereof on the environment. The method aims at providing a first order cause and effect relationship between the environment and the proposed activity. The matrix is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts. The matrix also indicates the specialist studies that have been conducted to address the potentially most significant impacts.



6.1.1 Checklist analysis

The independent consultant conducted a site visit on 5-6 August 2021. The site visit was conducted to ensure a proper analysis of the site-specific characteristics of the study area. Table 6.1 provides a checklist, which is designed to stimulate thought regarding possible consequences of specific actions and so assist scoping of key issues. It consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts. The table highlights certain issues, which are further analysed in matrix format in section 6.2.

Table 6.1: Environmental checklist

QUESTION	YES	NO	Un-sure	Description
1. Are any of the following located on the site earmarked for the development?				
I. A river, stream, dam or wetland	X			The Wetland Impact Assessment (Appendix D2) identified that the power line will cross over a wetland, as well as the
II. A conservation or open space area	X			According to the Terrestrial Biodiversity Assessment (Appendix D1), the site falls within Ecological Support Area 1.
III. An area that is of cultural importance	X			According to the Heritage Impact Assessment (Appendix D 5), the power line corridor falls within an area of high palaeontological significance as well as archaeological features.
IV. Site of geological significance		X		None.
V. Areas of outstanding natural beauty		X		None.
VI. Highly productive agricultural land		X		None.



VII. Floodplain		×		According to the Wetland Assessment (Appendix D2) while the Harts River is classified as non-perennial, the catchment is 443 square kilometres which can have significant runoff. The river at the position of the crossing has steep
VIII. Indigenous forest		×		None.
IX. Grass land	×			According to the Terrestrial Biodiversity Assessment (Appendix D1) The vegetation units present within the grid connection corridor consist of <u>grassland</u> .
X. Bird nesting sites		×		None.
XI. Red data species		×		No red listed plant species occur in the quarter degree square or was recorded in the corridor.
XII. Tourist resort		×		None.
2. Will the project potentially result in potential?				
I. Removal of people		×		None.
II. Visual Impacts	×			The Visual Impact Assessment (Appendix D4) concludes that the significance of the visual impact will be a “Negative Low Impact”. The only receptors likely to be impacted by the proposed development are the nearby property owners and on nearby roads.
III. Noise pollution		×		Construction activities will result in the generation of noise over a period of 12 months. The noise impact is unlikely to be significant due to the location of the power line parallel to an existing regional road.
IV. Construction of an access road		×		Access will be obtained via the Amalia Gravel road and proposed Gamma SPP (approved), as well as the N18.



V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.		×		None.
VI. Accumulation of large workforce (>50 manual workers) into the site.	×			Approximately 800 employment opportunities will be created during the construction phase of the entire SPP and 55 during the operational phases - this number is the total number of opportunities for both the authorised Gamma SPP and the proposed power line.
VII. Utilisation of significant volumes of local raw materials such as water, wood etc.		×		None.
VIII. Job creation	×			Approximately 800 employment opportunities will be created during the construction phase and 55 during the operational phases - this number is the total number of opportunities for both the authorised Gamma SPP and the proposed power line.
IX. Traffic generation	×			Traffic will be generated during the construction and operation phases. With an increase in traffic on the R34, Amalia Gravel Road and N18.
X. Soil erosion	×			The servitude of the power line will need to be cleared or graded to a limited extent, which may potentially result in a degree of dust being created, increased runoff and potentially soil erosion. The time that these areas are left bare will be limited to the construction phase, since vegetation will be allowed to grow back after construction.



XI. Installation of additional bulk telecommunication transmission lines or facilities		×		None.
3. Is the proposed project located near the following?				
I. A river, stream, dam or wetland	×			The Wetland Assessment (Appendix D2) identified one wetland type present within the grid connection corridor and the power line will cross over the Harts River.
II. A conservation or open space area	×			The corridor is located within Ecological Support Area 1.
III. An area that is of cultural importance	×			According to the Heritage impact Assessment (Appendix D5) and the SAHRIS Palaeosensitivity Map, the area proposed for the powerline development is underlain by sediments of very high palaeontological sensitivity. Additionally, in a field assessment completed by the EAP, stromatolite fossils were identified within the proposed alignment corridor. it is clear from the satellite imagery that a ruin of an old farmstead is located within the proposed powerline corridor. Although it is unlikely that the ruin itself
IV. A site of geological significance		×		None.
V. An area of outstanding natural beauty		×		None.
VI. Highly productive agricultural land		×		None.
VII. A tourist resort		×		None.



VIII. A formal or informal settlement		×		The town of Vryburg and the Huhudi Informal Settlement is located approximately 10kn northwest of the proposed power line.
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6.1.2 Matrix analysis

The matrix describes the relevant listed activities, the aspects of the development that will apply to the specific listed activity, a description of the environmental issues and potential impacts, the significance and magnitude of the potential impacts and possible mitigation measures. The matrix also highlights areas of particular concern (see Table 6.2) for more in-depth assessment. An indication is provided of the specialist studies which were conducted and that informed the initial assessment. Each cell is evaluated individually in terms of the nature of the impact, duration and its significance – should no mitigation measures be applied. This is important since many impacts would not be considered insignificant if proper mitigation measures were implemented.

In order to conceptualise the different impacts, the matrix specify the following:

- **Stressor:** Indicates the aspect of the proposed activity, which initiates and cause impacts on elements of the environment.
- **Receptor:** Highlights the recipient and most important components of the environment affected by the stressor.
- **Impacts:** Indicates the net result of the cause-effect between the stressor and receptor.
- **Mitigation:** Impacts need to be mitigated to minimise the effect on the environment.



Table 6.2: Matrix analysis

For ease of reference the significance of the impacts is colour-coded as follow:

Low significance	Medium significance	High significance	Positive impact
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LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES/ INFORMATION	
		Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk		
CONSTRUCTION PHASE															
<p><u>Activity 12(ii)(a)(c) (GNR. 327):</u> "The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more (a) within a watercourse or (b) within 32 meters of a watercourse, measured from the edge of a watercourse."</p> <p><u>Activity 19 (GNR. 327):</u> "The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse"</p> <p><u>Activity 27 (GNR. 327):</u> "The clearance of 1 hectares or more, but less than 20 hectares of indigenous vegetation."</p> <p><u>Activity 4(h)(iv) (GNR. 324):</u> "The development of a road wider than 4 metres with a</p>	<p><u>Site clearing and preparation</u> The proposed 132kV power line will connect the proposed Gamma SPP to the Mookodi-Magopela 132kV power line and subsequently, to the national grid.</p> <p>Power line tower footprints and the substation footprint will need to be cleared of vegetation and some areas may need to be levelled.</p> <p><u>Civil works</u> The main civil works are:</p> <ul style="list-style-type: none"> • Tower pegging • Terrain levelling if necessary – levelling will be minimal as the potential site chosen is relatively flat. • Construction of foundations for pylons. • Construction of the substation foundation • Assembly and erection of towers. • Stringing of conductors. 	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> • Direct habitat destruction and modification • Increased soil erosion and sedimentation • Soil and water pollution • Spread and establishment of alien invasive species • Negative effect of human activities and road mortalities 	-		S	S	D	CR	ML	Yes	- See Table 6.3	L	Terrestrial Biodiversity Assessment
			Avifauna	<ul style="list-style-type: none"> • Habitat loss and fragmentation • Noise • Dust Pollution 	-		S	S	D	PR	ML	Yes	- See Table 6.3	L	Avifauna Study
			Air	<ul style="list-style-type: none"> • Air pollution due to construction activities and the increase of traffic of construction vehicles. 	-		S	S	D	CR	NL	Yes	- Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.	L	-
			Soil	<ul style="list-style-type: none"> • Loss of topsoil in disturbed areas, causing a decline in soil fertility. • Soil erosion caused by alteration of the surface characteristics. 	-		S	S	Pr	PR	M	Yes	- Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. - The necessary silt fences and erosion control	M	-



<p>reserve less than 13,5 metres, in the North West Province, within a Critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.”</p> <p>Activity 12(h)(iv) (GN.R 324): “The clearance of an area of 300 square meters or more of indigenous vegetation in the North West Province, within a Critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.”</p>	<ul style="list-style-type: none"> Installation of the substation components. 											measures must be implemented in areas where these risks are more prevalent.		
		Geology	<ul style="list-style-type: none"> Removal of topsoil. Soil erosion. Hard/compact geology. If the bedrock occurs close to surface it may present problems. 	-	S	S	Pr	CR	NL	Yes	<ul style="list-style-type: none"> The most effective mitigation will be the minimisation of the project footprint by using the existing infrastructure as much as possible. If an activity will mechanically disturb below surface levels in any way, then any available topsoil should first be stripped from the entire surface and stockpiled for re-spreading during rehabilitation. Retention of vegetation where possible to avoid soil erosion. 	L	-	
		Existing services infrastructure	<ul style="list-style-type: none"> Generation of waste that needs to be accommodated at a licensed landfill site. Generation of sewage that needs to be accommodated by the local sewage plant. Increase in construction vehicles on existing roads. 	-	L	S	D	CR	NL	Yes	-	L	Confirmation from the Local Municipality	
		Surfacewater	<ul style="list-style-type: none"> Impact on the characteristics of the watercourse due to construction within the flood line zone. 	-	L	S	Po	PR	ML	Yes	- See Table 6.3	M	Wetland Impact Assessment	



			<ul style="list-style-type: none"> • Soil compaction and increased risk of sediment transport and erosion. • Soil and water pollution. • Spread and establishment of alien invasive species. 												
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"> • Job creation. • Business opportunities. • Skills development. 		+	P	S	D	I	N/A	Yes	- Where reasonable and practical, the service providers should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories.	L	-
			Visual landscape	<ul style="list-style-type: none"> • Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed power line. 	-		L	S	D	PR	NL	Yes	- See Table 6.3	L	Visual Impact Assessment
			Traffic volumes	<ul style="list-style-type: none"> • Increase in construction vehicles. 	-		P	S	Pr	CR	NL	Yes	The development may commence without influencing the levels-of-service for the local road network. However, some remedial work is recommended on the gravel road leading to the site. Remedial work should take place before the construction starts.	L	-
			Health & Safety	<ul style="list-style-type: none"> • Air/dust pollution. • Road safety. • Impacts associated with the presence of construction workers on site and in the area. • Influx of job seekers to the area. • Increased safety risk to farmers, risk of stock theft and damage to farm infrastructure associated with presence of construction workers on the site. • Increased risk of veld fires. 	-		L	S	Pr	PR	ML	Yes	<ul style="list-style-type: none"> - Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. - It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site. 	M	-
					-										



			Noise levels	<ul style="list-style-type: none"> The generation of noise as a result of construction vehicles, the use of machinery such as drills and people working on the site. 	-		L	S	D	CR	NL	Yes	- During construction care should be taken to ensure that noise from construction vehicles and plant equipment does not intrude on the surrounding residential areas. Plant equipment such as generators, compressors, concrete mixers as well as vehicles should be kept in good operating order and where appropriate have effective exhaust mufflers.	L	-	
			Tourism industry	<ul style="list-style-type: none"> Since there are no tourism facilities in close proximity to the corridor, the proposed activities are not expected to have an impact on tourism in the area. 	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Heritage resources (including archaeology & palaeontology)	<ul style="list-style-type: none"> Area with High Palaeontological Sensitivity. Palaeontological findings within power line corridor. Archaeological findings within power line corridor. 	-		S	S	D	BR	SL	Yes	- See Table 6.3	M	Heritage Impact Assessment	
OPERATIONAL PHASE																
<p><i>Activity 11(i) (GNR. 327): "The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."</i></p>	<p>Connection to the grid - The proposed 132 kV overhead power line will be approximately 4,5km long and will be constructed within the identified grid connection corridor to connect the authorised Gamma SPP to the national grid. The structure to be utilised for the power line towers will be informed by the local geotechnical and topographical conditions as well as by specific requirements from Eskom.</p> <p>This new power line will connect the SPP to the existing Mookodi-</p>	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> Direct habitat destruction and modification Increased soil erosion and sedimentation Soil and water pollution Spread and establishment of alien invasive species Negative effect of human activities and road mortalities. 	-		S	S	D	CR	ML	Yes	- See Table 6.3	L	Terrestrial Biodiversity Assessment	
			Avifauna	<ul style="list-style-type: none"> Displacement of priority avian species from important habitats Displacement of resident avifauna through increased disturbance Collision when flying into power line infrastructure 	-		L	L	PR	PR	ML	Yes	- See Table 6.3	M	Avifaunal Study	



<p>Maggpela 132kV power line located to the south-west of the SPP. For this Basic Assessment a larger grid connection corridor has been identified within which the power line route will be placed. The corridor is 100m wide and ~4,5km in length; and was assessed within this BA Report. A 132kV substation (1ha in extent) and service road associated with the power line is also included as part of the development (required associated infrastructure). This connection will enable the evacuation of the generated electricity into the national grid.</p>		<p>SOCIAL/ECONOMIC ENVIRONMENT</p>		<ul style="list-style-type: none"> Electrocution when perched on power line infrastructure 												
			Air quality	<ul style="list-style-type: none"> The proposed development will not result in any air pollution during the operational phase. 	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Soil	<ul style="list-style-type: none"> Soil Erosion caused by alteration of the surface characteristics 	-		L	L	D	PR	SL	Yes	- Avoid stripping land surfaces of existing vegetation by only allowing vehicles to travel on existing roads and not create new roads.	L	-	
			Geology	<ul style="list-style-type: none"> Soil erosion. Hard/compact geology. If the bedrock occurs close to surface it may present problems. 	-		S	S	Po	PR	ML	Yes	- Mitigation measures proposed by the detailed engineering geological investigation should be implemented.	L	-	
			Surfacewater	<ul style="list-style-type: none"> Impact associated with the development are limited to the construction phase and therefore not applicable to the operation phase. 	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Wetland Impact Assessment	
			Visual landscape	<ul style="list-style-type: none"> Potential visual impacts on sensitive visual receptors located within a 5km radius. Potential visual impacts on sensitive visual receptors in the region (5-10km) Visual and sense of place impacts 		-	L	L	PR	PR	SL	Yes	- See Table 6.3	M	Visual Impact Assessment	
			Traffic volumes	<ul style="list-style-type: none"> The proposed development will not result in any traffic impacts during the operational phase. 	-		L	L	Po	CR	NL	Yes	-	L	-	
			Health & Safety	<ul style="list-style-type: none"> The proposed development will not result in any health and safety impacts during the operational phase. 	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Noise levels	<ul style="list-style-type: none"> The proposed development will not result in any noise pollution during the operational phase. 	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			Tourism industry	<ul style="list-style-type: none"> Since there are no tourism facilities in close proximity to the corridor, the proposed activities 	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	



				are not expected to have an impact on tourism in the area.													
			Heritage resources (including archaeology & palaeontology)	<ul style="list-style-type: none"> Impact associated with the development are limited to the construction phase and therefore not applicable to the operation phase. 	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Heritage Impact Assessment
			Electricity supply	<ul style="list-style-type: none"> Generation of additional electricity. The power line will enable the evacuation of solar electricity that will be fed into the grid. 	+		I	L	D	I	N/A	Yes	-			N/A	-
			Electrical infrastructure	<ul style="list-style-type: none"> Additional electrical infrastructure. The proposed power line and substation will add to the existing electrical infrastructure and aid to lessen the reliance of electricity generation from coal-fired power stations. 	+		I	L	D	I	N/A	Yes	-			N/A	-
			Electrical infrastructure	<ul style="list-style-type: none"> Additional electrical infrastructure. The proposed power line and substation and the solar facility which it will cater for will add to the existing electrical infrastructure and aid to lessen the reliance of electricity generation from coal-fired power stations. 	+		I	L	D	I	N/A	Yes	-			N/A	-
DECOMMISSIONING PHASE																	
-	<p><u>Dismantlement of infrastructure:</u> During the decommissioning phase the power line and substation will be dismantled.</p> <p><u>Rehabilitation of biophysical environment:</u> The biophysical environment will be rehabilitated</p>	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> Direct habitat destruction and modification Increased soil erosion and sedimentation Soil and water pollution Spread and establishment of alien invasive species Negative effect of human activities and road mortalities 	-		L	S	D	PR	ML	Yes	- See Table 6.3		L	Terrestrial Biodiversity, Animal and Plant Species Impact Assessment	
			Avifauna	<ul style="list-style-type: none"> Displacement of priority avian species from important habitats Displacement of resident avifauna through increased disturbance 	-		S	S	Po	CR	NL	Yes	- See Table 6.3		L	Avifauna Impact Assessment (preliminary desktop assessment)	



			Air quality	<ul style="list-style-type: none"> Air pollution due to the increase of traffic of construction vehicles. 	-		S	S	D	CR	NL	Yes	- Regular maintenance of equipment to ensure reduced exhaust emissions.	L	-
			Soil	<ul style="list-style-type: none"> Soil degradation, including erosion. Disturbance of soils and existing land use (soil compaction). Physical and chemical degradation of the soils by construction vehicles (hydrocarbon spills). 		-	S	S	Pr	PR	M	Yes	<ul style="list-style-type: none"> Re-vegetation of affected areas must be made a priority to avoid erosion. Mitigation measures for the construction phase will apply. 	M	-
			Geology	<ul style="list-style-type: none"> It is not foreseen that the decommissioning phase will impact on the geology of the site or vice versa. 	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Existing services infrastructure	<ul style="list-style-type: none"> Generation of waste that need to be accommodated at a licensed landfill site. Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant. Increase in construction vehicles. 		-	L	S	D	I	NL	Yes	-	L	-
			Groundwater	<ul style="list-style-type: none"> Pollution due to construction vehicles. 	-		S	S	Pr	CR	ML	Yes	- Make use of appropriate drip trays for the repairing and servicing of vehicles.	L	-
			Surface water	<ul style="list-style-type: none"> Increase in storm water run-off. Pollution of water sources due to soil erosion. 	-		L	S	Po	PR	ML	Yes	<ul style="list-style-type: none"> Removal of any historically contaminated soil as hazardous waste. Removal of hydrocarbons and other hazardous substances by a suitable contractor to reduce contamination risks. Removal of all substances which can result in groundwater (or surface water) contamination. 	L	-
		SOCIAL/EC ONOMIC	Visual landscape	<ul style="list-style-type: none"> Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed power line 	-		L	S	D	PR	NL	Yes	- See Table 6.3	L	Visual Impact Assessment



			Traffic volumes	<ul style="list-style-type: none"> Increase in construction vehicles. 	-		L	S	Pr	CR	NL	Yes	<ul style="list-style-type: none"> Movement of heavy construction vehicles through residential areas should be timed to avoid peak morning and evening traffic periods. In addition, movement of heavy construction vehicles through residential areas should not take place over weekends. 	L	-
			Health & Safety	<ul style="list-style-type: none"> Air/dust pollution. Road safety. Increased crime levels. The presence of construction workers on the site may increase security risks associated with an increase in crime levels as a result of influx of people in the rural area. 	-		L	S	Pr	PR	ML	Yes	<ul style="list-style-type: none"> Demarcated routes to be established for construction vehicles to ensure the safety of communities, especially in terms of road safety and communities to be informed of these demarcated routes. Where dust is generated by trucks passing on gravel roads, dust mitigation to be enforced. Any infrastructure that would not be decommissioned must be appropriately locked and/or fenced off to ensure that it does not pose any danger to the community. 	L	-
			Noise levels	<ul style="list-style-type: none"> The generation of noise as a result of construction vehicles, the use of machinery and people working on the site. 	-		S	S	D	CR	NL	Yes	<ul style="list-style-type: none"> The decommissioning phase must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development. 	L	-



			Tourism industry	<ul style="list-style-type: none"> Since there are no tourism facilities in close proximity to the site, the decommissioning activities will not have an impact on tourism in the area. 	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Heritage resources (including archaeology & palaeontology)	<ul style="list-style-type: none"> Area with High Palaeontological Sensitivity. Palaeontological findings within power line corridor. Archaeological findings within power line corridor. 		-	S	S	D	BR	SL	Yes	- See Table 6.3	M					Heritage Impact Assessment

Nature of the impact:	(N/A) No impact	(+) Positive Impact	(-) Negative Impact		
Geographical extent:	(S) Site;	(L) Local/District;	(P) Province/Region;	(I) International and National	
Probability:	(U) Unlikely;	(Po) Possible;	(Pr) Probable;	(D) Definite	
Duration:	(S) Short Term;	(M) Medium Term;	(L) Long Term;	(P) Permanent	
Intensity/Magnitude:	(L) Low;	(M) Medium;	(H) High;	(MH) Very High	
Reversibility:	(CR) Completely Reversible;	(PR) Partly Reversible;	(BR) Barely Reversible;	-	
Irreplaceable loss of resources:	(IR) Irreversible	(NL) No Loss;	(ML) Marginal Loss;	(SL) Significant Loss;	(CL) Complete Loss
Level of residual risk:	(L) Low;	(M) Medium;	(H) High;	(MH) Very High	-

An Environmental Awareness and Fire Management Plan is included in Appendix F as part of the EMPr



6.2 KEY ISSUES IDENTIFIED

From the above it is evident that mitigation measures should be available for potential impacts associated with the proposed activity and development phases. The scoping methodology identified the following key issues which were addressed in more detail in the BA report – refer to the significance assessment attached as Appendix E1 to the report.

6.2.1 Impacts during the construction phase

During the construction phase the following activities will have various potential impacts on the biophysical and socio-economic environment:

- Activity 12(ii)(a)(c) (GN.R. 327): *“The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more (a) within a watercourse or (b) within 32 meters of a watercourse, measured from the edge of a watercourse.”*
- Activity 19 (GN.R. 327): *“The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse”*
- Activity 27 (GN.R. 327): *“The clearance of 1 hectares or more, but less than 20 hectares of indigenous vegetation.”*
- Activity 4(h)(iv) (GN.R 324): *“The development of a road wider than 4 metres with a reserve less than 13,5 metres, in the North West Province, within a Critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.”*
- Activity 12(h)(iv) (GN.R 324): *“The clearance of an area of 300 square meters or more of indigenous vegetation in the North West Province, within a Critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.”*

During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of months. Table 6.3 summarises the potentially most significant impacts and the mitigation measures that are proposed during the construction phase.



Table 6.3: Impacts and the mitigation measures during the construction phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Terrestrial Biodiversity Impact Assessment	Direct habitat destruction	Negative Low	Negative Low	<ul style="list-style-type: none"> • Impacts on the development footprint and surrounding vegetation should be kept to a minimum. • During construction, sensitive habitats must be avoided by construction vehicles and equipment, wherever possible, to reduce potential impacts. Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place. • All development activities should be restricted to specific recommended areas as defined and controlled by an Environment Control Officer (ECO). Storage of equipment, fuel and other materials should be limited to demarcated areas. The entire development footprint should be clearly demarcated prior to initial site clearance and measures implemented to prevent construction personnel from leaving the demarcated area. This would only be applicable to the construction phase of the proposed development. • The Environmental Site Officer (ESO) should advise the construction team in all relevant matters to ensure minimum destruction and damage to the environment. The ECO should enforce any measures that he/she deem necessary. Regular environmental training should be provided to construction workers to ensure the protection of the habitat, fauna and flora and their sensitivity to conservation. • Where holes for poles pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and getting trapped and/or injured. This could be prevented by the constant excavating and backfilling during planting of the poles along the lines.



				<ul style="list-style-type: none"> • Poisons for the control of problem animals should rather be avoided since the wrong use thereof can have disastrous consequences for birds of prey. The use of poisons for the control of rats, mice or other vermin should only be used after approval from an ecologist. • Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. • Monitoring should be implemented during the construction and decommissioning phases to ensure that minimal impact is caused to the fauna and flora of the area. 	
	Increased erosion and sedimentation	soil and	Negative Medium	Negative Low	<ul style="list-style-type: none"> • The project should be divided into as many phases as possible, to ensure that the exposed areas prone to erosion are minimal at any specific time. • Cover disturbed soils as completely as possible, using vegetation or other materials. • Minimize the amount of land disturbance and develop and implement stringent erosion and dust control practices. • Protect sloping areas and drainage channel banks that are susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas. • Repair all erosion damage as soon as possible to allow for sufficient rehabilitation growth. • Gravel roads to the construction sites must be well drained to limit soil erosion. • Control the flow of runoff to move the water safely off the site without destructive gully formation.



				<ul style="list-style-type: none"> • Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas. • Placement of pylons should be outside sensitive soil types and drainage channels.
	Soil and water pollution	Negative Low	Negative Low	<ul style="list-style-type: none"> • Any excess or waste material or chemicals should be removed from the site and discarded in an environmentally friendly way. The ECO should enforce this rule rigorously. • Hazardous chemicals to be stored on an impervious surface protected from rainfall and storm water run-off. • Spill kits should be on-hand to deal with spills immediately. • All vehicles should be inspected for oil and fuel leaks on a regular basis. Vehicle maintenance yards on site should make provision for drip trays that will be used to capture any spills. Drip trays should be emptied into a holding tank and returned to the supplier.
	Spread and establishment of alien invasive species	Negative Low	Negative Low (negligible)	<ul style="list-style-type: none"> • Control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the CARA or in terms of Working for Water guidelines. The control of these species should even begin prior to the construction phase considering that small populations of these species was observed during the field surveys. • Institute strict control over materials brought onto site, which should be inspected for seeds of noxious plants and steps taken to eradicate these before transport to the site. Routinely fumigate or spray all materials with appropriate low-residual herbicides prior to transport to or in a quarantine area on site. The contractor is responsible for the control of weeds and invader plants within the



				<p>construction site for the duration of the construction phase. Alien invasive tree species listed by the CARA regulations should be eradicated.</p> <ul style="list-style-type: none"> • Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish. • Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds. Once detected, an eradication/control programme should be implemented to ensure that the species' do not spread to surrounding natural ecosystems.
	Negative effect of human activities and road mortalities	Negative Low	Negative Low (negligible)	<ul style="list-style-type: none"> • No staff should be accommodated on the site. If practical, construction workers should stay in one of the nearby villages / towns and transported daily to the site. • The ECO should regularly inspect the site, including storage facilities and compounds and eradicate any invasive or exotic plants and animals. • Maintain proper firebreaks around entire development footprint. • Educate construction workers regarding risks and correct disposal of cigarettes. • More fauna is normally killed the faster vehicles travel. A speed limit should be enforced (preferably 40 km/hour). It can be considered to install speed bumps in sections where the speed limit tends to be disobeyed. (Speed limits will also lessen the probability of road accidents and their negative consequences). • Travelling at night should be avoided or limited as much as possible.
Wetland Impact Assessment	Crossing the depression and the Harts River.	Negative Low	Negative Low	<ul style="list-style-type: none"> • Place the pylons outside the buffer area of the depression. Store topsoil separately when the site is cleared. If the construction takes place during the rainy season, then place a berm downslope of the depression in order to



				<p>prevent siltation. This is unlikely to be required because the land has little or no slope.</p> <ul style="list-style-type: none"> • Replace the topsoil as soon as the construction had been completed. • Place the pylon as far away as possible from the riparian zone. Depending on the maximum distance allowed between the pylons, it may be necessary to place them on the gorge sides where the slopes are high. Some measures should be put in place to prevent erosion.
	<p>Soil compaction and increased risk of sediment transport and erosion.</p>	<p>Negative Medium</p>	<p>Negative Low</p>	<ul style="list-style-type: none"> • Stringent controls must be put in place to prevent any unnecessary disturbance or compaction of alluvial soils. Compaction of soils should be limited and / or avoided as far as possible. Compaction will reduce water infiltration and will result in increased runoff and erosion. Where any disturbance of the soil takes place (have taken place in the past), these areas must be stabilized and any alien plants which establish should be cleared and follow up undertaken for at least 2 years thereafter and preferably longer. Where compaction becomes apparent, remedial measures must be taken (e.g., “ripping” the affected area). Topsoil should preferably be separated from the subsoil, and topsoil sections should be kept intact as deep as possible. • Reseed any areas where earthworks have taken place with indigenous grasses to prevent further erosion. • Erosion control mechanisms must be established as soon as possible. Further financial provision should be continued over the subsequent years to allow for maintenance of the gabions, reno mattresses, and associated structures. • If compaction occurs, rectification can be done by application and mixing of manure, vegetation mulch or any other organic material into the area. Use of well cured manure is preferable as it will not be associated with the nitrogen negative period associated with organic material that is not composted.



				<ul style="list-style-type: none"> • Vehicle traffic should not be allowed on the rehabilitated areas, except on allocated roads. It will have a negative impact due to the dispersive/compaction characteristics of soils and its implications on the long term. • The indiscriminate use of machinery within the in-stream and riparian habitat will lead to compaction of soils and vegetation and must therefore be strictly controlled. • A buffer zone of 32 meters should be implemented around the drainage channels and riparian zone to prevent sediment changes to the channels. No activities or disturbance may take place within the 32m buffer. • Perform scheduled maintenance to be prepared for storms. Ensure that culverts have their maximum capacity, ditches are cleaned, and that channels are free of debris and brush than can plug structures.
	Soil and water pollution.	Negative Medium	Negative Low	<ul style="list-style-type: none"> • Ensure that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage. Regularly inspect all vehicles for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil. • No dumping of waste should take place within the wetland / riparian zone. If any spills occur, they should be immediately cleaned up. • Appropriate sanitary facilities must be provided for the duration of the proposed development and all waste removed to an appropriate waste facility. • Excess waste or chemicals should be removed from site and discarded in an environmentally friendly way. The ECO should enforce this rule rigorously. • All vehicles should be inspected for oil and fuel leaks on a regular basis. Vehicle maintenance yards on site should make provision for drip trays to capture spills. Drip trays should be emptied into a holding tank and returned to the supplier.



				<ul style="list-style-type: none"> • Implement standard dust control measures, including periodic spraying (frequency will depend on many factors including weather conditions, soil composition and traffic intensity and must thus be adapted on an on-going basis) and chemical dust suppressants of construction areas and access roads, and ensure that these are continuously monitored to ensure effective implementation. • A speed limit (preferably 40 km/hour) should be enforced on dirt roads. • Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with the label and application permit directions and stipulations for terrestrial and aquatic applications.
Avifaunal Study	Displacement of priority avian species from important habitats	Negative Medium	Negative Low	<ul style="list-style-type: none"> • Limit the construction footprint. • Retain indigenous vegetation wherever possible. • Limit access to remainder of area. • Avoid construction during the breeding season (summer). • Laydown areas to be placed only disturbed zones. • Construct in shortest timeframe. • Control noise to minimum.
Visual Impact Assessment	Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed power line	Negative Low	Negative Low	<ul style="list-style-type: none"> • Retain and maintain natural vegetation immediately adjacent to the development footprint. • Ensure that vegetation is not unnecessarily removed during the construction phase. • Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) where possible.



				<ul style="list-style-type: none"> • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. • Ensure that rubble, litter, etc. are appropriately stored (if it can't be removed daily) and then disposed of regularly at a licenced waste site. • Reduce and control dust during construction by utilising dust suppression measures. • Reduce construction activities between 07:00 and 18:00, where possible, in order to reduce the impacts of construction lighting. • Rehabilitate all disturbed areas immediately after the completion of construction work and maintain good housekeeping.
Heritage Impact Assessment	Impacts on heritage and palaeontological objects	Negative High	Negative Low	<ul style="list-style-type: none"> • A 20m no-development buffer is implemented around the pan located within the corridor. No pylon footings or access roads may be placed within the 20m buffer. • A 20m no-development buffer is implemented around the ruin located within the corridor. No pylon footings or access roads may be placed within the 20m buffer. • A final walkdown of the approved powerline route is conducted by a palaeontologist to identify and demarcate any exposures of the Boomplaas Formation stromatolites • located within the powerline alignment. Further, it is recommended that any exposures identified through this process are demarcated with security tape and protected with a • no-go buffer of 20m. No pylon footings or access roads may be placed within the 20m buffer.



				<ul style="list-style-type: none"> • If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the South • African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/excavation can be undertaken.
Other	Generation of waste - general waste, construction waste, sewage and grey water.	Negative Medium	Negative Low	<ul style="list-style-type: none"> • The Contractor shall install mobile chemical toilets on the site. • Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed. • Ablution facilities shall be within 30m from workplaces. There should be enough toilets available to accommodate the workforce (minimum requirement 1:15 workers). • Toilets shall be serviced regularly, and the ECO shall inspect toilets regularly. • Under no circumstances may open areas, neighbours' fences or the surrounding bush be used as a toilet facility. • Construction methods and materials should be carefully considered in view of waste reduction, re-use and recycling opportunities. • Specific areas must be designated on-site for the temporary management of various waste streams. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of runoff, seepage and vermin control. • Adequate weather and vermin proof waste bins and skips should be placed on site. Separate bins should be provided for general and hazardous waste.



				<ul style="list-style-type: none">• Documentation (waste manifest) must be maintained detailing the quantity, nature and fate of any regulated waste. Waste disposal records must be available for review at any time.• Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.• The Contractor shall supply waste collection bins where such is not available, and all solid waste collected shall be disposed of at registered/licensed landfill.• A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site.• If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling.• Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.• Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly.• All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours.• Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management.• A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.• Under no circumstances may solid waste be burnt on site.
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				<ul style="list-style-type: none"> All waste must be removed promptly to ensure that it does not attract vermin or produce odours
	Soil erosion	Negative Low	Negative Low	<ul style="list-style-type: none"> There are no additional mitigation measures required, over and above what has already been included in the Generic EMPr for overhead electricity transmission and distribution infrastructure as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019.
	Creation of local employment and business opportunities, skills development and training	Positive Low	Positive Medium	<ul style="list-style-type: none"> Strategies need to be identified by the local municipality and the business sectors in order to maximise the potential benefits associated with the establishment. Efforts should be made to employ local contractors first and contractors that are compliant with the Broad Based Black Economic Empowerment (BBBEE) criteria. Gender equality should also be promoted. If possible, a training and skills development programme for the local workers should be initiated prior to the construction phase.
	Technical support to local farmers and municipalities	Negative Low	Positive Low	<ul style="list-style-type: none"> Private consultation sessions with local farmers can be held to inform them about the installation of solar energy facilities, the benefits thereof, the process and costs. Workshops can also be held for the local farmers as well as the local municipality to also advise them regarding the installation of SPPs (and the associated infrastructure) and the process and costs thereof.
	Potential loss of productive farmland	Negative Medium	Negative Low	<ul style="list-style-type: none"> Development footprint needs to be fenced off prior to the construction phase and all construction related activities should be confined in this fenced off area. Livestock grazing on the proposed site need to be relocated.
	In-migration or influx of job seekers.	Negative Medium	Negative Low	<ul style="list-style-type: none"> A policy that no employment will be available at the gate should be implemented. Job seekers from the local community should be employed first.



	Presence of construction workers on the local communities	Negative Medium	Negative Low	<ul style="list-style-type: none"> The proposed site should be fenced off and the movement of construction workers should be limited to the vicinity of the site. Transportation for the construction workers need to be arranged by the contractor to ensure that there will be no trespassing of properties by any staff. Necessary arrangements to enable workers to return to their hometowns over weekends should also be arranged in order to reduce the risks posed to local family structures and social networks. No staff should be accommodated overnight on site, except for security staff. Contractors need to ensure that all workers sign a code of conduct before the construction phase starts, which are drawn up in accordance with the South African labour legislation. By doing this, workers will be legally informed of the associated risks on the property and that they would be held liable for any damages or losses. This code of conduct should also outline the acceptable behaviour and activities of construction workers.
	Heavy vehicles and construction activities	Negative Low	Negative Low	<ul style="list-style-type: none"> With regards to all safety measures, the drivers of the vehicles must be qualified, and all vehicles must be road worthy. Drivers should also be made aware of the strict speed limits on and off site and the potential road safety issues on site. The contractor must repair any damages to the gravel roads on the site, during the construction phase, and any cost with regards to the repair of the roads must be borne by the contractor.
	Risk to safety, livestock and farm infrastructure.	Negative Low	Negative Low	<ul style="list-style-type: none"> The proposed site should be fenced off and the movement of construction workers should be limited to the vicinity of the site. Contractors need to ensure that all workers sign a code of conduct before the construction phase starts, which are drawn up in accordance with the South African labour legislation. By doing this, workers will be legally informed of the associated risks on the property and that they would be held liable for any damages or losses.



				<ul style="list-style-type: none">• Any form of theft, damaged infrastructure and trespassing will lead to immediate dismissal and the workers would be held liable for the costs thereof.
	Increased risk of veld fires.	Negative Medium	Negative Low	<ul style="list-style-type: none">• A firebreak should be implemented before the construction phase. The firebreak should be controlled and constructed around the perimeters of the project site.• Adequate fire-fighting equipment should be provided and readily available on site and all staff should be trained in firefighting and how to use the fire-fighting equipment.• The contractor should ensure that no open fires are allowed on site. The use of cooking or heating implements should only be used in designated areas.• Contractors need to ensure that any construction related activities that might pose potential fire risks, are done in the designated areas where it is also managed properly.



6.2.2 Impacts during the operational phase

During the operational phase the grid connection corridor will serve a 132kV single-circuit power line and substation. The potential impacts will take place over a period of 20 – 30 years. Table 6.4 summarised the negative impacts are generally associated with the power line and substation, which include impacts on the avifauna, soils, geology, surface water, the pressure on existing services infrastructure, and visual impacts. The provision of sustainable services delivery also needs to be confirmed. The operational phase will have a direct positive impact through the provision of employment opportunities for its duration, and the generation of income to the local community.

During the operational phase the following activities will have various potential impacts on the biophysical and socio-economic environment:

- Activity 11(i) (GN.R. 327): *“The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.”*



Table 6.4: Impacts and the mitigation measures during the operational phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Avifaunal (preliminary desktop assessment)	Collision when flying into power line infrastructure	Negative Very High	Negative Medium	<ul style="list-style-type: none"> - Undertake a walk-through after pole positions are determined to demarcate sections requiring bird deterrents/flappers. - Install flappers on all required sections of power lines (as directed by avifaunal specialist) on or directly adjacent to site. - Undertake quarterly fatality monitoring.
	Electrocution when perched on power line infrastructure	Negative High	Negative Medium	<ul style="list-style-type: none"> - Pole designs to discourage bird perching and to be signed off by avifaunal specialist. - Undertake quarterly fatality monitoring.
Visual Impact Assessment	Potential visual impacts on sensitive visual receptors located within a 5km radius.	Negative Medium	Negative Medium	<ul style="list-style-type: none"> - Retain/re-establish and maintain natural vegetation under the power line. - Maintain the general appearance of the power line corridor/servitude
	Potential visual impacts on sensitive visual receptors in the region (5-10km)	Negative Low	Negative Low	<ul style="list-style-type: none"> - Retain/re-establish and maintain natural vegetation under the power line. - Maintain the general appearance of the power line corridor/servitude



	Visual and sense of place impacts	Negative Low		Negative Low		<ul style="list-style-type: none"> - The subjectivity towards the project in its entirety can be influenced by creating a “Green Energy” awareness campaign, educating the local community and potentially tourists on the benefits of renewable energy. This can be achieved by also hosting an ‘open day’ where the local community can have the opportunity to view the completed project which may enlist a sense of pride in the renewable energy project in their area. - Maintain good housekeeping measures.
Other	Soil erosion	Negative Low		Negative Low		<ul style="list-style-type: none"> - There are no additional mitigation measures required, over and above what has already been included in the Generic EMP for overhead electricity transmission and distribution infrastructure and substation infrastructure as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019.
	Local employment and business opportunities, skills development and training	Positive Low		Positive Medium		<ul style="list-style-type: none"> - If possible, a training and skills development programme for the local workers should be initiated prior to the operational phase.
	Potential loss of productive farmland	Negative Low		Negative Low		<ul style="list-style-type: none"> - Establish a rehabilitation fund. This fund can be utilised for the rehabilitation of the proposed project in the decommissioning phase.
	Change in the sense of place	Negative Low	Positive Low	Negative Low	Positive Low	<ul style="list-style-type: none"> - Due to the height of the power line and extent of the project, no viable mitigation measures can be implemented to eliminate the visual impact of the



						power line, but the subjectivity towards the project in its entirety can be influenced by creating a “Green Energy” awareness campaign, educating the local community and potentially tourists on the benefits of renewable energy.
	Development of infrastructure for the generation of clean, renewable energy	Positive Medium	Positive Medium	Positive Medium	Positive Medium	- Utilise the proposed solar power plant and the associated grid connection infrastructure to promote and increase South Africa’s contributions of renewable energy to the national energy supply grid.



6.2.3 Impacts during the decommissioning phase

The physical environment will benefit from the closure of the power line and substation since the Gamma SPP will be restored to its natural state. Table 6.5 provides a summary of the impacts during the decommissioning phase. The decommissioning phase will however potentially result in impact on soils, pressure on existing service infrastructure, surface water and the loss of permanent employment. Skilled staff will be eminently employable, and a number of temporary jobs will also be created in the process. Decommissioning of a PV facility, and the associated grid connection infrastructure, will leave a positive impact on the habitat and biodiversity in the area as the area will be rehabilitated to its natural state.



Table 6.5: Impacts and the mitigation measures during the decommissioning phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Terrestrial Biodiversity Impact Assessment	Direct habitat destruction	Negative Low	Negative Low	<ul style="list-style-type: none"> • Impacts on the development footprint and surrounding vegetation should be kept to a minimum. • During construction, sensitive habitats must be avoided by construction vehicles and equipment, wherever possible, to reduce potential impacts. Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place. • All development activities should be restricted to specific recommended areas as defined and controlled by an Environment Control Officer (ECO). Storage of equipment, fuel and other materials should be limited to demarcated areas. The entire development footprint should be clearly demarcated prior to initial site clearance and measures implemented to prevent construction personnel from leaving the demarcated area. This would only be applicable to the construction phase of the proposed development. • The Environmental Site Officer (ESO) should advise the construction team in all relevant matters to ensure minimum destruction and damage to the environment. The ECO should enforce any measures that he/she deem necessary. Regular environmental training should be provided to construction workers to ensure the protection of the habitat, fauna and flora and their sensitivity to conservation. • Where holes for poles pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and getting



				<p>trapped and/or injured. This could be prevented by the constant excavating and backfilling during planting of the poles along the lines.</p> <ul style="list-style-type: none"> • Poisons for the control of problem animals should rather be avoided since the wrong use thereof can have disastrous consequences for birds of prey. The use of poisons for the control of rats, mice or other vermin should only be used after approval from an ecologist. • Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. • Monitoring should be implemented during the construction and decommissioning phases to ensure that minimal impact is caused to the fauna and flora of the area. • After the decommissioning phase the area should be rehabilitated.
	Increased soil erosion and sedimentation	Negative Medium	Negative Low	<ul style="list-style-type: none"> • The project should be divided into as many phases as possible, to ensure that the exposed areas prone to erosion are minimal at any specific time. • Cover disturbed soils as completely as possible, using vegetation or other materials. • Minimize the amount of land disturbance and develop and implement stringent erosion and dust control practices. • Protect sloping areas and drainage channel banks that are susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas. • Repair all erosion damage as soon as possible to allow for sufficient rehabilitation growth.



				<ul style="list-style-type: none"> Gravel roads to the construction sites must be well drained to limit soil erosion. Control the flow of runoff to move the water safely off the site without destructive gully formation. Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas.
	Soil and water pollution	Negative Low	Negative Low	<ul style="list-style-type: none"> Any excess or waste material or chemicals should be removed from the site and discarded in an environmentally friendly way. The ECO should enforce this rule rigorously. Hazardous chemicals to be stored on an impervious surface protected from rainfall and storm water run-off. Spill kits should be on-hand to deal with spills immediately. All vehicles should be inspected for oil and fuel leaks on a regular basis. Vehicle maintenance yards on site should make provision for drip trays that will be used to capture any spills. Drip trays should be emptied into a holding tank and returned to the supplier. After decommissioning all materials must be disposed of in a responsible manner.
	Spread and establishment of alien invasive species	Negative Low	Negative Low (negligible)	<ul style="list-style-type: none"> Control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the CARA or in terms of Working for Water guidelines. The control of these species should even begin prior to the construction phase considering that small populations of these species was observed during the field surveys.



				<ul style="list-style-type: none"> • Institute strict control over materials brought onto site, which should be inspected for seeds of noxious plants and steps taken to eradicate these before transport to the site. Routinely fumigate or spray all materials with appropriate low-residual herbicides prior to transport to or in a quarantine area on site. The contractor is responsible for the control of weeds and invader plants within the construction site for the duration of the construction phase. Alien invasive tree species listed by the CARA regulations should be eradicated. • Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish. • Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds. Once detected, an eradication/control programme should be implemented to ensure that the species' do not spread to surrounding natural ecosystems.
	Negative effect of human activities and road mortalities	Negative Low	Negative Low (negligible)	<ul style="list-style-type: none"> • No staff should be accommodated on the site. If practical, construction workers should stay in one of the nearby villages / towns and transported daily to the site. • The ECO should regularly inspect the site, including storage facilities and compounds and eradicate any invasive or exotic plants and animals. • Maintain proper firebreaks around entire development footprint. • Educate construction workers regarding risks and correct disposal of cigarettes. • More fauna is normally killed the faster vehicles travel. A speed limit should be enforced (preferably 40 km/hour). It can be considered to install speed bumps in sections where the speed limit tends to be



				<p>disobeyed. (Speed limits will also lessen the probability of road accidents and their negative consequences).</p> <ul style="list-style-type: none"> • Travelling at night should be avoided or limited as much as possible.
Other	Generation of waste	Negative Medium	Negative Low	<ul style="list-style-type: none"> • All decommissioned equipment must be removed from site and disposed of at a registered land fill. Records of disposal must be kept.
	Soil erosion	Negative Low	Negative Low	<ul style="list-style-type: none"> • There are no additional mitigation measures required, over and above what has already been included in the Generic EMP for overhead electricity transmission and distribution infrastructure and substation infrastructure as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019.



6.3 SUMMARY OF RECOMMENDATIONS FROM SPECIALIST STUDIES

To address the key issues highlighted in the previous section the following specialist studies and processes were commissioned:

- Terrestrial Biodiversity Impact Assessment – conducted by AGES (see Appendix D1).
- Wetland Impact Assessment – conducted by iAfrica (see Appendix D2).
- Avifaunal Study – conducted by African Insights (see Appendix D3).
- A Visual impact assessment - conducted by Phala Environmental Consultants (see Appendix D4).
- A Heritage Screener- conducted by CTS Heritage (see Appendix D5).
- An assessment of the cumulative impacts associated with the proposed development – conducted by the lead consultant, Environamics in conjunction with the project specialists (refer to Section 7 of this report).

The following sections summarise the main findings from the specialist reports in relation to the key issues raised during the scoping phase.

6.3.1 Issue 1: Heritage, archaeological and palaeontological impacts

South Africa's heritage resources comprise a wide range of sites, features, objects and beliefs. According to Section 27(18) of the National Heritage Resources Act (NHRA), No. 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site. In accordance with Section 38 of the NHRA, an independent heritage consultant was therefore appointed to conduct a Heritage Impact Assessment (HIA) to determine if any sites, features or objects of cultural heritage significance occur within the proposed site. The main question which needs to be addressed is:

“Will the proposed development impact on any heritage, archaeological or palaeontological objects?”

The Heritage Impact Assessment (Refer to Appendix D5) confirmed the following:

Despite the overall archaeological sensitivity of the broader landscape, the archaeological survey conducted by Van Schalkwyk (2016, SAHRIS NID 362237) identified only one heritage resource of significance in his assessment for the authorised Gamma SPP. This site is described as “A small pan area where tools and flakes dating to the Middle Stone Age were identified. They were made from hardened shale. The material occurs all along the rim of the pan at a density of approximately one tool/flake per 10m².” Although the site identified by Van Schalkwyk (2016) is located well away from the proposed powerline corridor, there is an existing pan located within the powerline corridor which may be associated with similar Middle Stone Age artefacts. It is therefore recommended that a no-development buffer of 20m is implemented around the pan to ensure that any significant archaeological resources are not impacted. Furthermore, it is clear from the satellite imagery that a



ruin of an old farmstead is located within the proposed powerline corridor. Although it is unlikely that the ruin itself has any cultural significance, it is possible that there are buried archaeological deposits located in proximity to the ruin, associated with the occupation of the farmstead. It is therefore recommended that a no-development buffer of 20m is implemented around the ruin to ensure that such buried archaeological deposits are not impacted by the proposed development. No pylon footings or access roads may be placed within these 20m buffers.

According to the SAHRIS Palaeosensitivity Map, the area proposed for the powerline development is underlain by sediments of very high palaeontological sensitivity. Additionally, in a field assessment completed by the EAP, stromatolite fossils were identified within the proposed alignment corridor. According to the extract from the CGS 2724 Christiana Map, the development area for the proposed powerline is underlain by sediments of the Boomplaas and Clearwater Formations of the Ghaap Group. In 2016, Dr Almond completed a palaeontological assessment for the proposed Khubu and Gamma Solar Power Plants (SAHRIS ID 358386 and 358387). In his reports, Dr Almond notes that “Densely packed, well-preserved stromatolite assemblages are recorded within the Boomplaas Formation carbonate rocks in a small area of low-relief bedrock exposure just west of the farmstead. A range of stromatolitic growth forms is represented here. The Boomplaas Formation stromatolites recorded in the Vryburg area represent some of the oldest examples of these microbially-generated fossils in South Africa, but they have yet to be comprehensively described while their stratigraphic and geographical distributions are poorly understood.” Dr Almond (2016) recommended that the Boomplaas Formation bedrocks be excluded from the solar plant footprint, with a buffer zone of 20 m. The ECO should ensure that this area is clearly demarcated (e.g., using security tape) during the construction phase to prevent damage to the fossils by vehicles or personnel. It is similarly recommended that a final walkdown of the approved powerline route is conducted by a palaeontologist to identify and demarcate any exposures of the Boomplaas Formation stromatolites located within the powerline alignment. Further, it is recommended that any exposures identified through this process are demarcated with security tape and protected with a no-go buffer of 20m. No pylon footings or access roads may be placed within the 20m buffer.

There is no objection to the proposed development of powerline on heritage grounds on condition that:

- A 20m no-development buffer is implemented around the pan located within the corridor. No pylon footings or access roads may be placed within the 20m buffer.
- A 20m no-development buffer is implemented around the ruin located within the corridor. No pylon footings or access roads may be placed within the 20m buffer.
- a final walkdown of the approved powerline route is conducted by a palaeontologist to identify and demarcate any exposures of the Boomplaas Formation stromatolites located within the powerline alignment. Further, it is recommended that any exposures identified through this process are demarcated with security tape and protected with a no-go buffer of 20m. No pylon footings or access roads may be placed within the 20m buffer.
- If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the South African Heritage



Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/excavation can be undertaken.

6.3.2 Issue 2: Ecological Impacts

The potential impact of the proposed development on threatened flora and fauna and sensitive ecological features and areas known to occur in the North West Province had to be determined. The main question which needs to be addressed is:

“How will the proposed development impact on the ecology?”

The Terrestrial Biodiversity Impact Assessment (Appendix D1) concluded the following:

The desktop study indicated that the conservation status of the Ghaap Plateau Vaalbosveld vegetation unit, in which the survey area is found, is considered of Least Concern (SANBI, 2018). The study area is not located in or near a nationally threatened ecosystem, Protected Area (PA), or National Protected Area Expansion Strategy (NPAES) area. The project area falls within Ecological Support Area 1 (ESA 1). It is not located in or close to an Important Bird Area. The proposed power line will cross a NFEPA river, but no NFEPA wetlands.

During the vegetation survey six different vegetation units were identified, namely:

- *Tarchonanthus camphoratus*– *Eragrostis rigidior* grassland – Variation A.
- *Tarchonanthus camphoratus*– *Eragrostis rigidior* encroached grassland – Variation B.
- *Tarchonanthus camphoratus*– *Eragrostis rigidior* encroached grassland – Variation C.
- *Olea europaea* subsp. *cuspidata*– *Heteropogon contortus* grassland on slope.
- *Searsia lancea* – *Setaria sphacelata* var. *sericea* riparian vegetation.
- *Searsia lancea* – *Eragrostis rigidior* pan.

One plant species that is protected according to the North-West Biodiversity Management Act No. 4 of 2016 was recorded at the project area, namely: *Cheilanthes dolomiticola*. Four endemic plant species were recorded, namely: *Ehretia rigida*, *Searsia tridactyla*, *Cheilanthes dolomiticola*, and *Hermbstaedtia odorata*.

The EIA screening tool lists no species of conservation concern present within the survey area.

Five declared invader plant species were recorded.

According to the national web-based environmental screening tool in terms of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and regulation 16(1)(b)(v) of the EIA regulations, 2014, as amended, no red listed fauna species occur in the project area. Three Near Threatened fauna species may be present (medium probability) at the project area, based on their distribution and habitat requirements, namely the Leopard (*Panthera pardus*), the European Roller (*Coracias garrulus*) and the Giant Bullfrog (*Pyxicephalus adspersus*). If these species are present, it is not foreseen that they will be seriously affected by the power line.



Potential impacts were described and rated, and suitable mitigation measures discussed. The most significant impacts resulting from the proposed construction activities are considered to be increased soil erosion and sedimentation, although these impacts can be successfully mitigated.

The sensitivity analysis indicated that the river and natural pan have a high sensitivity, the rocky slopes next to the river have a medium sensitivity, the grassland area and artificial pan have a medium-low sensitivity, and the encroached grassland has a low sensitivity.

Based on the results of this biodiversity study, the proposed development is supported, provided strict implementation of the recommended mitigation measures in this regard.

6.3.3 Issue 3: Wetland Impacts

The potential impact of the proposed development on wetlands and riparian areas and areas known to occur in the North West Province had to be determined. The main question which needs to be addressed is:

“How will the proposed development impact on the surface water features?”

According to the Wetland Assessment (Appendix D2) *Two wetland were identified:*

- *A wetland along the transmission line on Portion 5. The start is at 27.06531755° S, 24.78577680° E and the end at 27.06582975° S, 24.78461559° E*

Oakleaf, Rensburg and Sepane soils were identified in the depression on Portion 5. These are deep reddish and pale brown sands. Patches occur where clay accumulated that remains wet during the rainy season and was delineated as wetlands. The depression is directly in the path of the line and should be considered when placing the transmission line towers.

- *The Harts River is crossed on Portion 2. The line enters the riparian zone at 27.07301492° S, 24.76933934° E and exits the zone at 27.07355598° S, 24.76806732° E.*

Glenrosa, Mispah and rocky outcrops occur along the banks of the Harts River. All the soils above the riparian zone are shallow with no properties that would suggest wet or waterlogged conditions. The riparian zone is delineated and is protected by NEMA and the Section 1 of the Water Act. This is also the ecological buffer proposed in terms of Section 21 of the Water Act.

The present ecological state of the depression and of the Harts River crossing is moderately modified.

Pylons are spaced at around 170 m. The footing should be positioned where it will cause the least damage to the wetlands or riparian vegetation.

The span required to leave the wetland undisturbed is as follows:

- Depression on Portion 5 of Champions Kloof: 148 m (Depression on Portion 5: A buffer zone of 32 m from the outer edge applies. The pylons should be placed outside the wetland buffer.)
- The Harts River riparian zone: 145 m (River crossing on Portion 2: The buffer is the outer edge of the riparian zone. The pylons should be placed outside these boundaries. Place suitable structures downslope to prevent scouring and erosion.)

The findings of this study together with the Risk Matrix indicate that the development poses low risk to the wetland, it is therefore recommended that an Authorisation be granted.



6.3.4 Issue 4: Avifaunal Impacts

The potential impact of the proposed development on birds known to occur in the North West Province had to be determined. The main question which needs to be addressed is:

“How will the proposed development impact on the avifauna?”

According to the Avifaunal Study (Appendix D3) the proposed power line for the Gamma SPP is situated in an area of moderate avifaunal diversity, but has the potential to impact many large, fast-flying and otherwise power line-sensitive species. If Day/night diverters on lines across watercourses are implemented, the impact should be low.

6.3.5 Issue 5: Visual Impacts

Due to the extent of the proposed photovoltaic solar plant, it is expected that the plant will result in potential visual impacts. The main question which needs to be addressed is:

“To what extent will the proposed development be visible to observers and to will the landscape provides any significant visual absorption capacity”

The Visual Impact Assessment (Refer to Appendix D4) concluded that the significance of the visual impact will remain a “Negative Low Impact”. The construction and operational phases of the proposed power line may have a visual impact on the study area, especially within (but not restricted to) a 5 - 10km radius of the proposed power line. The visual impact will differ amongst places, depending on the distance of the power line. The proposed development is located in a close proximity to other existing Eskom power infrastructure.

Due to the height of the power line (32m), no viable mitigation measures can be implemented to eliminate the visual impact of the power line, but the possible visual impacts can be reduced. A number of mitigation measures have however been proposed regardless of whether or not mitigation measures will reduce the significance of the of the anticipated impacts, they are considered good practice and should be implemented and maintained throughout the construction, operational and decommissioning phases of the project. In terms of possible landscape degradation, the landscape does not appear to have any specific protection or importance. No buffer areas or areas to be avoided are applicable for this development.

6.4 METHOD OF ENVIRONMENTAL ASSESSMENT

The environmental assessment aims to identify the various possible environmental impacts that could results from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e., site, local, national or global whereas intensity is defined by the severity of the impact e.g., the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 6.6.



Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

6.4.1 Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact, the following criteria is used:

Table 6.6: The rating system

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).



3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component, and the quality, use, integrity and functionality of the system or component is severely



		impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component, and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible, rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible, and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.



3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
SIGNIFICANCE		
<p>Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.</p> <p>The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.</p>		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.



7 CUMULATIVE EFFECTS ASSESSMENT

This section aims to address the following requirements of the regulations:

Appendix 1. (3)(i) A BAR (...) must include-

(j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts.

7.1 INTRODUCTION

The EIA Regulations (as amended in 2017) determine that cumulative impacts, *“in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.”* Cumulative impacts can be incremental, interactive, sequential or synergistic. EIAs have traditionally failed to come to terms with such impacts, largely as a result of the following considerations:

- Cumulative effects may be local, regional or global in scale and dealing with such impacts requires coordinated institutional arrangements;
- Complexity - dependent on numerous fluctuating influencing factors which may be completely independent of the controllable actions of the proponent or communities; and
- Project level investigations are ill-equipped to deal with broader biophysical, social and economic considerations.

Despite these challenges, cumulative impacts have been afforded increased attention in this Basic Assessment Report and for each impact / field of study a separate section has been added which discusses any cumulative issues, and where applicable, draws attention to other issues that may contextualise or add value to the interpretation of the impact. This chapter analyses the proposed project’s potential cumulative impacts in more detail by: (1) defining the geographic area considered for the cumulative effects analysis; (2) providing an overview of relevant past and present actions in the project vicinity that may affect cumulative impacts; (3) presenting the reasonably foreseeable actions in the geographic area of consideration; and (4) determining whether there are adverse cumulative effects associated with the resource areas analysed.

The term "Cumulative Effect" has for the purpose of this report been defined as: the summation of effects over time which can be attributed to the operation of the Project itself, and the overall effects on the ecosystem of the grid connection corridor that can be attributed to the Project and other existing and planned future projects.

7.2 GEOGRAPHIC AREA OF EVALUATION

The geographic area of evaluation is the spatial boundary in which the cumulative effects analysis was undertaken. The spatial boundary evaluated in this cumulative effects analysis generally includes an area of a 30km radius surrounding the proposed development – refer to Figure 7.1 below.

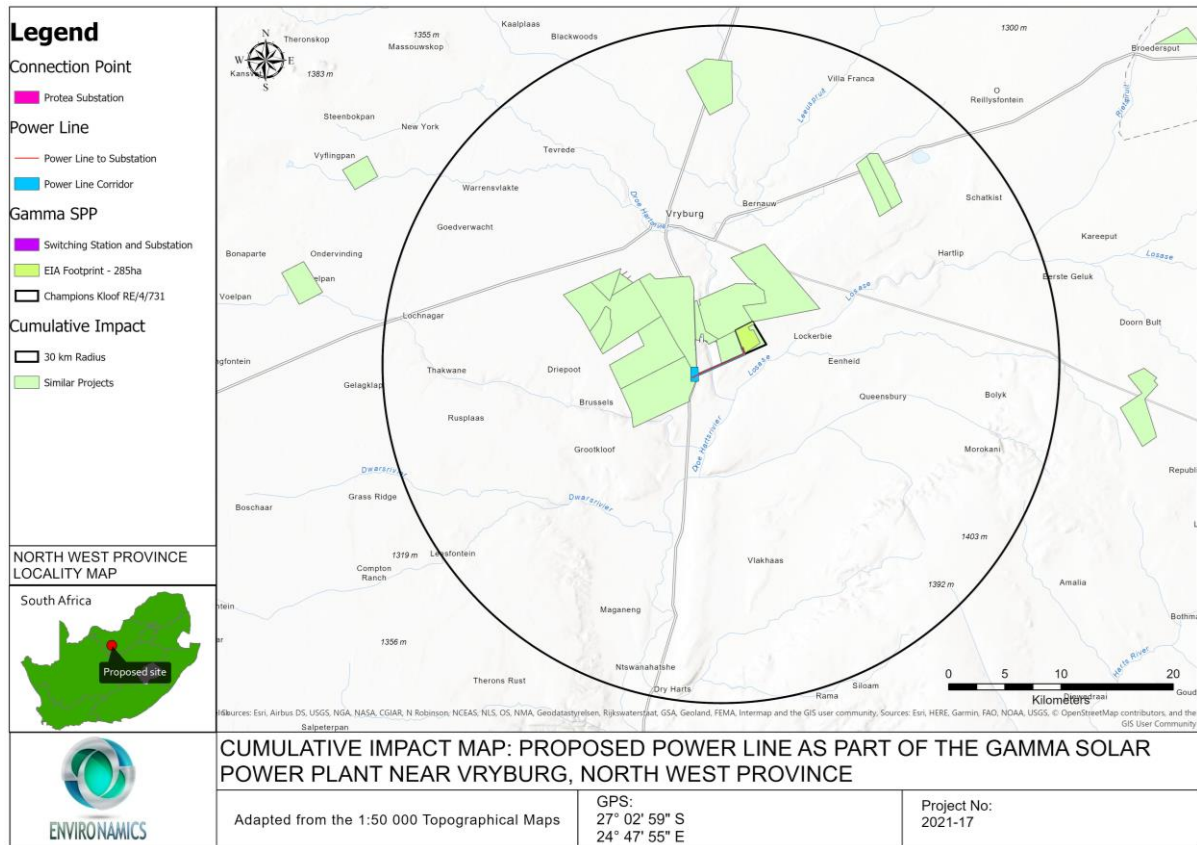


Figure 7.1: Geographic area of evaluation with utility-scale renewable energy generation sites (assuming the presence of required associated grid connection infrastructure)

The geographic spread of solar PV projects (including the associated grid connection infrastructure), administrative boundaries and any environmental features (the nature of the landscape) were considered when determining the geographic area of investigation. It was argued that a radius of 30km would generally confine the potential for cumulative effects within this particular environmental landscape. The geographic area includes projects located within the Free State Province. A larger geographic area may be used to analyse cumulative impacts based on the specific temporal or spatial impacts of a resource. For example, the socioeconomic cumulative analysis may include a larger area, as the construction workforce may draw from a much wider area. The geographic area of analysis is specified in the discussion of the cumulative impacts for that resource where it differs from the general area of evaluation described above.

7.3 TEMPORAL BOUNDARY OF EVALUATION

A temporal boundary is the timeframe during which the cumulative effects are reasonably expected to occur. The temporal parameters for these cumulative effects analysis are the anticipated lifespan of the proposed project, beginning in 2022 and extending out at least 20 years, which is the minimum expected project life of the proposed project. Where appropriate, particular focus is on near-term cumulative impacts of overlapping construction schedules for proposed projects in the area of evaluation.



7.4 OTHER PROJECTS IN THE AREA

The following section provides details on existing projects being proposed in the geographical area of evaluation.

7.4.1 Existing projects in the area

The area within which the proposed power line corridor is proposed is characterised by existing Eskom transmission and distribution infrastructure and solar power facilities. It must be noted that not all details of existing and proposed grid connection infrastructure within the surrounding area are known. The focus of the cumulative impact assessment is on proposed and existing solar power plants and the associated required grid connection infrastructure needed for the operation of the facilities.

According to the DFFE's database Twenty (19) PV solar plant applications have been submitted to the Department within the geographic area of investigation – refer to table 7.1

Table 7.1: A summary of related facilities, that may have a cumulative impact, in a 30 km radius of the study area

Site name	Proposed generating capacity	DFFE reference	EIA process	Project status
Waterloo	75 MW	14/12/16/3/3/2/308	Scoping and EIA	Operational
Tiger Kloof	75 MW	14/12/16/3/3/2/535	Scoping and EIA	Approved
Naledi	75 MW	14/12/16/3/3/2/390	Scoping and EIA	Approved
Carocraft	75 MW	14/12/16/3/3/2/374	Scoping and EIA	Approved
Elda	14 MW	14/12/16/3/3/2/750	Scoping and EIA	Approved
Khubu SPP	115MW	14/12/16/3/3/2/912	Scoping and EIA	Approved
Sonbesie SPP	115MW	14/12/16/3/3/2/915	Scoping and EIA	Approved
Woodhouse PV 1	100MW	14/12/16/3/3/2/863	Scoping and EIA	Approved
Woodhouse PV 2	100MW	14/12/16/3/3/2/865	Scoping and EIA	Approved
Vryburg PV 1	115MW	14/12/16/3/3/1/1939	Scoping and EIA	Approved
Vryburg PV 2	115MW	14/12/16/3/3/1/1940	Scoping and EIA	Approved
Vryburg PV 3	115MW	14/12/16/3/3/1/1941	Scoping and EIA	Approved
Protea SPP	115MW	14/12/16/3/3/2/914	Scoping and EIA	Approved
Sendawo 1	75MW	14/12/16/3/2/893	Scoping and EIA	Approved
Sendawo 2	75MW	14/12/16/3/2/893	Scoping and EIA	Approved



Sendawo 3	75MW	14/12/16/3/2/893	Scoping and EIA	Approved
Moeding Solar	115MW	14/12/16/3/3/1/1987	Scoping and EIA	Approved
Alpha SPP	115MW	14/12/16/3/3/2/916	Scoping and EIA	Approved
Meerkat SPP	115MW	14/12/16/3/3/2/913	Scoping and EIA	Approved

It is unclear whether other projects not related to renewable energy is or has been or will be constructed in this area. In general, development activity in the area is focused agriculture. Agriculture in the area is primarily associated with cattle grazing and game farming. The next section of this report will aim to evaluate the potential for solar projects (including the associated grid connection infrastructure) for this area in the foreseeable future.

7.4.2 Projects in the foreseeable future

As part of the SEA for Wind and Solar Energy in South Africa, the CSIR and the DEFF mapped the location of all EIA applications submitted within South Africa. According to this database two (19) applications have been approved, with one application still being in process. The majority of these projects are located within close proximity to the proposed grid connection corridor.

7.5 SPECIALIST INFORMATION ON CUMULATIVE EFFECTS

In line with the Terms of Reference (ToR) provided, specialists were asked to, where possible, take into consideration the cumulative effects associated with the proposed development and other projects which are either developed or in the process of being developed in the local area. The following sections present their findings.

7.5.1 Ecology and Wetlands

The Terrestrial Biodiversity Impact Assessment and the Wetland Impact Assessment (refer to Appendix D1 and Appendix D2) confirmed that the impacts associated with the proposed power line will include direct habitat destruction, habitat fragmentation, increased soil erosion and sedimentation, soil and water pollution, spread and establishment of alien invasive species, negative effect of human activities and road mortalities, impact on the characteristics of the watercourse, soil compaction and increased risk of sediment transport and erosion. With the implementation of the proposed mitigation measures the extent of the impacts is expected to be reduced and concentrated within the site/grid connection corridor and will therefore be linked only to the actual on-ground development footprint of the proposed infrastructure.

Overall, because of the restricted nature of solar plants and few or no emissions and pollutants into air when operational, soil and water cumulative impacts to the environment are limited (if compared for example to emissions from fossil fuel burning). Ultimately power plants could relieve the pressures to use fossil fuels that are associated with numerous cumulative impacts and habitat losses.



7.5.2 Avifaunal

It is the cumulative impacts, in addition to the prevalence of planned solar developments, that increase the cumulative risks and, therefore, warrant mitigations. Mitigating the cumulative impacts would require limiting the impact of the Gamma SPP's power line to an absolute minimum, which is not necessarily feasible but should be pursued. The mitigations to reduce cumulative impacts involve limiting the disturbance footprint (overall size), focussing the development on already disturbed zones, limiting human activity and noise throughout the project life, disturbing as little natural vegetation as possible, retaining the natural vegetation beneath the panels and around infrastructure, limiting the extent and width of roadways, reducing the speeds that vehicles travel, and then thoroughly rehabilitating the entire footprint back to natural grassland/shrubland after decommissioning. Implementing successful mitigations along the power line should reduce the impact rating for cumulative displacement resident avifauna by 19% down to an acceptable Low-Negative score, however cumulative displacement of priority avian species would reduce by 28% but would still be in the Medium-Negative category.

7.5.3 Visual

The Visual Impact Assessment (refer to Appendix D4) confirms that cumulative impacts are expected to occur during the construction and operation phases of the project. During the construction phase the construction activities may increase the cumulative visual impact together with existing electricity infrastructure, specifically for road users using the R48. Dust is considered to be the main factor which must be considered for this phase. The significance of the impacts will be low.

During the operation phase visual impacts are expected to occur for observers in close proximity to the development, for visual receptors within the region and visual and sense of place impacts. The significance of these impacts will be low.

7.5.4 Heritage

The proposed powerline development will form part of the infrastructure required for the Gamma Solar development and is located in close proximity to the substation and operations and maintenance facilities associated with the Gamma Solar development. Furthermore, the proposed powerline is located within an already approved solar facility development footprint which is also located within a belt of approved renewable energy facilities. In terms of impacts to heritage resources, it is preferred that this kind of infrastructure development is concentrated in one location and is not sprawled across an otherwise culturally significant landscape. The construction of the proposed powerline is therefore unlikely to result in unacceptable risk or loss, nor will the proposed powerline development result in a complete change to the sense of place of the area or result in an unacceptable increase in impact. No additional cumulative impacts have been identified.

7.6 IMPACT ASSESSMENT

Following the definitions of the term, the “residual effects on the environment”, i.e., effects after mitigation measures have been put in place, combined with the environmental effects of past, present and future projects and activities will be considered in this assessment. Also, a “combination of



different individual environmental effects of the project acting on the same environmental component” can result in cumulative effects.

7.6.1 Potential Cumulative Effects

The receptors (hereafter referred to as Valued Ecosystem Components (VECs) presented in Section 6 (refer to the matrix analysis) have been examined alongside other past, present and future projects for potential adverse cumulative effects. A summary of the cumulative effects discussed are summarized in Table 7.2. There have been 22 specific VECs identified with reference to the Solar Project (Table 6.2), which relates to the biophysical and socio-economic environments. Table 7.2 indicates the potential cumulative effects VECs and the rationale for inclusion/exclusion.

Table 7.2: Potential Cumulative Effects for the proposed project

Valued Ecosystem Components (VECs)	Rationale for Inclusion / Exclusion	Level of Cumulative Effect
Construction Phase		
Loss or fragmentation of indigenous natural fauna and flora	The loss of habitat on-site has the potential to add to the cumulative impacts that habitat loss in the region is having on avifauna.	- Low
Avifauna	Development of multiple solar energy facilities, and the associated grid connection infrastructure, in this region may have cumulative impacts on birds, this will happen via the same factors identified here viz: collision, avoidance and displacement.	- Medium
Loss or fragmentation of habitats	Removal of large areas of habitats may have a significant effect on loss of habitats.	- Medium
Soil erosion	The largest risk factor for soil erosion will be during the construction phase. Should these impacts occur, there may be a cumulative impact on storm water runoff in the corridor.	- Medium
Impacts of the geology on the proposed development	A fatal flaw cannot be identified that may prematurely terminate the development of the proposed solar farm.	N/A
Generation of waste	An additional demand for landfill space could result in cumulative impacts if services become unstable or unavailable,	- Low



	which in turn would negatively impact on the local community.	
Employment opportunities	The community will have an opportunity to better their social and economic well-being, since they will have the opportunity to upgrade and improve skills levels in the area.	+ Low
Visual intrusion	The construction of the PV plant and 132kV evacuation line may increase the cumulative visual impact together with farming activities and people using the regional road adjacent to site. Dust will be the main factor to take into account.	- Low
Increase in construction vehicles	If damage to roads is not repaired, then this will affect the farming and mining activities in the area and result in higher maintenance costs for vehicles of locals and other road users. The costs will be borne by road users who were no responsible for the damage.	- Negligible
Impact of construction workers on local communities & influx of job seekers	Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.	- Low
Risk to safety, livestock and farm infrastructure	If fire spreads to neighbouring properties, the effects will be compounded. Negligible cumulative effects, provided losses are compensated for.	- Low
Increased risks of grass fires	The risk of grass fires can be mitigated and managed.	- Negligible
Operational Phase		
Loss of agricultural land	Because of the location of the corridor parallel to a regional road its contribution to any cumulative impact is considered to be low.	- Low



Change in land use	Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. The impacts are however mitigated with the placement of the grid connection corridor adjacent property borders.	- Low
Visual intrusion	The operation of the 132kV evacuation line may increase the cumulative visual impact together with the existing Eskom power infrastructure and agricultural infrastructure.	- Low
Consumption of water	An additional demand on water sources could result in a significant cumulative impact with regards to the availability of water. However, the power line will not use water during the operational phase.	- Negligible
Generation of additional electricity	The evacuation of generated electricity into the Eskom grid will strengthen and stabilize the grid (especially in the local area).	+ Low
Change in the sense of place	The construction of the power line will increase the cumulative change in the sense of place due to industrial type infrastructure that is being proposed and the existing mining infrastructure in the region. Since the area is already largely transformed, the impact will be limited.	- Low
Development of infrastructure for the generation of clean, renewable energy	Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.	+ Medium
Decommissioning Phase		
Visual intrusion	The decommissioning of the PV plant and 132kV evacuation line may increase the cumulative visual impact together with farming and people using the existing roads adjacent to site. Dust and housekeeping will be the main factors to take into account.	- Low
Generation of waste	An additional demand on municipal services could result in significant cumulative	- Medium



	impacts with regards to the availability of landfill space.	
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7.7 CONCLUSION

This chapter of the Basic Assessment Report (BAR) addressed the cumulative environmental effects of the construction, operation and decommissioning project phases. The information to date has shown that no significant adverse residual impacts are likely. However, cumulative impacts could arise as other similar projects are constructed in the area.

The potential most significant cumulative impacts relate to:

- Cumulative effects during construction phase:
 - Loss or fragmentation of indigenous natural fauna and flora (- Low)
 - Avifauna (- Medium)
 - Loss or fragmentation of habitats (- Medium)
 - Soil erosion (- Medium)
 - Generation of waste (- Low)
 - Temporary employment (+ Low)
 - Visual intrusion (- Low)
 - Increase in construction vehicles (-Negligible)
 - Impact of construction workers on local communities & influx of job seekers (- Low)
 - Risk to safety, livestock and farm infrastructure (-Low)
 - Increased risk of grass fires (-Negligible)

- Cumulative effects during the operational phase:
 - Loss of agricultural land (-Low)
 - Change in land use (- Low)
 - Visual intrusion (- Low)
 - Consumption of water (-Negligible)
 - Generation of additional electricity (+ Low)
 - Change in the sense of place (- Low)
 - Development of infrastructure for the generation of clean, renewable energy (+ Medium)

- Cumulative effects during the decommissioning phase:
 - Visual intrusion (- Low)
 - Generation of waste (- Medium)



8 ENVIRONMENTAL IMPACT STATEMENT

This section aims to address the following requirements of the regulations:

Appendix 3. (3) A BAR (...) must include-

- (l) an environmental impact statement which contains-
 - (i) a summary of the key findings of the environmental impact assessment;
 - (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and
 - (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;
- (m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;
- (n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;
- (o) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;
- (q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;

8.1 SUMMARY OF KEY FINDINGS AND ASSESSMENT RESULTS

Based on the contents of the report the following key environmental issues were identified, which were addressed in this BAR (rating provided is the significance of the impact include mitigation):

- Impacts during construction phase:
 - Direct habitat destruction (-Medium)
 - Habitat fragmentation (-Medium)
 - Increased soil erosion and sedimentation (-Medium)
 - Soil and water pollution (-Low)
 - Air pollution (-Low)
 - Spread and establishment of alien invasive species (-Negligible)
 - Negative effect of human activities and road mortalities (-Negligible)



- Impact on the characteristics of the watercourse due to construction within the flood line zone. (-Low)
 - Soil compaction and increased risk of sediment transport and erosion (- Low)
 - Soil and water pollution (- Low)
 - Spread and establishment of alien invasive species (- Low)
 - Displacement of priority avian species from important habitats (- Low)
 - Impacts on heritage objects (- Low)
 - Generation of waste - general waste, construction waste, sewage and grey water (- Low)
 - Creation of local employment and business opportunities, skills development and training (+Medium)
 - Technical support to local farmers and municipalities (+Low)
 - Potential loss of productive farmland (- Low)
 - In-migration or influx of job seekers (- Low)
 - Presence of construction workers on the local communities (- Low)
 - Heavy vehicles and construction activities (- Low)
 - Risk to safety, livestock and farm infrastructure (- Low)
 - Increased risk of veld fires (- Low)
 - Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed power line (-Low)
- Impacts during the operational phase:
- Collision of avifauna when flying into power line infrastructure (-Medium)
 - Electrocuting of avifauna when perched on power line infrastructure (-Medium)
 - Soil erosion (- Low)
 - Local employment and business opportunities, skills development and training (+Medium)
 - Potential loss of productive farmland (- Low)
 - Change in the sense of place (- Low)
 - Development of infrastructure for the generation of clean, renewable energy (+Medium)
 - Potential visual impacts on sensitive visual receptors located within a 5km radius (- Medium)
 - Potential visual impacts on sensitive visual receptors in the region (5-10km) (- Low)
 - Visual and sense of place impacts (- Low)
- Impacts during the decommissioning phase:
- Direct habitat destruction (-Medium)
 - Habitat fragmentation (-Medium)



- Increased soil erosion and sedimentation (-Medium)
 - Soil and water pollution (-Low)
 - Air pollution (-Low)
 - Spread and establishment of alien invasive species (-Negligible)
 - Negative effect of human activities and road mortalities (-Negligible)
 - Generation of waste (-Low)
 - Soil erosion (-Low)
- Cumulative biophysical impacts resulting from similar development in close proximity to the proposed activity (- Medium)

8.2 RECOMMENDATION OF EAP

The final recommendation by the EAP considered firstly if the legal requirements for the EIA process had been met and secondly the validity and reliability of the substance of the information contained in the BA report. In terms of the legal requirements it is concluded that:

- All key consultees have been consulted as required by Chapter 6 of the EIA Regulations - already approved by the environmental authority.
- The Basic Assessment process has been conducted as required by the EIA Regulations, Regulations 19 and Appendix 1.
- The EMPr was compiled in conjunction with the Generic EMPr for overhead electricity transmission and distribution infrastructure and substation infrastructure which was published in Government Gazette 42323 on 22 March 2019.
- The proposed mitigation measures will be sufficient to mitigate the identified impacts to an acceptable level.

In terms of the contents and substance of the BA report the EAP is confident that:

- All key environmental issues were identified during the BA process. These key issues were adequately assessed during the BA phase to provide the environmental authority with sufficient information.

The final recommendation of the EAP is that:

It is the opinion of the independent EAP that the proposed development will have a net positive impact for the area and will subsequently ensure the optimal utilisation of resources through enabling the operation of the authorised Gamma Solar Power Plant. All negative environmental impacts can further be effectively mitigated through the proposed mitigation measures, and the significance of the impacts can be reduced to either medium or low. Based on the contents of the report it is proposed that an environmental authorisation be issued, which states (amongst other general conditions) that the power line and substation as part of



the Gamma Solar Power Plant and associated infrastructure, North West Province be approved subject to the following conditions:

- Implementation of the proposed mitigation measures set out in the EMPr.
- Implementation of the proposed mitigation measures set out in the specialist studies.
- The proposed power line must comply with all relevant national environmental laws and regulations.
- All actions and task allocated in the EMPr should not be neglected and a copy of the EMPr should be made available onsite at all times.
- Should archaeologically sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

We trust that the department find the report in order and eagerly await your final decision in this regard.

Carli van Niekerk

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