VOLUME I: BASIC ASSESSMENT REPORT

PROPOSED PAULPUTS SOUTH WEF GRID CONNECTION & ASSOCIATED INFRASTRUCTURE, NORTHERN CAPE PROVINCE

On behalf of

PAULPUTS WIND ENERGY FACILITY SOUTH (RE) (PTY) LTD

JULY 2020

FOR PUBLIC COMMENT

Prepared By:

Arcus Consultancy Services South Africa (Pty) Limited

Office 607 Cube Workspace
Icon Building
Cnr Long Street and Hans Strijdom Avenue
Cape Town
8001

T +27 (0) 21 412 1529 l **E** paulputs@arcusconsulting.co.za
W www.arcusconsulting.co.za

Registered in South Africa No. 2015/416206/07

PROJECT INFORMATION

Arcus Reference No:	3944 Paulputs South WEF Grid Connection & associated infrastructure.		
Project Title:	Basic Assessment Report for the Proposed Paulputs South WEF Grid Connection & associated infrastructure, Northern Cape Province.		
Project Director:	Ashlin Bodasing	-	Arcus Consultancy Services South Africa (Pty) Ltd
Project Manager & EAP	Ashleigh von der Heyden	-	Arcus Consultancy Services South Africa (Pty) Ltd
Specialist Project Team:	Dr Owen Davies	-	Arcus Consultancy Services South Africa (Pty) Ltd
	Dr Brian Colloty	-	Enviro Sci. (Pty) Ltd
	Jayson Orton	-	ASHA Consulting (Pty) Ltd
	Johann Lanz	-	Independent Consultant
	Jamie Pote	-	3Foxes Consulting
	Stephen Faultley	-	Techso (Pty) Ltd
	Alan Moore	-	Arcus Consultancy Services South Africa (Pty) Ltd
	Leandri Kruger	-	Independent Consultant
	Kerry Schwartz	-	SiVEST SA (Pty) Ltd
	Michael Brits Jonathan Aronson	-	Arcus Consultancy Services South Africa (Pty) Ltd
Project Applicant:	Paulputs Wind Energy Facility South (RE)(Pty) Ltd		
Report Status:	Basic Assessment Report – Draft for Public Comment		

PUBLIC PARTICIPATION PROCESS: INVITATION TO COMMENT

Invitation to Comment: Members of the public, local communities, and stakeholders are invited to comment on the Amendment Report which is made available for public review and comment from **Friday, 30 July 2021 to Monday, 30 August 2021 (both days inclusive) at the following locations.**

Location	Physical Address	Contact person
Hard Copy Location:		
Pofadder Library	108 Water Street, Pofadder	J. Kamies – 054 933 0221
Electronic Copy Location		
Arcus Website	https://arcusconsulting.co.za/projects/	Ashleigh von der Heyden 021 412 1529
Comment Submission		
Comments can be submitted to: Arcus Consultancy Services South Africa (Pty) Ltd Office 607 Cube Workspace Icon Building Cnr Long Street and Hans Strijdom Avenue Cape Town 8001 T +27 (0) 21 412 1529 l E paulputs@arcusconsulting.co.za		

EXECUTIVE SUMMARY

The Applicant, Paulputs Wind Energy Facility South (RE) (Pty) Ltd ('Paulputs South'[1]), intends to apply for Environmental Authorisation for the construction and operation of the Paulputs South WEF Grid Connection and associated infrastructure - which includes a substation yard and BESS (hereon referred to as the 'proposed development'). This document serves as the **Basic Assessment Report (BAR)** which aims to present the environmental impact assessment undertaken on the preferred alternative for the proposed development.

The preferred site layout and technical specifications of this proposed development were assessed by the specialists in the approved 300MW Paulputs Wind Energy Facility (WEF) Environmental Impact Assessment (EIA), undertaken by Arcus Consulting Services South Africa ('Arcus') in 2019. The findings and recommendations contained in these specialist reports have been subsequently validated with reference to this BAR. It is intended that this BAR will provide sufficient information to Interested and Affected Parties (I&APs), Organs of State and to the Department of Forestry, Fisheries and Environment (DFFE) - acting as the Competent Authority (CA) - to make an informed comment and decision on the proposed development.

In terms of Regulation 11 of the NEMA EIA Regulations, 2014 (as amended), the Applicant ('Paulputs South') requested that the Department consider issuing two separate Environmental Authorisations for (1) A OHPL and (2) A Substation yard, including BESS, as the OHPL will eventually be taken over by Eskom. This approach has been approved by the DFFE on 08 September 2020 and one combined Basic Assessment Report and Application has been submitted for consideration.

PROJECT BACKGROUND

Paulputs Wind Energy Facility (RF) (Pty) Ltd ('PWEF'), a wholly owned subsidiary of WKN Windcurrent SA (Pty) Ltd, was granted environmental authorisation for the 300 MW (75 Turbine) Paulputs Wind Energy Facility (WEF) and its associated 132 kV Grid Connection on 11 December 2019 by the Department of Forestry, Fisheries and Environment (DFFE) (DFFE Reference No. 14/12/16/3/3/2/1120) (Figure 1.1).

As part of the original Environmental Impact Assessment (EIA), three alternative Grid Connection options (A, B and C) and three alternative on-site substation options (A, B and C) were assessed. The Competent Authority (CA), DFFE, chose to only issue a favourable authorisation for the preferred Grid Connection option 'C' and on-site substation option 'A'. (Figure 1.1).

To comply with the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bidding requirements, the 300MW Paulputs WEF is being split into the 150MW Paulputs South WEF and the 150MW Paulputs North WEF (being split as part of a separate amendment application). The authorised Grid Connection option 'C' and on-site substation option 'A' will be used for Paulputs North WEF. A new authorisation for additional electrical infrastructure is thus required to connect Paulputs South WEF to the national grid.

THE PROPOSED DEVELOPMENT

[1] Paulputs Wind Energy Facility (RE) (Pty) Ltd has given permission to Paulputs Wind Energy Facility South (RE) (Pty) Ltd to submit an application for the proposed development. Three separate Part II amendment applications are being undertaken in parallel with this application to split and amend the Paulputs WEF EA into Paulputs North WEF, Paulputs North WEF Grid Connection Paulputs South WEF respectively.

In effect of the above, Paulputs South (the Applicant[2]) intends to apply for Environmental Authorisation for the construction and operation of the Paulputs South WEF Grid Connection and associated infrastructure - which includes a substation yard and BESS (hereon referred to as the 'proposed development'). Both the OHPL and substation above were assessed as part of the approved Paulputs WEF (Reference No. 14/12/16/3/3/2/1120), and as such, this BAR assessment will serve to validate the information contained within the approved EIA report (Arcus, 2019) for the Paulputs WEF[3] such that:

- The proposed OHPL route was originally referred to as the OHPL Option A; and
- The Proposed On-site Substation area was originally referred to as the Substation Option C.

The proposed development is located approximately 35 km north-east of Pofadder and approximately 80 km west of Kakamas and is situated in two district municipalities, the Namakwa District Municipality and the ZF Mgcawu District Municipality, and within the Khâi-Ma Local Municipality and the Kai !Garib Local Municipality, Northern Cape Province (Plate I, Figure 1.2). Project locality details are shown in Table I below.

Table I: Project Locality Details

Farm Name and Farm Portion	Size in hectare (Ha)	21 digit surveyor general codes
Farm Konkoonsies 91, Portion 6	1713.12	C03600000000009100006
Farm Lucasvlei 93, Portion 1	3193.78	C03600000000009300001
Farm Lucasvlei 93, Portion 2	2895.08	C03600000000009300002
Farm Scuit-Klip 92, Remaining Extent	5447.91	C03600000000009200000
Farm Scuit-Klip 92, Portion 1	3507.64	C03600000000009200001
Farm Scuit-Klip 92, Portion 3	948.99	C03600000000009200003
Farm Scuit-Klip 92, Portion 4	3507.63	C03600000000009200004
Farm Scuit-Klip 92, Portion 5	1573.06	C03600000000009200005

The proposed development assessed in this report includes the development of all specific and require infrastructure in order to establish the connection between the Paulputs South WEF and Paulputs North WEF facilities and the national grid (Plate I and Figure 1.2). This infrastructure will include:

- A 4.4 ha substation yard comprising:
  - 1.1 ha on-site substation;
  - 0.5 ha for offices;
  - 1 ha temporary storage area which will be used for the battery energy storage systems (BESS); and
  - 1 ha permanent laydown area.
- A double circuit Overhead Powerline (OHPL) of 132kV which will Loop–in and Loop-out (LILO) of the on-site substation and the existing Eskom Paulputs Main Transmission Substation (MTS).
- Up to 6m wide access roads to the Substation Yard, and 4m wide jeep tracks to provide access to and along the 31m OHPL servitude.

[2] Paulputs Wind Energy Facility (RE) (Pty) Ltd has given permission to Paulputs Wind Energy Facility South (RE) (Pty) Ltd to submit an application for the proposed development. Three separate Part II amendment applications are being undertaken in parallel with this application to split and amend the Paulputs WEF EA into Paulputs North WEF, Paulputs North WEF Grid Connection Paulputs South WEF respectively.

[3] The EA was issued with commentary that the DEFF chose to only approve a preferred option, and thus did not consider any other alternatives, regardless of their suitability to the proposed development.

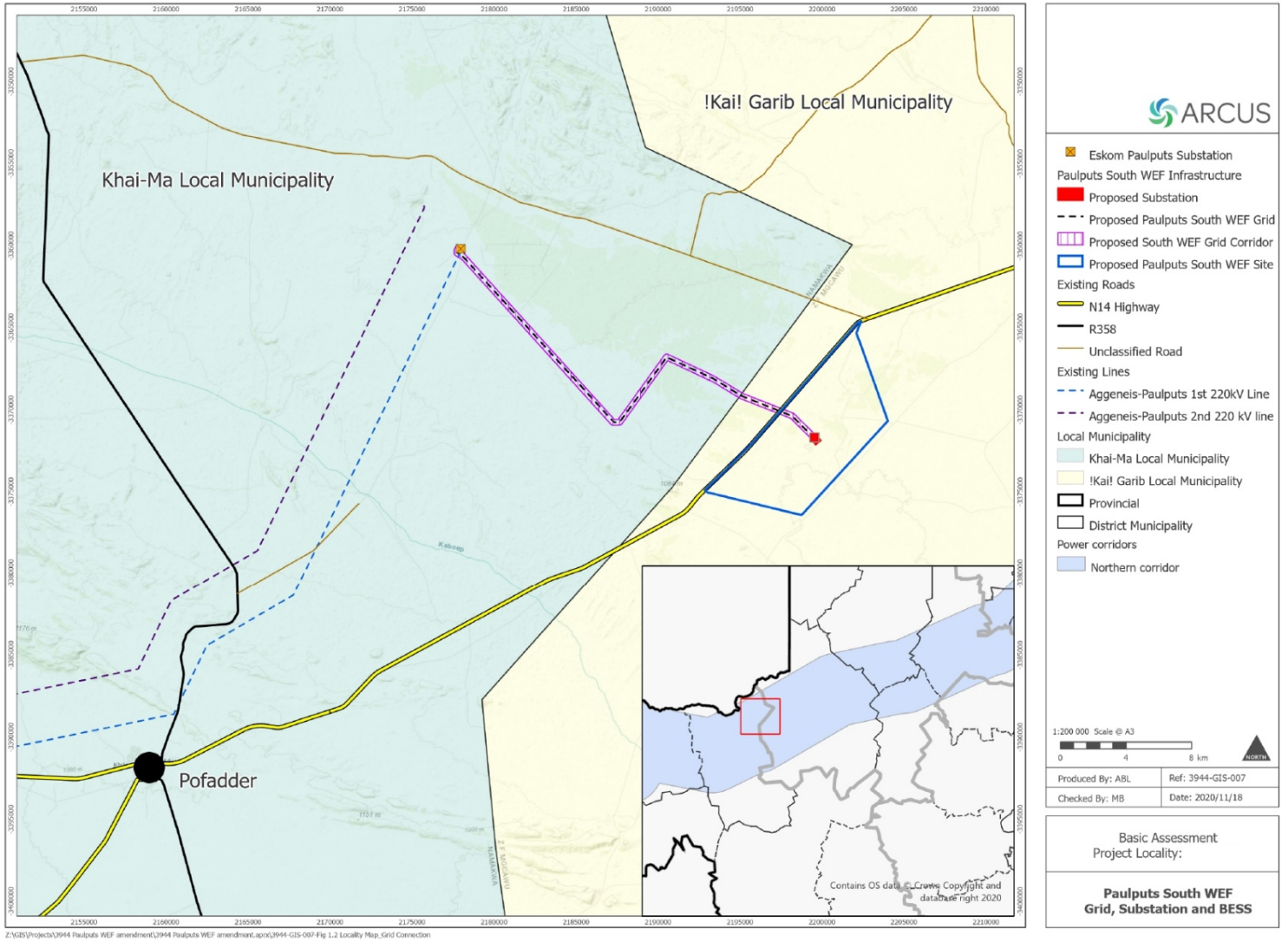

Plate 1: Locality map showing the demarcated 300m corridor for the Paulputs South WEF OHPL

A SUMMARY OF THE PROJECT NEED AND DESIRABILITY:

Under the National Infrastructure Plan, 18 Strategic Integrated Projects (SIPs) have been developed to promote fast-tracked development and growth of social and economic infrastructure across all nine provinces. Among the 18 SIPs, **SIP 8** targets the development of green energy in support of the South African economy (The Paulputs South WEF) and **SIP 10** targets the provision of electricity transmission and distribution for all (This application).

The development of the OHPL, on-site substation and operational BESS as part of the Paulputs South WEF, is required for several reasons. These are:

- The Paulputs South WEF will not be able to transfer the electricity generated without the proposed development;
- The OHPL and on-site substation will evacuate electricity generated by the proposed Paulputs South WEF into the National Eskom grid; and
- The BESS will diminish the variability of energy supply into grid – thus making power supply into the national Eskom grid more reliable.

SUMMARY OF THE CONSIDERATION OF ALTERNATIVES:

In accordance with the requirements of Appendix 1 of the 2014 EIA Regulations (as amended), a basic assessment report must contain a consideration of the alternatives, which can include activity alternatives, site/location alternatives, layout alternatives, technology alternatives and the "do-nothing" alternative.

- **Activity Alternatives:** No alternative 'Activities' are being assessed as part of this BAR. Paulputs South WEF requires a OHPL, on-site substation with BESS to connect to the national grid. The OHPL will connect into the existing Eskom-Paulputs substation.
- **Site/Location Alternatives:** The Proposed Development is to be located on the footprint previously assessed as part of the Approved Paulputs WEF. As such, no alternative sites have been assessed.
- **Layout Alternatives:** The preferred layout of the OHPL and substation was assessed as part of the authorised Paulputs WEF EIA (Arcus, 2019). This preferred layout (as part of the Paulputs WEF EIA) was assessed by specialists between July-August 2019, and again in July 2020. As such, no layout alternatives will be assessed. Avifaunal monitoring took place between Autumn 2019 and Summer 2020
- **Technology Alternatives:** The battery technology being considered is Flow, Solid-State, Lithium Ion (Li-Ion) and/or Sodium Sulphur batteries. The EAP has undertaken a high-level desktop study and risk assessment of the BESS for the proposed amendment. The undertaking of the RA was based on instruction given by DFFE to assess the impact of the preferred battery technologies, as well as the findings and recommendations contained within the Specialist Reports.
- **No-Go Alternative:** If the proposed development is not built (i.e. the No-Go / "do-nothing" alternative is preferred) then the Paulputs South WEF will not be able to connect into the national grid and supply renewable electricity to all grid users. In addition, by not constructing the BESS, this could result in the WEF having a reduced efficiency and potential operational interruptions as a result of an unstable grid, which may make the WEF limited in its capacity to be a competitive bidder within the REIPPP or any programmes going forward.

SUMMARY OF THE ASSESSMENT OF POTENTIAL IMPACTS

The specialist assessments and information relating to the baseline environment, collected through field and desktop research and outlined in the approved Paulputs WEF EIA (Arcus, August 2019), was drawn upon to assess the environmental impacts of the proposed development. Each specialist involved in the authorised Paulputs WEF EIA study provided a validation of the existing information contained within their original assessments. These

validations, along with a site sensitivity verification (in line with the DFFE Screening tool protocols) are found in Section 10 and Volume II. The table below aims to provide the Competent Authority and I&APs with details relating to the findings and recommendations of this assessment in relation to the findings contained in the specialist studies undertaken as part of the authorised Paulputs WEF EIA (Arcus, 2019):

Table V: Comparison of Findings and Recommendations between the Paulputs WEF EIA and this BA Report

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	**Original EIA Conclusion**	**Screening Tool Sensitivity**	**Validation Conclusion**
Geology, Soils and Agriculture	The OHPL will be located on land zoned and used for agriculture (grazing). The assessment has found that the OHPL and Substation will only impact agricultural land which is of low agricultural potential and only suitable for grazing.	Due to the low agricultural potential of the site, and the consequent low agricultural impact, there are no restrictions relating to agriculture which preclude authorisation of the OHPL and Substation.	**Medium**	Because of the low sensitivity of the site and the negligible agricultural impact of grid infrastructure in this agricultural environment, the proposed development does not have an unacceptable negative impact on the agricultural production capability of the site. For the same reasons, micro-siting will have no influence on agricultural impacts in this environment and it is therefore confirmed that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities.
Geotechnical	Based on geological and geotechnical information obtained for Paulputs and interpretation thereof, there appears to be no geotechnical reason for the wind farm development not to proceed.		None	N / A
Aquatic	The proposed layout of the OHPL and Substation would seem to have limited impact on the aquatic environment.	Based on the site visit the significance of the impacts assessed for the aquatic systems after mitigation would be Low. The final number of actual water course crossings can be determined when micro-siting occurs, but presently 67 crossings have been identified that would trigger the need for a Water Use License application (WULA) (a potential General Application [GA]) in terms of Section 21 c and i of the National Water Act (Act 36 of 1998) (NWA), should any construction take place within these areas. Should any of the present road crossings need to be upgraded then the opportunity exists to improve the	**Very High**	The aforementioned OHPL, Substation and BESS has little bearing on the aquatic environment as the footprint would not result in any changes to the impacts previous assessed. Therefore the significance of the impact would remain low after mitigation during the construction, operation and decommissioning phases of the project as the with the exception of road crossings all the delineated systems with a High Sensitivity as is required by the Biodiversity Assessment Protocols – Aquatic Theme will be avoided.

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	Original EIA Conclusion	Screening Tool Sensitivity	Validation Conclusion
		current state (lack of habitat continuity) for example by replacing pipe culverts with box culverts. This opportunity to improve the hydrological conditions can be seen as a net benefit and has been assessed as part of the cumulative impact statement.		
Terrestrial Biodiversity	The OHPL and Substation is located within the Bushmanland Arid Grassland vegetation type, which is an extensive vegetation type considered to be generally low sensitivity with a low abundance of species of concern. Under the final layout assessed, it was found that there would not be a direct impact on the rocky outcrops. The abundance of listed fauna in the area is low and there while there are some habitats present that are considered to be of high faunal value, these occupy a small proportion of the site and have been avoided.	In terms of the limits of acceptable change within the different sensitivity categories provided for the development, the final development footprint is well within these limits and as such no limits of acceptable change have been exceeded by the development.	**Very High** for Terrestrial Biodiversity	Terrestrial Biodiversity Theme is Very High, with Critical Biodiversity Area 1 & 2, Ecological Support Area and FEPA quinary catchments indicated as being present. The proposed development would result in the limited transformation and loss of some natural habitat, limited to the footprints for pylons, the substations and BESS and an access road along the route, typically consisting of a two-track road. This loss will be highly localised but will result in a negligible cumulative loss of the vegetation type and species. The northern section of the powerline route also intersects with a designated CBA (2) and the southern end with a designated CBA (1)1, although there is no discernable difference between the habitat within the designated CBA's and surrounding areas. The footprint within these areas will be restricted to pylon footprints only and hence will be negligible in area.
Plant Species			**Medium** for Plant Species	Plant Species Theme is Medium with two flora species conservation concern (Crotalaria pearsonii & sensitive species 144) indicated as possibly occurring in the vicinity of the site. Numerous flora and fauna species protected in terms of the Northern Cape Nature Conservation Act

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	Original EIA Conclusion	Screening Tool Sensitivity	Validation Conclusion
				(Act 9 of 2009) are present or likely to be present and will require the appropriate permits before commencement. Several more sensitive habitats, generally confined to small areas, within the broader homogenous Bushmanland Arid Grassland landscape were noted and have been mapped and designated a higher sensitivity. This is due to the prevalence of various protected species that are not common to the surrounding grassland mozaic.
Animal Species			**High** for Animal Species	Animal Species Theme is Medium/High with possibly species including a single bird, Neotis ludwigii. Due to the small size of the overall footprint, risks to faunal species are likely to be low.
Avifauna	Activity and abundance of priority species and red data species were found to be very low to low. The diversity of these species recorded was also low. Abundances and diversity of small passerines was found to be low as well.	The OHPL and Substation does have the potential to negatively impact certain species, particularly Ludwig's Bustard. This impact is partially mitigatable and considered acceptable when all mitigations have been applied. All mitigation measures listed must be included in the EMPr or as a condition of the EA. From an avifaunal perspective, the project is acceptable and can be authorised.	None	It is unlikely that the OHPL, Substation and BESS would result in a change in impacts as assessed for the authorised EIA – including cumulative impacts. Impacts can be mitigated to acceptable levels provided the recommended mitigation measures of the original authorisation are implemented.
Bats	It is envisioned that the OHPL, Substation and BESS will have a low impact on bats in the proposed project vicinity.	Impacts can be mitigated to acceptable levels provided the recommended mitigation measures of the original authorisation are implemented.	None	It is unlikely that the OHPL, Substation and BESS would result in a change the significance in impacts as assessed in the FEIR – including cumulative impacts. Impacts can be mitigated to acceptable levels provided the recommended

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	**Original EIA Conclusion**	**Screening Tool Sensitivity**	**Validation Conclusion**
				mitigation measures of the original authorisation are implemented.
Noise	Construction noise impacts are no more than Low significance. Mitigation measures were recommended. Potential impacts of no more than Low intensity were identified for the operation of the OHPL and Substation no further mitigation is therefore required.	No significant impacts are therefore anticipated due to the OHPL and Substation and as such, it is the opinion of the author that the proposed development may be authorised. It is recommended that a condition is attached to the permission for the OHPL and Substation, requiring that noise due to the operation of the proposed development is not to exceed standard noise levels.	None	Overall, the OHPL, Substation and BESS will not result in any additional noise impact relative to that already assessed and authorised Paulputs WEF.
Heritage, Archaeology and Palaeontology	In terms of the powerlines, there is still a small chance that isolated water holes with associated archaeological sites can be located in open areas but these could only be identified once a final road layout is available and surveyed. The landscape is more natural than cultural but will experience visual impacts. The important part of this is that the N14 is considered a route of cultural significance and aesthetic value because of the qualities of the landscape through which it passes.	It is best practice to avoid all significant heritage sites but, if this is not possible, mitigation can still be effected if necessary. It is recommended that a pre-construction archaeological survey be carried out within the authorised footprint in order to identify any residual issues and recommend mitigation as may be required. It remains possible, that rare, isolated bones might be present and could be damaged or destroyed during	**High** – Heritage and Archaeology	Given that the project has been studied in its entirety, no new impacts are envisaged aside from a very minor potential increase in cumulative impacts. In light of the already authorised electrical projects in the area, including some that are already in operation, the intensity of this increase is deemed to be negligible. The site and its surrounds have already had an electrical layer added to the cultural landscape and the change proposed by the proposed OHPL, Substation and BESS will be negligible. As such, all assessment ratings

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	**Original EIA Conclusion**	**Screening Tool Sensitivity**	**Validation Conclusion**
	The existing power lines and substation within the area, present a far more limited impact and, if the wind farm is constructed then the proposed OHPL and Substation would have a negligible further impact.	construction activities. Mitigation would involve protecting and reporting any fossils that are found so that they can be examined and collected (if necessary) by a palaeontologist. Because impacts of high significance are not expected to occur, it is recommended that the proposed OHPL and Substation can be authorised.	**Medium** - Palaeontology	provided in the original impact assessment continue to apply.
Visual	Overall, sparse human habitation and the predominance of natural vegetation cover across much of the broader project area would give the viewer the general impression of a largely natural setting with some pastoral elements. The level of contrast will however be reduced by the presence of the KaXu, !Xina and Konkoonies SEFs, the Paulputs substation and the existing high voltage power lines in close proximity to the Paulputs WEF application site. The area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. The proposed 132kV power line and substation will have a moderate impact	No fatal flaws were identified for any of the substation sites or power line route options. The visual impacts associated with the proposed Paulputs WEF development (which includes the OHPL and Substation) infrastructure are of moderate significance. Given the low level of human habitation and the absence of sensitive receptors, the project is deemed acceptable from a visual perspective and the EA should be granted. The impacts associated with the construction, operation and decommissioning phases of the project can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.	None	The OHPL, Substation and BESS will not give rise to additional visual impacts or exacerbate the impacts previously identified in the VIA for the Paulputs WEF OHPL. Given the low level of human habitation and the absence of sensitive receptors in the area, the project is deemed acceptable from a visual perspective.

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	**Original EIA Conclusion**	**Screening Tool Sensitivity**	**Validation Conclusion**
	on eleven (11) potentially sensitive receptors.			
Social	The findings of this Social Impact Assessment (SIA) conducted for the proposed OHPL and Substation indicates that during the construction and the operational phase of the proposed development project, various employment opportunities, with different levels of skills will be created. In addition this will also create local business opportunities benefitting the socio-economic development of the local communities of Pofadder and Kakamas.	The establishment of the proposed Paulputs WEF and OHPL and Substation is therefore supported by the findings of this SIA report and therefore, also creating a positive social benefit for society. The local communities will however benefit from the establishment of a Community Trust if it is managed effectively. The challenges posed by climate change and global warming will be addressed by the investment in renewable energy facilities like the proposed Paulputs WEF and OHPL and Substation.	None	The proposed OHPL, Substation and BESS will not result in any additional impacts, cumulative impacts or residual impact, nor will it change the significance of these impacts. Paulputs South must ensure compliance with the recommendations of Section 4 of the approved SIA for the Paulputs WEF and OHPL, Substation and BESS.
Traffic	The proposed grid is expected to be built over a period of 24 months. The grid build would run concurrently with the construction of the Paulputs South WEF and is not expected to generate significant traffic volumes on the road network. A Traffic Management Plan must be prepared to reduce limit traffic congestion and to enhance road safety, in light of the additional traffic due to the associated WEF; and to ensure safe site access and a Transport Management Plan must be prepared to address transport of abnormal super-load and abnormal load vehicles to and on-site.	It was concluded that the development of the grid and associated infrastructure will not have undue detrimental impact on traffic and that identified impacts can be suitable mitigated. It is the reasoned opinion of the specialist that the development of the grid can be approved, from a traffic and transport engineering perspective, subject to the specific requirements / mitigation measures included in the specialist report.	None	The proposed development does not change the Traffic Specialist Report findings and recommendations as stated in the authorised Paulputs WEF EIA. A transport management plan must be compiled and must consider the logistics of transporting abnormal loads to site. This plan must be compiled after preferred bidder is awarded.

SUMMARY OF THE CONCLUSIONS AND RECOMMENDATIONS

The proposed Paulputs South WEF, and the OHPL, Substation and BESS applied for in this application, have the potential to provide much needed renewable energy to the country's grid. The use of renewable energy to provide power to South Africa is supported at international, national, provincial and local level. Given South Africa's need for additional electricity generation and the need to decrease the country's dependency on coal-based power, renewable energy has been identified as a national priority, with wind energy identified as one of the readily available, technically viable and commercially cost-effective sources of renewable energy.

This separate application for the OHPL, Substation and BESS is needed to connect Paulputs South to the national grid, it is necessary that the project components are divided into two Environmental Authorisations for (1) the OHPL and (2) the substation yard, including BESS, because the Environmental Authorisation for the proposed OHPL may become the property of ESKOM in the future and would thus not be controlled by the Applicant. The substation and BESS will remain the property of the Applicant.

Taking into consideration the findings of this BAR and the findings of the approved Paulputs WEF EIA, it is the opinion of the Environmental Assessment Practitioner (EAP) that most negative impacts associated with the implementation of the proposed development can be mitigated to acceptably low levels.

While potential residual impacts may exist, these will have a very low impact on the proposed development site only. The need and desirability outlined can be seen as the benefits associated with the implementation of the proposed development and is intended to benefit a much larger group of people, in terms of renewable energy supply and positive local and regional economic impact

Overall, it is recommended that the Paulputs South WEF OHPL, on-site substation, battery energy storage system (BESS) and associated infrastructure be authorised, subject to implementation of the recommended mitigation measures and management actions contained in the approved Paulputs WEF EIA, this BA report, the EMPr's and all the specialist reports.

TABLE OF CONTENTS

ATTACHED FIGURE LIST:

PLATE LIST:

TABLE LIST:

ACRONYMS

BA	Basic Assessment	**IPP**	Independent Power Producer
BAR	Basic Assessment Report	**kV**	Kilo Volt
CA	Competent Authority	**Li-Ion**	Lithium Ion
CAA	Civil Aviation Authority	**MTS**	Main Transmission Substation
dB	Decibels	**MW**	Mega Watt
BESS	Battery Energy Storage System	**NEMA**	National Environmental Management Act
DAEARD &LR	Northern Cape Department of Agriculture, Environmental Affairs, Rural Development & Land Reform	**NEMAA**	National Environmental Management Amendment Act
DFFE	Department of Forestry, Fisheries and Environment	**NFEPA**	National Freshwater Ecosystem Priority Area
DENC	Northern Cape Department of Environment and Nature Conservation	**NERSA**	National Energy Regulator of South Africa
DoE	Department of Energy	**NHRA**	National Heritage Resources Act
DMRE	Department of Mineral Resources and Energy	**NWA**	National Water Act
EA	Environmental Authorisation	**PES**	Present Ecological State
EAP	Environmental Assessment Practitioner	**PPP**	Public Participation Process
ECA	Environment Conservation Act, 1989 No. 73 of 1989)	**REIPPPP**	Renewable Energy Independent Power Producer Procurement Programme
EGI	Electricity Grid Infrastructure	**S&EIA**	Scoping and Environmental Impact Assessment
EIA	Environmental Impact Assessment	**SABAAP**	South African Bat Assessment Advisory Panel
EMF	Environmental Management Framework	**SAHRA**	South African Heritage Resources Agency
EMPr	Environmental Management Programme	**SANBI**	South African National Biodiversity Institute
GPS	Global Positioning System	**SANRAL**	South African National Roads Agency Limited
GWh	Giga Watt hour	**SCADA**	Supervisory Control and Data Acquisition
Ha	Hectares	**SDF**	
HIA	Heritage Impact Assessment	**SEA**	Strategic Environmental Assessment
I&APs	Interested and Affected Parties	**SIA**	
IDP	Integrated Development Plan	**WEF**	
IFC	International Finance Corporation		

1 INTRODUCTION

Paulputs Wind Energy Facility (RF) (Pty) Ltd ('PWEF'), a wholly owned subsidiary of WKN Windcurrent SA (Pty) Ltd, was granted environmental authorisation for the 300MW (75 turbines) Paulputs Wind Energy Facility (WEF) and its associated 132kV OHPL on 11 December 2019 by the Department of Forestry, Fisheries and Environment (DFFE) (DFFE Reference No. 14/12/16/3/3/2/1120). As part of the original Environmental Impact Assessment (EIA)[4], three alternative OHPL options (A, B and C) and three alternative on-site substation options (A, B and C) were assessed. The Competent Authority (CA), DFFE, chose to only issue a favourable authorisation for the preferred OHPL option 'C' and on-site substation option 'A' (Figure 1.1).

To comply with the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bidding requirements, the abovementioned 300MW Paulputs WEF is being split into the 150MW Paulputs South WEF and the 150MW Paulputs North WEF (being split as part of a separate amendment application). The authorised OHPL option 'C' and on-site substation option 'A' will be used for Paulputs North WEF and a new authorisation for additional electrical infrastructure is now required to connect Paulputs South WEF to the National Grid.

As a result of the decision above, WKN Windcurrent SA (Pty) Ltd, under the Special Purpose Vehicle (SPV) Paulputs Wind Energy Facility South (RE) (Pty) Ltd ('Paulputs South'[5]), is is seeking Environmental Authorisation for the alternatives not approved in the original EIA. Paulputs South intends to construct and operate the Paulputs South WEF OHPL and Substation yard (the 'proposed development') (Figure 1.2) which, as read above, is vital for connecting Paulputs South WEF to the National Eskom Grid and for ensuring the Paulputs South WEF's successful contribution to the REIPPPP.

The findings and recommendations contained in the specialist reports (Volume II or the Original EIA) have been subsequently validated with reference to this BAR. Specialists were requested to compiled validation reports/letters which consider the following:

- Confirm if the information pertaining to the OHPL options and substation options of the Original EIA is unchanged when compared to the project description and scope of work for the proposed development. Where changes are made, these must be noted.
- To validate that findings and recommendations of original EIA specialist reports are still relevant with regards to the proposed development. Where impacts have changed, they must be fully assessed.
    - Specialists are to consider the impacts of Battery Energy Storage Systems on the area approved for Temporary Laydown in the original EIA. Where potential impacts may arise, these must be assessed and mitigation measures must be provided to mitigate these impacts as far as reasonably and practically possible.
- Validate the findings of the DFFE Environmental Screening tool with reference to the proposed development and ensure that the protocols have been considered and met in a site verification report.

Plate 1-1 (Figure 1.1 attached) shows the infrastructure which was assessed as part of the original EIA. Plate 1-2 (Figure 1.2 attached) shows the infrastructure being considered as

[4] The EIA undertaken by Arcus Consultancy Services (Pty) Ltd in 2019, which assessed the Paulputs Wind Energy Facility (WEF) and its associated 132kV grid connection, is hereon referred to as the **'original EIA'**

[5] Paulputs Wind Energy Facility (RE) (Pty) Ltd has given permission to Paulputs Wind Energy Facility South (RE) (Pty) Ltd to submit an application for the proposed development. Three separate Part II amendment applications are being undertaken in parallel with this application to split and amend the Paulputs WEF EA into Paulputs North WEF, Paulputs North WEF Grid Connection Paulputs South WEF respectively.

part of this BAR. Notably, Battery Energy Storage Systems (BESS) were not assessed or approved in the original EIA. As part of this BAR, BESS have been assessed and/or considered by both specialists (Volume II) as well as by the EAP. BESS have been described in Section 2 and Section 4, and a Risk Assessment for the potential BESS technologies has been included in Section 10 with specific mitigation measures being recommended in Section 12. With the lack of research and uncertainty around preferred BESS technology – specifically technologies preferred for large renewable energy projects – this BAR chooses to not assess a preferred technology, but rather a range of technologies applicable for Wind Energy Facilities.

Under the National Infrastructure Plan, 18 Strategic Integrated Projects (SIPs) have been developed to promote fast-tracked development and growth of social and economic infrastructure across all nine provinces. Among the 18 SIPs, **SIP 8** targets the development of green energy in support of the South African economy (The Paulputs South WEF) and **SIP 10** targets the provision of electricity transmission and distribution for all (This application).

The development of the OHPL, on-site substation and operational BESS as part of the Paulputs South WEF, is required for several reasons. These are:

- The Paulputs South WEF will not be able to transfer the electricity generated without the proposed development;
- The OHPL and on-site substation will evacuate electricity generated by the proposed Paulputs South WEF into the National Eskom grid; and
- The BESS will diminish the variability of energy supply into grid – thus making power supply into the national Eskom grid more reliable.

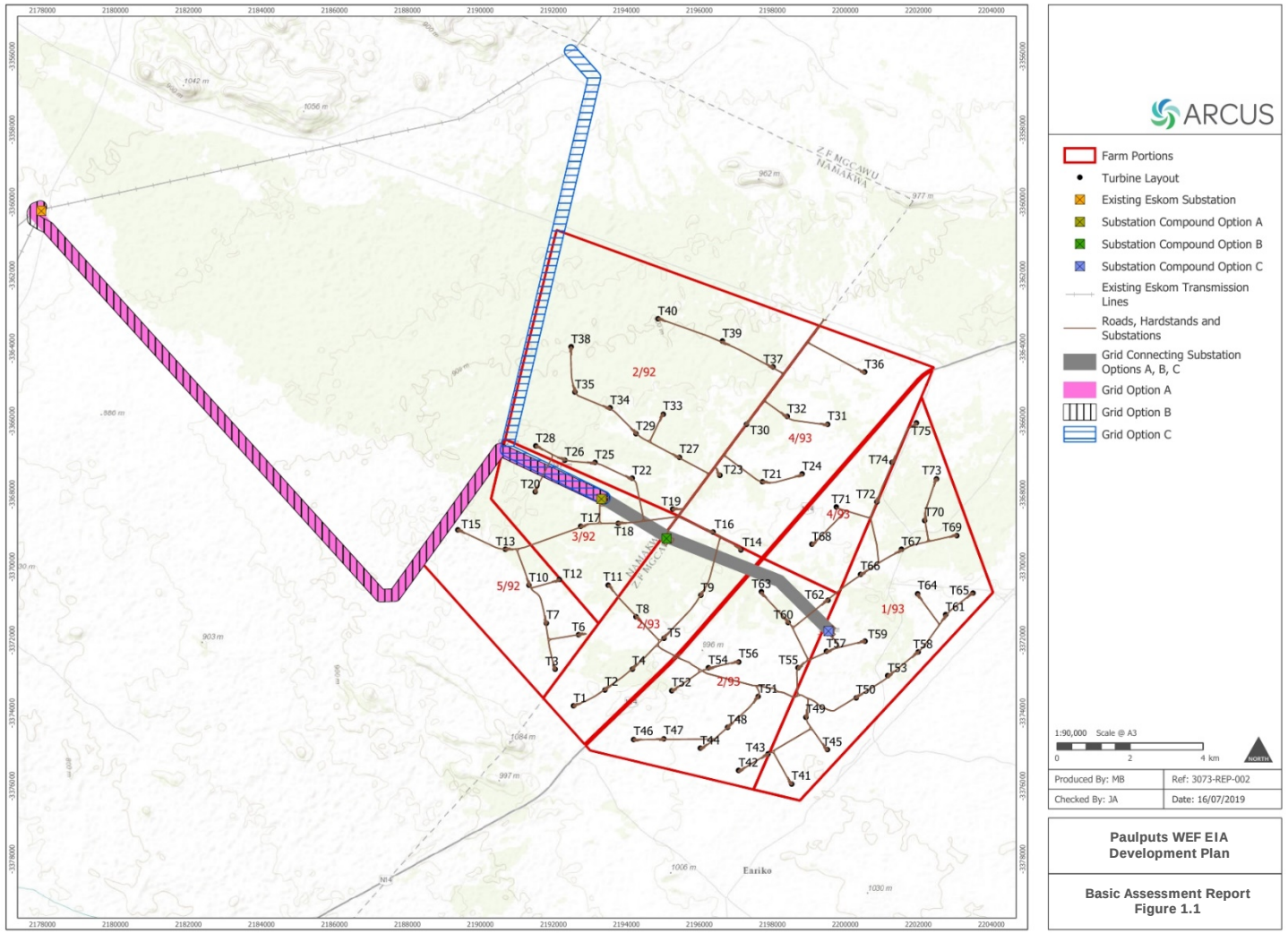

Plate 1-1: Approved Paulputs WEF Development Plan indicating the OHPL options and substation options assessed.

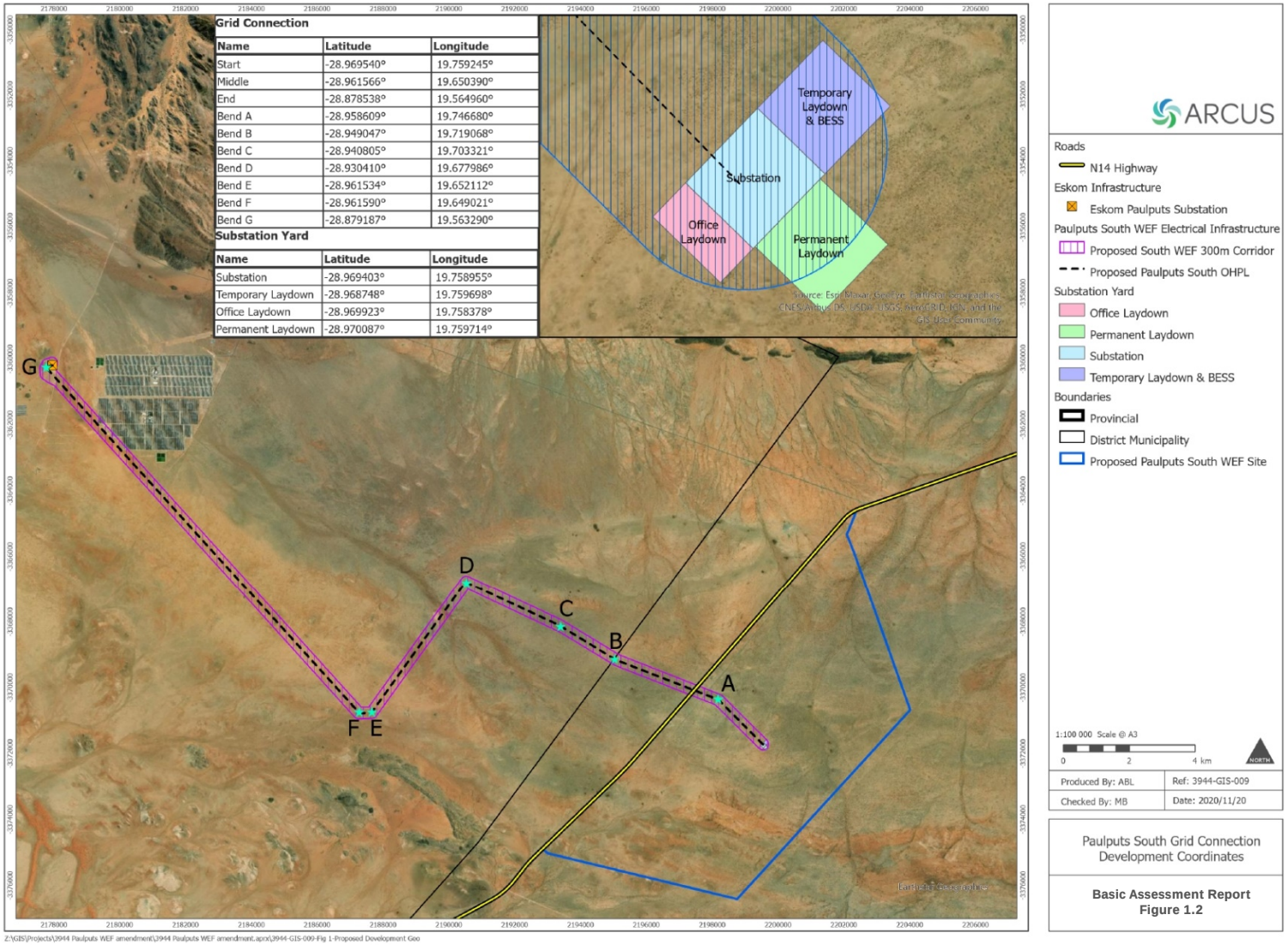

Plate 1-2: Proposed Paulputs South WEF OHPL and Substation Yard

This BA report aims to provide the following information for the competent authority to make an informed decision on the application:

- Policy and legislative context of the proposed development;
- Methodology used to conduct the assessment and derive an outcome;
- The public participation process;
- The baseline environmental conditions including any specialists' studies conducted;
- The need and desirability;
- The assessment of alternatives; and
- The results of the impact assessment.

Document layout

This Draft Basic Assessment Report has been separated into two volumes:

- Volume I: This includes the BAR and its Appendices
- Volume II: This includes the Specialist Impact Assessments and site verifications.

NEMA Appendix 1 Document Requirements

As a minimum, the BAR aims to satisfy the requirements stipulated in Appendix 1 of GN No. R 983 of 4 December 2014 (as amended). The BAR represents the outcomes of the assessment process and contains the following Sections with reference to the legal requirements as outlined in the National Environmental Management act, 1998 (Act No. 107 of 1998) (NEMA) EIA Regulations, 2014 (as amended):

Table II: NEMA Appendix 1 Document Requirements

NEMA Regulation Requirement		**Report section**
(a)	**Details of -**	
(i)	The EAP who prepared the report and;	Section 1
(ii)	The expertise of the EAP, including a CV	Appendix A
(b)	**The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including:**	Section 2
(i)	The 21-digit Surveyor General code of each cadastral land parcel	Section 2
(ii)	Where available, the physical address and farm name	
(iii)	Where the required information in terms of (i) and (ii) is not available, the coordinates of the boundary of the property or properties	N/A
(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 –**	Figures
(i)	A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken	
(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 –**	Section 2 and Section 6
(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.	Section 2
(e)	**A description of the policy and legislative context within which the development is proposed**	Section 5

NEMA Regulation Requirement		Report section
(i)	An identification of all the 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 this report; and	
(ii)	How the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks and instruments.	
(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.**	Section 4
(g)	**A motivation for the preferred site, activity and technology alternative.**	Section 3
(h)	**A full description of the process followed to reach the proposed preferred alternative within the site, including -**	Section 6
(i)	Details of the alternatives considered	Section 3
(ii)	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs	Section 6
(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.	Appendix C
(iv)	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	Section 7
(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	Section 8 and Section 9
(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	Section 8
(vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community, that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	
(viii)	The possible mitigation measures that could be applied and level of residual risk	
(ix)	The outcome of the site selection matrix;	Section 9
(x)	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Section 3
(xi)	A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 3 and Section 9
(i)	**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-**	Section 8 and Section 8
(i)	a description of all environmental issues and risks that were identified during the environmental impact assessment process	
(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-**	Section 8

NEMA Regulation Requirement		Report section
(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 impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report.**	Section 8
(l)	**An environmental impact statement which contains-**	Section 9
(i)	a summary of the key findings of the environmental impact assessment:	Section 8
(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	Figures List
(iii)	a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 8
(m)	**Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the impact management outcomes for the development for inclusion in the EMPr.**	Section 8 Appendix B
(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**	Section 9
(o)	**A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed**	Section 9
(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**	Section 9
(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**	N/A
(r)	**an undertaking under oath or affirmation by the EAP in relation to-**	
(i)	the correctness of the information provided in the reports	
(ii)	the inclusion of comments and inputs from stakeholders and I&APs	Appendix A
(iii)	the inclusion of inputs and recommendations from the specialist reports where relevant; and	
(iv)	any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties	
(s)	**Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;**	N/A

NEMA Regulation Requirement		Report section
(v)	**Any specific information that may be required by the competent authority**	N/A
(w)	**Any other matters required in terms of section 24(4)(a) and (b) of the Act**	N/A

In effect of the above, Paulputs South (the Applicant[6]) intends to apply for Environmental Authorisation for the construction and operation of:

- 132 kV, double circuit, loop-in/loop-out OHPL – originally referred to as OHPL Option A in the Paulputs WEF EIA; and
- 4.4 ha and comprises: 1.1 ha on-site substation, 0.5 ha for offices, 1 ha temporary storage area which will be used for the battery energy storage systems (BESS), and 1 ha permanent laydown area. The On-site substation was originally referred to as substation option C in the Paulputs WEF EIA;

Both the OHPL and substation above were assessed as part of the approved Paulputs WEF (Reference No. 14/12/16/3/3/2/1120), and as such, this BAR assessment will serve to validate the information contained within the approved EIA report of 2019 for the Paulputs WEF[7].

In terms of Regulation 11 of the NEMA EIA Regulations, 2014 (as amended), the Applicant ('Paulputs South') requested that the Department consider issuing two separate Environmental Authorisations for (1) the OHPL and (2) the substation yard, including BESS, as the OHPL will eventually be taken over by Eskom and will thus require a separate Environmental Authorisation for the Paulputs South WEF. This approach has been approved by the DFFE on the 08 September 2020 and one Basic Assessment Report and Application will be submitted.

As the proposed developments require Environmental Authorisation (EA) from the Competent Authority (CA), Paulputs South appointed Arcus Consultancy Services South Africa (Pty) Ltd ('Arcus') as the project manager and independent Environmental Assessment Practitioner ('EAP') to undertake the necessary BA report and EA application.

1.1 Objectives of this Basic Assessment Report

A Basic Assessment is a consolidation of the two phases of a Scoping and EIA (S&EIA) process into a single phase and involves the identification and assessment of potential impacts associated with a proposed development.

The Basic Assessment Report (BAR) findings, including specialist findings, are used by the EAP, Applicant (Paulputs South) and Authorities to obtain an objective view of the potential environmental and social impacts that could arise during the construction, operation and decommissioning of the proposed development and its associated infrastructure and facilities. Aligned to the '*One Environmental System'*, this BAR has been compiled with the following objectives:

[6] Paulputs Wind Energy Facility (RE) (Pty) Ltd has given permission to Paulputs Wind Energy Facility South (RE) (Pty) Ltd to submit an application for the proposed development. Three separate Part II amendment applications are being undertaken in parallel with this application to split and amend the Paulputs WEF EA into Paulputs North WEF, Paulputs North Grid Connection and Paulputs South WEF respectively.

[7] The EA was issued with commentary that the DEFF chose to only approve a preferred option, and thus did not consider any other alternatives, regardless of their suitability to the proposed development.

The Report Objectives	•To provide the project's I&APs, stakeholders, commenting authorities and the competent authority (CA), with a thorough project description and BA process description. •To maintain cordial relationships with local residents, authorities and other stakeholders via sustained open communication •To determine the policy and legislative context within which the proposed activity is undertaken and how the activity complies with and responds to the policy and legislative context. •To describe the need and desirability of the proposed alternatives. •To provide an objective assessment of the preferred alternatives and any other alternatives that could present a viable/feasible option for development. •To minimise the negative environmental impacts as far as feasible. •To maximise the positive and minimise the negative socio-economic impacts.

The outcome of the process is to engender productive comment or input, based on all information generated to date and presented herein.

1.2 Details of EAP and Specialists

As a specialist renewable energy consulting firm, Arcus is a leader in providing environmental and social consulting, advisory and management services. Arcus provides a turn-key consulting service and has considerable experience in renewable energy developments, from site identification and feasibility through to impact assessment and the construction and operational phases.

Based in the United Kingdom and South Africa (Cape Town), our teams have worked on more than 250 renewable energy projects across the world and are highly trained in various environmental disciplines, with significant hands-on experience in an array of projects across various industries.

Arcus focuses on collaborating with the developer to deliver the most cost effective and least impacting project design that meets the needs for future generations. Arcus adopt a communicative and quality-based approach for all projects and have been certified in terms of the Quality Management System ISO 9001 standard for the past four years. This system provides tools, control measures and guidelines for reporting, data management, equipment calibration and management, timeline management, map production and overall project management.

In terms of BESS experience, Arcus has provided planning and environmental consultancy support (including EIA) on a range of client portfolios of BESS and energy management facilities including projects for Mulilo, WKNWindCurrent, SPR, Coronation Power, Element Power, Statkraft, Astra Ventures, GridCodePower as well as a National Strategic Infrastructure Project (NSIP) scheme for Cleve Hill Solar Park Ltd.

Projects have ranged in scale from local South African applications which support Independent Power Producer (IPP) Projects to nationally significant infrastructure projects (NSIP) in the United Kingdom. Our advice covers the full project life cycle from site finding through planning or Part 2 Application, to acquisition, due diligence, and operational monitoring and compliance.

1.2.1 Contact Person and Corresponding Address

Details of the Environmental Assessment Practitioner (EAP) who prepared the report are presented below:

Table 1-1: Details of the EAP

Name of practitioner	**Ms Ashlin Bodasing**
Designation	**Project Director**
Tel no	+27 (0) 21 412 1529
E-mail address	paulputs@arcusconsulting.co.za
Name of practitioner	**Mrs Ashleigh von der Heyden**
Designation	**Project Manager and EAP**
Tel no	+27 (0) 21 412 1529
E-mail address	paulputs@arcusconsulting.co.za

1.2.2 Expertise of the EAP

Ashlin Bodasing (Project Director) is a Technical Director at Arcus. Ashlin will act as Project Director and will be responsible for the overall direction of the project and ensure that all legal requirements are met.

Having obtained her Bachelor of Social Science Degree (Geography and Environmental Management) from the University of Kwa-Zulu Natal; she has over 16 years' experience in the environmental consulting industry in southern Africa. Ashlin has excellent Project Management experience and has gained major project experience in the development of Environmental Impact Assessments, Environmental Management Plans and the monitoring of construction activities. Her areas of expertise include project management, environmental scoping and impact assessments, environmental management plans, environmental compliance monitoring and environmental feasibility studies, and environmental due diligence reviews.

Ashleigh Blackwell (Project Manager and EAP) is a Senior Environmental Consultant at Arcus Consulting, Cape Town. She is a registered SACNASP Environmental Consultant with 5.5 years working experience in the environmental sector, namely the Renewable Energy and Mining sectors. In addition, she has international reporting experience for the International Finance Corporation (IFC) and Equator Principles (EP) Performance Standards and the World Bank Environmental Guidelines. Ashleigh has a proven track record in managing environmental projects to the required quality standards, timeframes and budgets. Her core responsibilities include client management and project implementation, reporting and execution. Her day-to-day responsibilities include report review, stakeholder engagement and business development.

Ashleigh completed her BSc (Hons) in Conservation Ecology at the University of Stellenbosch and is currently completing her MSc at the University of Witwatersrand. She is a member of the Soil Science Society of South Africa (SSSSA) and is completing her Project Management Professional (PMP) Certification through the Project Management Institute (PMI).

1.2.3 Specialist Team Members

Where specialist expertise is required, specialist consultants with relevant project experience, professional criteria, expertise in report writing and availability are selected (Table 1-2). Arcus maintains overall responsibility for the project, which includes managing the specialists. The quality of the studies and results provided by the specialist consultants

is considered key, as this can actively assist in expediting the authority decision-making process.

The majority of the same specialists were commissioned for this amendment report, with exception of the Avifaunal study (Table1-2). The original Avifaunal study for the approved Paulputs WEF EIA was undertaken by Andrew Pearson who is no longer a bird specialist. Dr Owen Davies has replaced Andrew and undertook an additional site visit in February 2020 to verify the information contained in the approved Paulputs WEF Avifaunal specialist report.

Table 1-2: Details of the Specialist Project Team

Technical Discipline	Lead Specialist	Specialist Organisation
Avifauna preconstruction monitoring and impact assessment	Dr Owen Davies	Arcus Consultancy Services SA Pty Ltd
Independent External Review	Chris van Rooyen	Independent Consultant
Terrestrial ecology (flora and fauna)	Jamie Pote	Independent Consultant
Soil, land use and agricultural potential	Johann Lanz	Private Consultant
Aquatic / Freshwater	Brian Colloty	EnviroSci Pty Ltd
Heritage, archaeology and palaeontology	Jayson Orton	ASHA Consulting
Socio-Economic	Leandri Kruger	Private Consultant
Noise	Alan Moore	Arcus Consultancy Services SA Pty Ltd
Visual	Kerry Schwartz	SiVest
Traffic and transportation	Stephen Fautley	TechSO

1.3 Project Assumptions and Limitations

The following assumptions and limitations are applicable to the proposed development:

- The assumption is made that the information on which this report is based (baseline studies and project information, as well as existing information) is accurate and correct.
- The assumptions and limitations presented in each specialist report (Volume II of this report) are noted for the amendment report.
- It is assumed that all information provided by Paulputs South WEF and I&APs to the project team was correct and valid at the time it was provided.
- It is assumed that the recommendations derived from this report would be included in all tender documentation/bidding documentation and the EMPr for implementation.
- It should be emphasised that information, as presented in this BA report, only has reference to the study area (Paulputs South WEF) as indicated on the accompanying figures. Therefore, this information cannot be applied to any other area without detailed investigation.

- As the design of the project has not been finalised, and due to the dynamic nature of the planning environment, the dimensions and layout of the infrastructure may change from draft reporting to final reporting. Subsequent project modifications that emanate from discussions with the I&APs and further technical considerations will be conveyed to the public domain should the need arise.

2 PROJECT DEVELOPMENT DETAILS

This section provides the technical details and design parameters of the proposed development. Additionally, this section will provide insight on the choice of preferred location and feasible specifications for the construction, operation and decommissioning of the proposed development

2.1 Project Location Description

The proposed development is located approximately 35 km south-east of Pofadder and approximately 80 km west of Kakamas in the Northern Cape Province. The OHPL is situated in two district municipalities, the Namakwa District Municipality and the ZF Mgcawu District Municipality, and within the Khâi-Ma Local Municipality and the Kai !Garib Local Municipality (Figure 1.1 and Table 2-1). The Substation and BESS are situated within the ZF Mgcawu District Municipality within the Kai !Garib Local Municipality.

Table 2-1: Project Locality Details

Property owner		Farm name and portion	Size in hectare	21 digit surveyor general codes
	FLORES JOHANNES VAN DER COLFF	SCUIT-KLIP 92/3	948.99	C03600000000009200003
		SCUIT-KLIP 92/5	1573.06	C03600000000009200005
		LUCASVLEI 93/1	3193.78	C03600000000009300001
		LUCASVLEI 93/2	2895.08	C03600000000009300002
	T G N BOERDERY TRUST	SCUITKLIP 92/0	5447.91	C03600000000009200000
	KONKOONSIES TRUST	SCUITKLIP 92/1	3507.64	C03600000000009200001
		KONKOONSIES 91/6	1713.12	C03600000000009100006
	KAXU CSP SOUTH AFRICA PTY LTD, ABENGOA	SCUITKLIP 92/4	3507.63	C03600000000009200004

Reference Point	Latitude	Longitude
OHPL Development Area Co-ordinates		
Start	28°58'10.26"S	19°45'32.51"E
Middle	28°57'17.58"S	19°38'27.51"E
End	28°52'43.69"S	19°33'53.23"E
On-Site Substation Development Area Co-ordinates		
North Corner	28°58'7.32"S	19°45'32.26"E
West Corner	28°58'9.88"S	19°45'29.46"E
South Corner	28°58'12.14"S	19°45'32.10"E
East Corner	28°58'9.61"S	19°45'34.93"E
BESS Development Area Co-ordinates		
North Corner	28°58'4.95"S	19°45'34.82"E

West Corner	28°58'7.32"S	19°45'32.26"E
South Corner	28°58'9.61"S	19°45'34.93"E
East Corner	28°58'7.24"S	19°45'37.48"E

Application area (ha)	The proposed OHPL option is approximately 26.5 km long. The substation yard is approximately 4.4 ha and comprises: 1.1 ha on-site substation, 0.5 ha for offices, 1 ha temporary storage area which will be used for the battery energy storage systems (BESS), and 1 ha permanent laydown area
Magisterial district	Ward 1 of the Khâi-Ma Local Municipality of DC6 – Namakwa District Municipality. Ward 9 of the Kai !Garib Local Municipality of DC8 – ZF Mgcawu District Municipality
Distance and direction from nearest town	The site is located 35 km north east of Pofadder.

In terms of current land uses, available services and existing infrastructure, the proposed development is surrounded by the N14 national highway to the west and the R358 regional road to the south west. The Namibian border is located approximately 50km north of the site and Namibia can be accessed via Onseepkans.. In terms of mining assets, 95% of South Africa's diamond output is in the Northern Cape. Pelladrift water scheme, Gamsbergs Zinc mine and Aggeneys Airport are located in Aggeneys, some 80 km north-west of the site.

There are no farmsteads (that is a residential and administrative node of buildings and infrastructure from which a farm is managed) impacted by the proposed development, however there are dwellings that exist. The proposed development is located within a sheep and goat farming agricultural region and currently used only for grazing. There is no cultivation across the proposed development site.

Other than grazing, the proposed development is surrounded by a number of renewable energy projects. (Figure 2.2). Directly west of the facility is the KaXu and !Xina Solar facilities as well as the smaller Konkoonsies Solar facility. Approved, constructed and operational renewable projects within 35 km of the proposed development are indicated in Table 2-2.

Eleven renewable energy projects and their associated ancillary infrastructure were identified within a 35 km radius of the proposed development site. It is assumed that all of these renewable energy developments include OHPL and Substation infrastructure.

Table 2-2 Renewable energy developments proposed within a 35 km radius of Paulputs Proposed Development

Development	Current status of EIA/development	Technology	Capacity
KaXu Solar One SEF	In operation	Solar	100MW
Khoi-Sun SEF	EIA approved	Solar	75MW
Konkoonsies SEF	In operation	Solar	20MW
Konkoonsies II SEF	Construction underway	Solar	75MW
Paulputs PV 1 SEF	EIA approved	Solar	100MW
Paulputs PV 2 SEF	EIA approved	Solar	100MW
Paulputs PV 3 SEF	EIA approved	Solar	100MW
Skuitdrift SEF	EIA approved	Solar	10MW
Southern Cross SEF	EIA underway	Solar	20MW
Tutwa SEF	EIA underway	Solar	20MW
!Xina Solar One SEF	In Operation	Solar	100MW

All of these projects are Solar Energy Facilities and are relevant as they influence the various specialists' cumulative impact assessments for the proposed development. It should be noted that this assessment is qualitative and based on specialists' knowledge.

Depending on the specialist study this 35 km radius was increased to determine the full extent of cumulative impacts.

2.2 Technical Project Details

The anticipated operational life span of the proposed development is approximately 20-25 years. This is aligned to the life span of the Paulputs South Wind Energy Facility - once fully operational. It must be noted that even though the EA applied for is a 10-year period, it may be the case that the project does not begin immediately until all environmental permits, permissions and legal matters are in place.

Table 2-3 gives an indication of the estimated timeframes in relation to the implementation of the actions, activities or project phases (construction, operation and decommissioning) for the proposed development.

Table 2-3: Estimated Timeframes of the Different Phases Associated with the Proposed Development

Phase	Timeframe
Pre-Construction and Construction	1.5 year
Operation	20 years
Decommissioning	1 year
Post-Decommissioning / Rehabilitation	0.5 year

Table 2-4 provides a brief summary of the relevant technical details of the proposed development.

Table 2-4: Technical Details of the Proposed OHPL, Substation and BESS

Technical Detail	Description
EA Validity	10 years
OHPL	
Height of pylons	Maximum of 30 m high
Length of transmission line	Maximum 26.5 km
Types of poles used	Both monopoles and lattice structures are being considered
Corridor within which to construct the transmission lines	300 m corridor (i.e. 150 m on either side of the proposed transmission lines)
Area occupied by pylon servitude	The pylon servitude width will be 31 m (132 kV) wide
Transmission capacity	• Double-Circuit • Overhead • 132 kV, evacuating a maximum of 300 MW
Width of servitude roads	3 – 6 m wide
Length of servitude roads	26.8 km (worst case scenario)
Site access	N14 (including for abnormal loads)
Height of fencing	Maximum 3m only around the on-site substation and buildings

Type of fencing	Wired mesh / chain link fence not electrified
On-Site Substation Yard	The substation component may be up to 132kV, but may also be less (e.g. 33kV substation), depending on final Eskom requirements/agreements. This substation is comprised partly of: • A control room (which measures performance information); • Earthing mats and earthing rods; • Switching gear; • Step-up transformers and protection equipment; • Various feeder bays; and • Controlled access.
Area occupied by both permanent and construction laydown areas	4.4 ha and comprises: 1.1 ha on-site substation, 0.5 ha for offices, 1 ha temporary storage area which will be used for the battery energy storage systems (BESS), and 1 ha permanent laydown area
Area occupied by buildings	The O&M complex will form part of the substation yard and will be approximately 0.5 ha (100m X 50m).
Battery Energy Storage System (BESS)	Battery Modules will be housed in containers (similar to shipping containers), and these containers will be delivered pre-assembled. The containers will have approximate dimension ranges of: height 2 m - 5 m, width 1.5 m - 3 m, length 7 m - 20 m. The containers are raised slightly off the ground and may be stacked vertically to a maximum height of 10 m. Ancillary (or associated) infrastructure will include (but is not limited to): • A battery room; • Inverters; • Switch gear room; and • Supervisory Control and Data Acquisition (SCADA) equipment.
Ancillary Infrastructure	Infrastructure coupled with the on-site substation yard: • Internal roads and access; • Welfare facilities: ablutions, maintenance rooms, security hut etc.; • Stormwater infrastructure; • Temporary construction areas; and • Perimeter fencing.
Site Access and Internal roads.	As far as possible, existing gravel access roads will be utilised and where this is not possible, roads will be constructed to run in a 2-way direction, approximately 4 – 6 m wide. It is assumed that the same access roads as approved in the Paulputs WEF will be utilised for this project. Caution will be taken to preserve any road infrastructure such as culverts, and where necessary, these may be upgraded. The development site will have one (1) security controlled entry and exit point.

2.2.1 Electrical OHPL

The OHPL will assist the authorised Paulputs South WEF (and Paulputs North WEF if need be) to distribute electricity into the national grid. The preferred OHPL will be a 132kV, double-circuit overhead powerline (OHPL), assessed as a 300 m wide corridor by the specialists. The line will be approximately 26.5 km long from the on-site substation to the existing Eskom Paulputs Substation, north-west of the N14.

At this stage it is known that Eskom, in partnership with IPPs, are considering construction of a collector substation adjacent to the existing Paulputs Substation on the farm portion belonging to the Koonkoosies II Project. This new collector substation is a possible future connection point for the proposed Paulputs South WEF to the national grid.

2.2.1.1 Establishment of a Servitude

A servitude is by definition "the right to use someone else's land for a specified purpose", in this case the right to erect, operate and maintain a power line, as well as access rights to carry out these activities. Ownership of the land remains with the original landowner who signs a servitude agreement and keeps overall responsibility for the land.

A topographical survey will be conducted along the OHPL corridor to inform the final route, location and design of the tower foundations, pylons and structures. Once the final servitude route has been confirmed construction of the power line begins. The servitude is generally cleared of wooded plant species and any protruding alien vegetation to reduce fire risk and prevent shortages with vegetation, in line with the Environmental Management Programme (EMPr) and Eskom requirements and guidelines.

Although existing roads and tracks will be used as much as possible, access roads for minor vehicles may be created for the construction phase as well as for periodic maintenance, in negotiation with the relevant landowner.

Vegetation will be cleared beneath the overhead powerline to create a two-track servitude "service" road of approximately 5 m in width and 26.5 km in length, for 4x4 vehicles to be able to access and monitor the servitude. The servitude will run the length of the overhead powerline excepting for spans across existing structures.'

2.2.1.2 OHPL Tower Structures

The type of structures which will support the double circuit overhead line is yet to be determined and may include:

- Concrete, steel or wood monopoles;
- Guy line supported steel structures;
- Free standing metal lattice towers; or
- Multi-pole structures such as H-towers or K-towers.

The preferred type of tower is dependent on a variety of factors, including the terrain, cost, conductor size, live line compatibility and required electrical characteristics. Currently the preferred is the concrete, steel or wood monopoles. Tower type selection will therefore be based on additional on-site investigations during the detailed design phase of the project.

Similarly, the foundation size and type will depend on the type of tower selected as well as conditions of the local terrain. Tower steel is typically delivered on a 24-ton truck, or on smaller vehicles in difficult terrain. The tower structures are assembled on the ground and erected on the constructed foundations using an 8-ton crane truck. Following this the power lines and conductors are strung from tower to tower. The average span between two 132 kV towers is 200 m but can vary between 150 and 375 m depending on the terrain and ground profile.

2.2.1.3Electrical Cabling

The electricity from the turbines will be transferred via a double-circuit 33 kV electrical cable network to 33/132 kV transformers located in the on-site substation compound, of approximately 4.4 ha in extent. Where possible the cabling will be underground but the feasibility of this will be confirmed as the design progresses and in-depth geotechnical studies are conducted.

The on-site substation will house electrical infrastructure such as transformers and switchgear to enable the energy to be transferred into the national grid. The substation itself is 1.1 ha. The operations and maintenance building including parking will be approximately 0.5 ha.

2.2.2 On-site Substation and ancillary infrastructure

The function of the proposed on-site substation will be to facilitate the transfer of energy generated by the Paulputs South WEF (and stored within the BESS) to the proposed Paulputs South WEF switching station where the energy will be added to the national Eskom grid by means of the proposed OHPL[8].

The substation yard is approximately 4.4 ha and comprises: 1.1 ha on-site substation, 0.5 ha for offices, 1 ha temporary storage area which will be used for the battery energy storage systems (BESS), and 1 ha permanent laydown area and 1 ha permanent laydown area. Underground cabling will link the turbines to each other and to the on-site transformer / control building. Detailed construction and trenching specifications will depend on the ground conditions encountered. Typically, cables would be laid in a trench approximately 1 m deep and 0.5 m wide. To minimise ground disturbance, cables will be routed along the side of the access tracks where practicable.

The substation will have a capacity up to 132 kV, and will include various feeder bays and controlled access. Infrastructure coupled with the on-site substation includes:

- Internal roads and access;
- Welfare facilities: ablutions, maintenance rooms, security hut etc.;
- Stormwater infrastructure;
- Temporary construction areas; and
- Perimeter fencing.

2.2.3 Battery Energy Storage System (BESS)

Unlike conventional energy storage facilities, such as pumped hydro, a BESS has the advantage of being flexible in terms of site location and sizing. Therefore, they can be incorporated into, and placed in close proximity, to a wind or solar facility. They also have the advantage of being easily scaled and designed to meet specific demands.

The function of the BESS will be to store peak kinetic energy produced by the Paulputs South for use in the following ways:

- To power the operation of the Paulputs South when the national grid is strained by high (or peak) demand, often resulting in load-shedding.
- To provide excess generation to the national grid which will assist with stabilizing electricity supply during peaks and troughs of demand.
- To reduce the impact caused by the variability and limited predictability of wind generation.

The battery technology being considered is Flow, Solid-State, Lithium Ion (Li-Ion) and/or Sodium Sulphur batteries. With rapid developments in battery technology globally, and uncertainty regarding the preferred battery technology of choice, the EAP has undertaken a high-level desktop study and risk assessment of the BESS for the proposed amendment. The battery technologies under consideration are explained further below, and compared in a table of advantages and disadvantages.

2.2.3.1 The NEMA and BESS

Although international BESS standards are currently being updated, current BESS regulations in South Africa are mostly written for backup power (uninterrupted power supply) applications.

[8] The Grid Connection option from the Paulputs South WEF to the Hydra-Eskom MTS has been applied for as part of a separate Basic Assessment and Environmental Authorisation Process.

As discussed in the Pre-Application meeting held with DFFE on 14 August 2020, the BESS will not trigger any listed activities on its own due to the fact that is to be located on an area already authorised for storage related activity. Furthermore, activities relating to storage of dangerous goods, such as Activity 14 of Listing Notice 1 and Activity 10 of Listing Notice 3, will not be triggered by the proposed battery storage facility installation, due to the following:

- A battery is not deemed to be a container; and
- Electrolytes that are used within battery storage facilities: their function is deemed to be like transformers within substations: converting high voltage electricity to lower voltage electricity for further distribution. The function of the battery is not for "storage" or "storage and handling" of a dangerous good.

Battery storage does not trigger any listed activities relating to the generation of electricity as technology does not 'generate' electricity, it simply stores electricity generated by a renewable energy facility (Paulputs South WEF in this instance) and discharges the stored electricity as and when required by the grid

2.2.3.2 BESS Technologies under Consideration

Typically BESS consist of multiple battery cells that are assembled together to form modules. Each cell contains a positive electrode, a negative electrode and an electrolyte. A module may consist of thousands of cells working in conjunction. Modules are normally packaged inside containers (similar to shipping containers) and these containers are delivered pre-assembled to the WEF site (Plate 2-1 shows the inside of one such container).

Paulputs South anticipates the placement of containers within the area currently authorised for temporary laydown. Ancillary (or associated) infrastructure will include (but not limited to):

- a battery room;
- inverters;
- switch gear room; and
- Supervisory Control and Data Acquisition (SCADA) equipment.

The containers will have approximate dimension ranges of: height 2 m - 5 m, width 1.5 m - 3 m, length 7 m - 20 m. The containers are raised slightly off the ground and are bunded to prevent possible environmental damage resulting from any equipment malfunction. The proposed development is considering the option of stacking these containers vertically to a maximum of two container layers or a height of 10m.

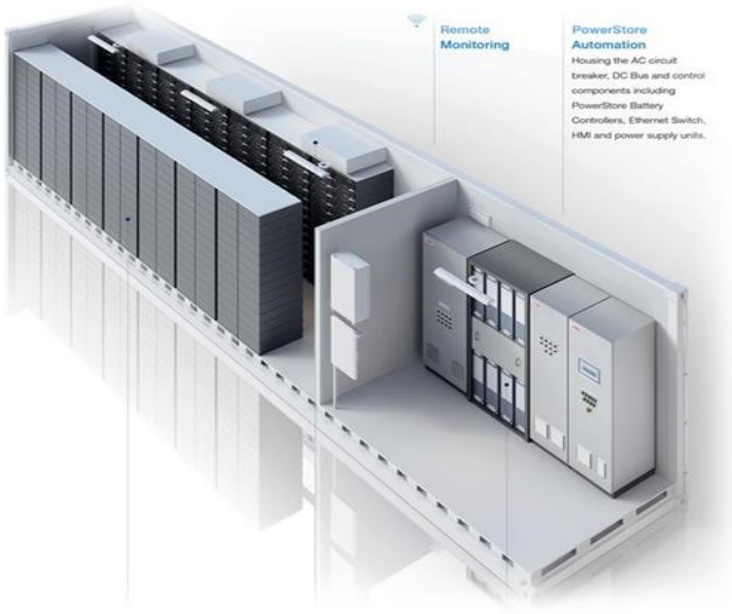

Plate 2-1: Typical representation of how batteries and battery modules are housed and assembled.

Lithium ion (Li-ion) batteries are the most common stationary battery in the market today. Simply put, the batteries consist of a graphite electrode and a lithium-based electrode immersed in a liquid. When the battery is in use, charged lithium atoms ions flow from the graphite electrode to the lithium-based electrode through the liquid, and that flow of charged particles is what generates electricity. When the battery is recharged the flow is reversed, sending the lithium ions back to the graphite anode where they are stored ready for discharge.

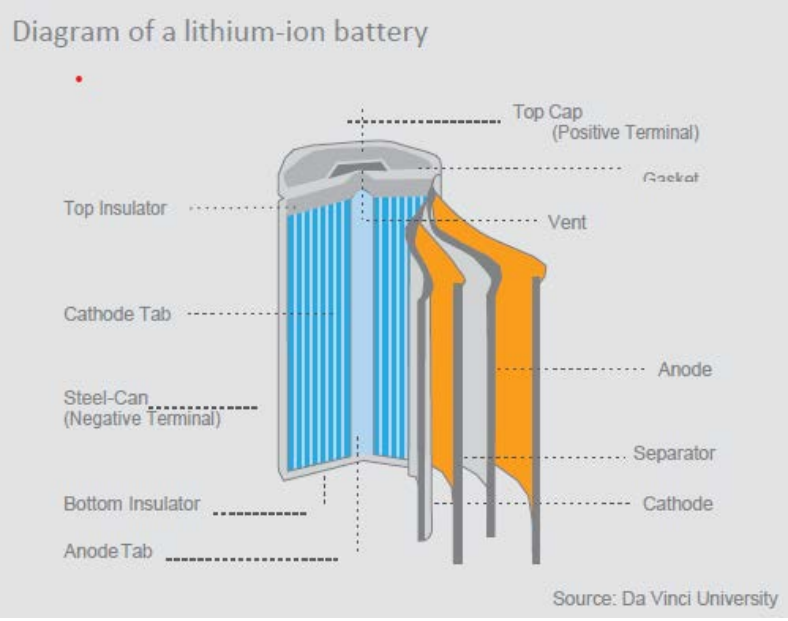

Plate 2-2: Diagram of a Lithium-Ion Battery

A sodium sulphur (NaS) battery is a molten state battery constructed from sodium (Na) and sulphur (S). The battery casing is the positive electrode while the molten core is the negative electrode. The battery operates at high temperatures of between 300-350 degrees Celsius (°C), while lower temperature versions are under development. In charging, the

sodium ions are transported through the ion selective conductor to the anode reservoir. Discharge is the reverse of this process. Since sodium ions move easily across the ion selective conductor, electrons cannot, therefore there is no self-discharge. When not in use the batteries are typically left under charge so that they will remain molten and be ready for use when needed. If shut down and allowed to solidify, a reheating process is initiated before the batteries can be used again.

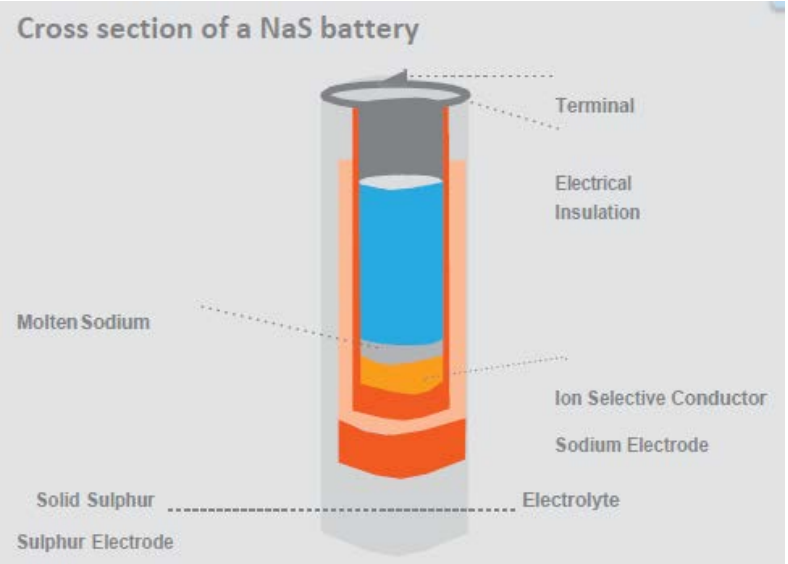

Plate 2-3: Diagram of a Sodium-Sulphur Battery

Solid State Battery is an acceptable solution to assist with reducing the fire risk Li-ion batteries pose. Unlike Li-Ion Batteries, Solid State Batteries have an ionic liquid made up of non-flammable molten salts with low melting points i.e. the electrolyte is considered a solid. Compared to Li-ion batteries with liquid electrolytes, SSBs offer an attractive option owing to their potential in improving safety and achieving both higher power and high energy densities. The trade-off with this type of battery is that electrically charged atoms do not move as freely and easily through a solid as they do through a liquid, so thus making them less efficient at generating electricity.

Flow Batteries consist of two tanks of liquids that feed into electrochemical cells. The main difference between flow and conventional batteries is that flow batteries store the electricity in the liquid rather than in the electrodes. They're far more stable than Li-ion, they have longer lifespans, and the liquids are less flammable. Not only that, but a flow battery can be scaled up by simply building bigger tanks for the liquids. The most widely known and used flow battery is vanadium flow battery.

Table 2-5: The technology options for the BESS[9][10][11]

Activity Alternative	Advantage	Disadvantage
Li-Ion Batteries	• Lithium ion has the smallest installation footprint when compared to the technologies for the similar energy capacity. • Li-ion batteries are able to tolerate more discharge cycles than other technologies.	• Negative effects of overcharging/ over discharging. • Volatility leading to Fire and Explosions

[9] Li-Ion Battery and Na-S Battery: https://ensia.com/features/battery-innovations-renewable-energy/

[10] Flow Battery: https://newatlas.com/energy/iron-aqds-flow-battery-usc/

[11] Solid State Battery: https://www.greentechmedia.com/articles/read/us-storage-companies-quietly-grow-bets-on-solid-state-batteries

Activity Alternative	Advantage	Disadvantage
	• High efficiency. • Produce the highest voltage compared to other batteries by driving high electron flow	• Potential for issues associated with overheating (Certain Lithium chemistry's). • The Lithium element in this technology is considered hazardous / dangerous goods. • Lithium is a finite resource with concerns of its availability in the long term.
NaS Batteries	• Long life cycle. • Able to tolerate a high number of charge/discharge cycles. • ability to discharge fully with no effects to the performance.	• low energy to size ratio. • Heating may be required. • Potential safety issues with the molten sodium. • Has the potential to catch on fire.
Flow Batteries	• More stable than Li-Ion battery • Are known to have the longest lifespan • Less flammable liquids • Technology is scalable for large grid infrastructure and renewable energy project.	• the liquids can be costly, so there's a greater up-front cost for the batteries • Not as efficient as Li-Ion Battery
Solid State Battery	• Potential to substitute Lithium for another electrode material • Marked improvement in safety at cell and battery levels: solid electrolytes are non-flammable when heated, unlike their liquid counterparts. • It permits the use of innovative, high-voltage high-capacity materials, enabling denser, lighter batteries with better shelf-life as a result of reduced self-discharge • simplified mechanics as well as thermal and safety management	• Reduced conductivity • Sourcing of a suitable electrolyte • Not as well researched and widely accepted as Li-Ion batteries • Narrow temperature range and cannot tolerate varying temperature

No hazardous substances are expected to occur or be stored on site for the Paulputs South WEF, and no additional listing notice activities are triggered by the placement and operation of the BESS.

Plate 2-4 provide a visual representation of a typical set up of an on-site substation and BESS. Paulputs South WEF will have similar project components and will be designed in a similar manner. Figure 5-2 illustrated the ancillary project layout proposed for the Paulputs South WEF.

Plate 2-4: A stock image of a similar development with an on-site substation and BESS. Source [https://reneweconomy.com.au/why-grid-based-battery-storage-is-already-a-no-brainer-in-australia-85967/]

A high-level Battery Energy Storage System (BESS) risk assessment has been conducted.

The findings of this assessment are contained in Section 8, whilst the conclusions of the assessment are provided in Section 10.

2.2.4 Additional Project Components

In terms of access routes and internal roads, the development site will have one (1) security controlled entry and exit point. As far as possible, existing gravel access roads will be utilised and where this is not possible, road will be constructed to run in a 2-way direction, approximately 4 – 6 m wide. Caution will be taken to preserve any road infrastructure such as culverts, and where necessary, these may be upgraded. The site is easily accessible from the N14 or R358 arterial road, however it is assumed that the same access roads as approved in the Paulputs South WEF will be utilised for this project – these roads are located north of the proposed development site.

3 CONSIDERATION OF ALTERNATIVES

There are no alternatives for this proposed development. The proposed development was originally assessed as an alternative option for OHPL in the approved Paulputs EIA (Arcus, August 2019). The location and layout of the development is still considered the most feasible and the Applicant is applying for the authorisation of the proposed development to transfer electricity generated by the Paulputs South WEF, south-east of the N14, to the existing Eskom Paulputs Substation.

The proposed development would be located in an area which has undergone a complete alternative assessment conducted as part of the Paulputs WEF EIA process (Arcus, 2019).

The proposed development of all other applications in the area must also be considered.

3.1 The No-Go Alternative

The 'No-Go' scenario assumes that the proposed development does not proceed, implying a continuation of the current situation or the status quo. It is equivalent to the future baseline scenario in the absence of the proposed development.

Relative to this authorisation, the main implication of the No Development scenario is that the Paulputs South WEF will not have a route to transfer the electricity which it will generate

to the national grid. Furthermore, the advantages of installing the BESS is that it provides for grid stabilization, load-levelling and an uninterrupted power supply.

Should the no-go alternative be implemented for the proposed development, it will result in the reduced efficiency of the Paulputs South WEF and potential operational interruptions of the WEF as a result of an unstable grid.

Evacuation of the electricity generated by the WEF is necessary for the project to proceed. The result will also include the following:

- The land-use remains agricultural, with no further benefits derived from the implementation of a complementary land use;
- The proposed development will not contribute to the establishment of transmission lines within the recognised Northern Strategic Transmission Corridor;
- There is no change to the current landscape or environmental baseline;
- No additional electricity will be generated on-site or supplied through means of renewable energy resources. This would have negative implications for the South African government in achieving its proposed renewable energy target, given the need for increased generation;
- There is no opportunity for additional employment (permanent or temporary) in the local area where job creation is identified as a key priority;
- The Paulputs South WEF will not succeed in the REIPPP, and the potential social economic, and climate change mitigation benefits would not be realised by the WEF and OHPL; and
- The local Economic Development benefits associated with the development of the Paulputs South WEF and its associated infrastructure's REIPPPP commitments will not be realised, such as securing local energy production.

The purpose of the proposed development is to export electricity, generated by a renewable resource, to the national grid. Other socio-economic and environmental benefits that will result from the proposed development are:

- Reduced air pollution emissions - burning fossil fuels generates CO_2 emissions which contributes to global warming. Emissions of sulphurous and nitrous oxides are produced which are hazardous to human health and impact on ecosystem stability;
- Water resource saving – conventional coal-fired power stations use large quantities of water during their cooling processes. As a water stressed country, South Africa needs to be conserving such resources wherever possible;
- Improved energy security – renewables can be deployed in a decentralised way close to consumers, improving grid strength while reducing expensive transmission and distribution losses. Renewable energy projects contribute to a diverse energy portfolio;
- Exploit significant natural renewable energy resources – biomass, solar and wind resources remain largely unexploited;
- Sustainable energy solutions – the uptake of renewable energy technology addresses the country's energy needs, generation of electricity to meet growing demands in a manner which is sustainable for future generations; and
- Employment creation and other local economic benefits associated with support for a new industry in the South African economy.

The 'No-Go' alternative would not assist the government in addressing climate change, energy security and economic development. Implementing this option would also not allow for any beneficial socio-economic and environmental impacts as outlined above.

Addressing climate change is one of the benefits associated with the implementation of this proposed development. Climate change is widely considered by environmental professionals as one of the single largest threats to the environment on a local, national and global scale.

Based on the above, the 'No-Go' alternative is not a preferred alternative.

4 THE PREFERRED ALTERNATIVE

In accordance with the requirements of Appendix 1 of the 2014 EIA Regulations (as amended), a basic assessment report must contain a consideration of the alternatives, which can include activity alternatives, site/location alternatives, layout alternatives, technology alternatives and the "do-nothing" alternative. Alternatives are required to be assessed in terms of social, biophysical, economic and technical factors. When assessing alternatives, they should be "practical", "feasible", "relevant", "reasonable" and "viable".

In this instance, this Section provides an overview of alternatives that have been considered for the proposed development.

4.1 Preferred OHPL Infrastructure

Typically, electrical energy generated by wind turbines is transported to the consumer via a series of transmission and distribution networks and substations. The voltage of the electrical energy is changed by each component in the network to optimize its transmission. Wind turbines capture wind energy and convert it to electrical energy when the turbine is fitted with its own transformer that steps up the voltage usually to 22 or 33kV. This electrical energy is then transported via underground cabling to an onsite substation where it will be boosted to the required voltage for long distance transmission via the national electrical grid network.

A powerline consists of one or more conductors that are strung on in-line structures and bend structures. The proposed powerline would either be wooden poles, concrete poles and/or monopole steel structures with a height of up to 25 m. The preferred supporting structure would be a concrete or steel monopole as these are the Eskom standard and are cost effective. They are also the preferred structure from an avifaunal perspective, and acceptable from a visual perspective. This preferred structure would be subject to line design and engagement with Eskom. From a visual perspective wooden poles are preferred due to their rural character. If steel is used it must not be painted but galvanized and allowed to oxidize naturally over time. The grey colour produced in this process will help to reduce the visual impact.

Plate 4-1: Proposed Self-supporting Steel / Concrete Monopoles.

Table 4-1: Advantages and Disadvantages of the OHPL Alternatives

No.	Alternatives	Advantages / Disadvantages
1	Concrete, steel monopoles structures	• These are the Eskom standard towers • Cost-effective • Steel monopole is the preferred structure from an avifaunal perspective, and acceptable from a visual perspective

2	Guy line supported steel structures	• Small footprint • Not considered preferable for the proposed application due to theft of members and agricultural aversion due to stay wires
3	Self-Supporting steel lattice towers	• Not preferred from an avifaunal perspective • Not considered preferable for the proposed application due to possible theft of members and cost
4	Multi-pole structures such as H-towers or K-towers	• Not preferred from an avifaunal perspective • Wooden structures are fire hazard and degrade faster • Not considered reasonable or feasible for the proposed application

The size of the footprint depends on the type of structure used as each has a varied basal footprint. Footprints typically range from 0.8 m x 0.8 m to 1.9 m x 1.9 m. The average distance between two pylon structures would be approximately 250 m but can vary between 200 m and 375 m depending on the topography of the area.

Additional infrastructure associated with the OHPL will consist of:

- Foundations and insulators;
- Existing access roads and jeep tracks; and
- Line and servitude clearances to meet the statutory requirements.

The servitude width required for the powerline is 31 m (i.e. 15.5 m on either side measured from the centre line of the powerline). According to Eskom design requirements, the minimum vertical clearance to buildings, poles and structures not forming part of the powerline must be 3.8 m, while the minimum vertical clearance between the conductors and the ground is 6.7 m. Moreover, these design requirements allow for the minimum distance of powerline to a public road to be 95m from the centreline of the powerline servitude, to the centreline of the road servitude. Lastly the minimum distance between trees or shrubs and any bare phase conductor of the powerline must be 4 m, allowing for the possible sideways movement and swing of both the powerline and the tree or shrub.

Both the terrain and the underlying geotechnical conditions will play a role in determining the type of foundation to be used. As mentioned above, the actual size and type of foundation to be installed will be determined by the preferred powerline structure. The minimum working area required around a structure is 20 m X 20 m

4.2 Preferred Substation Infrastructure

The substation yard is approximately 4.4 ha and comprises: 1.1 ha on-site substation, 0.5 ha for offices, 1 ha temporary storage area which will be used for the battery energy storage systems (BESS), and 1 ha permanent laydown area. Underground cabling will link the turbines to each other and to the on-site transformer / control building. Detailed construction and trenching specifications will depend on the ground conditions encountered. Typically, cables would be laid in a trench approximately 1 m deep and 0.5 m wide. To minimise ground disturbance, cables will be routed along the side of the access tracks where practicable.

The substation will have a capacity up to 132 kV, and will include various feeder bays and controlled access. Infrastructure coupled with the on-site substation includes:

- Internal roads and access;
- Welfare facilities: ablutions, maintenance rooms, security hut etc.;
- Stormwater infrastructure;
- Temporary construction areas; and
- Perimeter fencing.

4.3 BESS Infrastructure

In terms of the BESS, the following potential technology options below have been considered. The options below do not represent typical 'alternatives' for assessment. The Applicant will determine which technology is preferable during the design phase and their choices are particularly impacted on by the rapid advancements in technology. As such, the EAP has considered all technologies, and not only a preferred technology.

- Lithium-Ion Batteries (LI-Ion);
- Sodium Sulphur Batteries (Na-S);
- Flow Batteries;
- Solid State Battery (SSB); and
- Other (Lead-Acid Battery, Nickle-Cadmium, Hydrogen battery)[12]

Typically BESS consist of multiple battery cells that are assembled together to form modules. Each cell contains a positive electrode, a negative electrode and an electrolyte. A module may consist of thousands of cells working in conjunction. Modules are normally packaged inside containers (similar to shipping containers) and these containers are delivered pre-assembled to the WEF site (Plate 4-1 shows the inside of one such container).

Paulputs South anticipates the placement of containers within the area currently authorised for temporary laydown. Ancillary (or associated) infrastructure will include (but not limited to):

- a battery room;
- inverters;
- switch gear room; and
- Supervisory Control and Data Acquisition (SCADA) equipment.

The containers will have approximate dimension ranges of: height 2 m - 5 m, width 1.5 m - 3 m, length 7 m - 20 m. The containers are raised slightly off the ground and are bunded to prevent possible environmental damage resulting from any equipment malfunction. The proposed development is considering the option of stacking these containers vertically to a maximum of two container layers or a height of 10m.

[12] These have not been mentioned below as they are not considered a viable BESS option for large scale utilities infrastructure projects.

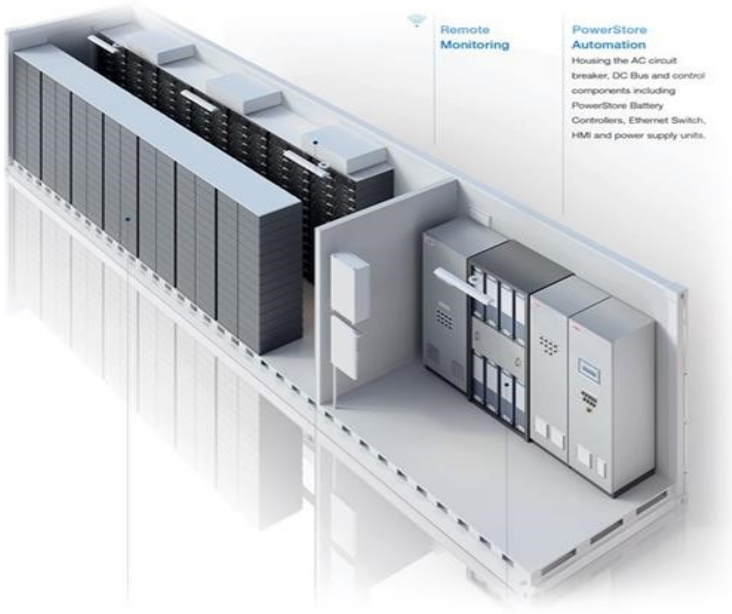

Plate 4-1: Typical representation of how batteries and battery modules are housed and assembled.

Lithium ion (Li-ion) batteries are the most common stationary battery in the market today. Simply put, the batteries consist of a graphite electrode and a lithium-based electrode immersed in a liquid. When the battery is in use, charged lithium atoms ions flow from the graphite electrode to the lithium-based electrode through the liquid, and that flow of charged particles is what generates electricity. When the battery is recharged the flow is reversed, sending the lithium ions back to the graphite anode where they are stored ready for discharge.

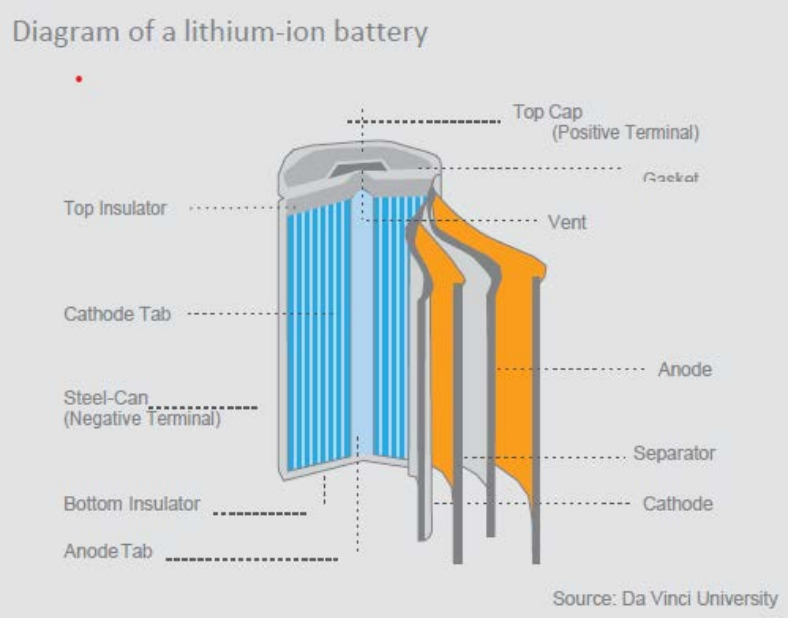

Plate 4-2: Diagram of a Lithium-Ion Battery

A sodium sulphur (NaS) battery is a molten state battery constructed from sodium (Na) and sulphur (S). The battery casing is the positive electrode while the molten core is the negative electrode. The battery operates at high temperatures of between 300-350 degrees Celsius (°C), while lower temperature versions are under development. In charging, the

sodium ions are transported through the ion selective conductor to the anode reservoir. Discharge is the reverse of this process. Since sodium ions move easily across the ion selective conductor, electrons cannot, therefore there is no self-discharge. When not in use the batteries are typically left under charge so that they will remain molten and be ready for use when needed. If shut down and allowed to solidify, a reheating process is initiated before the batteries can be used again.

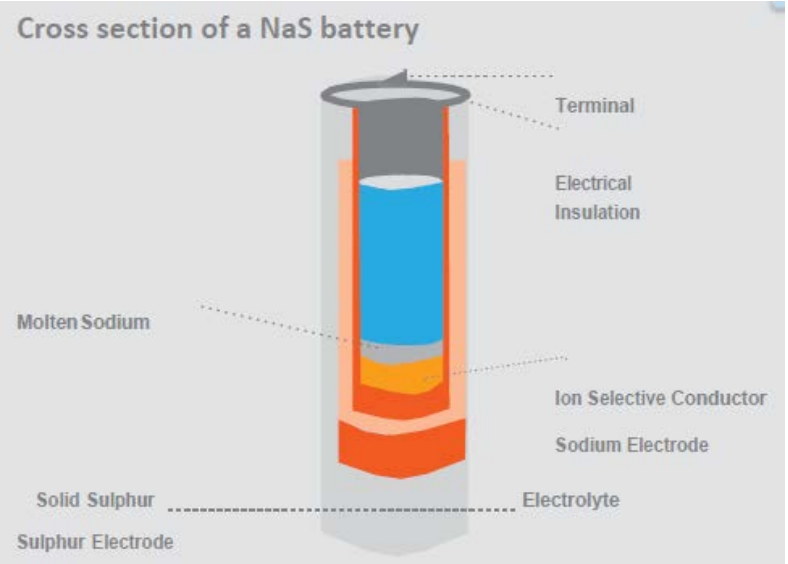

Plate 4-3: Diagram of a Sodium-Sulphur Battery

Solid State Battery is an acceptable solution to assist with reducing the fire risk Li-ion batteries pose. Unlike Li-Ion Batteries, Solid State Batteries have an ionic liquid made up of non-flammable molten salts with low melting points i.e. the electrolyte is considered a solid. Compared to Li-ion batteries with liquid electrolytes, SSBs offer an attractive option owing to their potential in improving safety and achieving both higher power and high energy densities. The trade-off with this type of battery is that electrically charged atoms do not move as freely and easily through a solid as they do through a liquid, so thus making them less efficient at generating electricity.

Flow Batteries consist of two tanks of liquids that feed into electrochemical cells. The main difference between flow and conventional batteries is that flow batteries store the electricity in the liquid rather than in the electrodes. They're far more stable than Li-ion, they have longer lifespans, and the liquids are less flammable. Not only that, but a flow battery can be scaled up by simply building bigger tanks for the liquids. The most tyoical flow battery is vanadium flow battery.

Table 4-2: The technology options for the BESS[13][14][15]

Activity Alternative	Advantage	Disadvantage
Li-Ion Batteries	• Lithium ion has the smallest installation footprint when compared to the technologies for the similar energy capacity. • Li-ion batteries are able to tolerate more discharge cycles than other technologies.	• Negative effects of overcharging/ over discharging. • Volatility leading to Fire and Explosions

[13] Li-Ion Battery and Na-S Battery: https://ensia.com/features/battery-innovations-renewable-energy/

[14] Flow Battery: https://newatlas.com/energy/iron-aqds-flow-battery-usc/

[15] Solid State Battery: https://www.greentechmedia.com/articles/read/us-storage-companies-quietly-grow-bets-on-solid-state-batteries

Activity Alternative	Advantage	Disadvantage
	• High efficiency. • Produce the highest voltage compared to other batteries by driving high electron flow	• Potential for issues associated with overheating (Certain Lithium chemistry's). • The Lithium element in this technology is considered hazardous / dangerous goods. • Lithium is a finite resource with concerns of its availability in the long term.
NaS Batteries	• Long life cycle. • Able to tolerate a high number of charge/discharge cycles. • ability to discharge fully with no effects to the performance.	• low energy to size ratio. • Heating may be required. • Potential safety issues with the molten sodium. • Has the potential to catch on fire.
Flow Batteries	• More stable than Li-Ion battery • Are known to have the longest lifespan • Less flammable liquids • Technology is scalable for large grid infrastructure and renewable energy project.	• the liquids can be costly, so there's a greater up-front cost for the batteries • Not as efficient as Li-Ion Battery
Solid State Battery	• Potential to substitute Lithium for another electrode material • Marked improvement in safety at cell and battery levels: solid electrolytes are non-flammable when heated, unlike their liquid counterparts. • It permits the use of innovative, high-voltage high-capacity materials, enabling denser, lighter batteries with better shelf-life as a result of reduced self-discharge • simplified mechanics as well as thermal and safety management	• Reduced conductivity • Sourcing of a suitable electrolyte • Not as well researched and widely accepted as Li-Ion batteries • Narrow temperature range and cannot tolerate varying temperature

No hazardous substances are expected to occur or be stored on site for the Paulputs South WEF, and no additional listing notice activities are triggered by the placement and operation of the BESS.

Plate 4-4 provide a visual representation of a typical set up of an on-site substation and BESS. Paulputs South WEF will have similar project components and will be designed in a similar manner. Figure 5-2 illustrated the ancillary project layout proposed for the Paulputs South WEF.

Plate 4-4: A stock image of a similar development with an on-site substation and BESS. Source [https://reneweconomy.com.au/why-grid-based-battery-storage-is-already-a-no-brainer-in-australia-85967/].

A High-Level BESS risk assessment has been provided in Section 8.

4.4 Preferred Access

In terms of access routes and internal roads, the development site will have one (1) security controlled entry and exit point. As far as possible, existing gravel access roads will be utilised and where this is not possible, road will be constructed to run in a 2-way direction, approximately 4 – 6 m wide. Caution will be taken to preserve any road infrastructure such as culverts, and where necessary, these may be upgraded. The site is easily accessible from the N14 or R358 arterial road, however it is assumed that the same access roads as approved in the Paulputs South WEF will be utilised for this project – these roads are located north of the proposed development site.

5 NEED AND DESIRABILITY

This section serves to expand on the need and desirability (or motivation) for the proposed development that is provided in Section 2 and Section 3 above. The concept of need and desirability can be explained in terms of its two components, where *need* refers to *time* and *desirability* refers to *place*. The need and desirability sections below have been compiled in accordance with the NEMA EIA Regulations, 2014 (as amended) Appendix 1(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*, as well as the Integrated Environmental Management Guideline on Need and Desirability, 2017.

The proposed development is essential to the successful operation of the Paulputs South WEF (and Paulputs North WEF if need be) and will assist the operation to transfer electricity generated to the national grid. The proposed development represents the best practicable environmental option, identified through specialists' assessments (Arcus, 2019) and letters provided (Volume II).

5.1 National Need and Desirability

The Strategic Environmental Assessment (ESA) for Electricity Grid Infrastructure (EGI) in South Africa identified five Strategic Transmission Corridors, which are considered

important to support the large scale electricity transmission and distribution infrastructure. The entire site of the proposed development falls within the Northern Strategic Transmission Corridor (Plate 5-1).

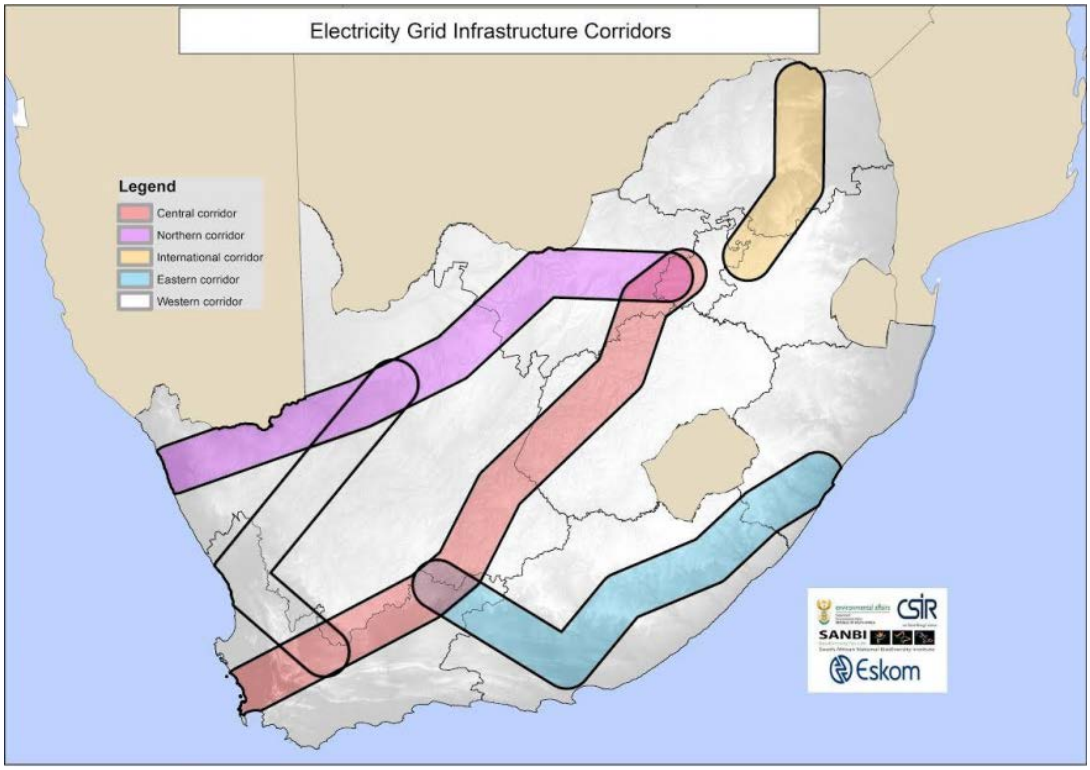

Plate 5-1: Strategic Transmission Corridors

Under the National Infrastructure Plan, 18 Strategic Integrated Projects (SIPs) have been developed to promote fast-tracked development and growth of social and economic infrastructure across all nine provinces. Among the 18 SIPs, **SIP 8** targets the development of green energy in support of the South African economy and **SIP 10** targets the provision of electricity transmission and distribution for all.

If the Paulputs South WEF is selected as a preferred bidder, this proposed development will indirectly contribute to SIP 8 and SIP 10. In addition to this, the proposed development ensure that the Paulputs South WEF remains competitive as it is bid into next bidding round (or in future bidding rounds) of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

Renewable energy is supported in terms of meeting the country's climate change goals, and in terms of reducing the country's dependence on fossil fuels as the main source of meeting the country's electricity requirements. The National Climate Change Adaptation Strategy[16] (NCCAS) for The Republic of South Africa Version UE10, 13 November 2019, explains that the South African primary sectors, such as agriculture and mining, which are natural resource dependent are high consumption uses of energy. The NCCAS is adopting a cluster approach to assist with the changing climate conditions and the affect it has on various sectors. An action in support of this proposed development is the approach to "create a more adaptive energy system to reduce dependence on a centralised system and increase distributed generation, especially in rural areas". "This will involve encouraging the development of an adaptive and decentralised energy system so that the system is more resilient to climate disruptions".

[16] https://www.environment.gov.za/sites/default/files/docs/nationalclimatechange_adaptationstrategy_ue10november2019.pdf

Both national and provincial policies and planning documents support the development of renewable energy facilities, and the authorised Paulputs South WEF cannot be developed without authorisation of a suitable OHPL. Furthermore, the development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan. It is thus for the following reasons, that the project is desirable:

- The BESS will diminish the variability of energy supply into grid – thus making power supply into the national Eskom grid more reliable.
- The REIPPPP has requirements for '*key principles for the design*' of the Independent Power Producers (IPP) Request for Qualification and Proposal (RFP). If Paulputs South cannot construct an independent on-site substation with a BESS (i.e. the No-Go alternative is preferred and the project is not approved), the Paulputs South WEF project may be limited in its capacity to be a competitive bidder within the REIPPP or any programmes going forward.
- Lastly, should the no-go alternative be implemented (the project is not approved) for the proposed development, there could be a reduced efficiency of the Paulputs South WEF and potential operational interruptions of the WEF as a result of an unstable grid or reduced wind resource.

Should the no-go alternative be implemented (the project is not approved) for the proposed development, the Paulputs South WEF will not be able to contribute to the Green Energy incentives of the country, as there will be no means for the WEF to evacuate electricity into the National Eskom grid.

5.2 Regional Need and Desirability

In the Northern Cape thus far, around 3 561 MW of renewable energy facilities have been connected or are committed for integration with the power grid from Rounds 1 to 4B of which there is approximately 42% Photovoltaic (PV), 41% Wind Energy and 17% Concentrated Solar Power (CSP). According to the Eskom Transmission Development Plan (TDP) (2020 – 2027), the Northern Cape network requires strengthening to reduce grid instability and enhance the integration and evacuation of renewable energy generation.

Since the introduction of renewable generation within the Northern Cape, it was clear that the network will need to be strengthened to enable the integration and evacuation of renewable power out of the province to other parts of the country. According to the Eskom Transmission Development Plan (2018 – 2029) there are planned network strengthening project for Paulputs which includes

- Upgrading the Paulputs Substation;
- Aggeneis-Paulputs 2nd 220kV line. This project introduces the 2nd Aggeneis-Paulputs 220 kV line built at 400kV to meet the N-1 security standard for the Paulputs area. Since the introduction of renewable generation within the Northern Cape, it was clear that the network will need to be strengthened to enable the integration and evacuation of renewable power out of the province to other parts of the country; and
- Paulputs 3rd 220/132 kV transformer. This includes the installation of the 3rd 220/132kV transformer at Paulputs Substation.

The reason for this application, and separation of the project components into separate Environmental Authorisations for (1) OHPL and (2) the on-site substation and BESS, is due to the fact that the Environmental Authorisation for the proposed OHPL may become the property of Eskom, and would not be controlled by the Applicant. Should this be the case, then the OHPL will directly address the need and desirability of Eskom to strengthen its network and load in the Northern Cape.

Electricity generation from renewable sources are limited by the intermittency and variability of wind and solar resources, i.e. when wind blows and sun shines. The proposed BESS allows for the storing of electricity for later use even when the renewable resource is unavailable. The process involves the conversion of electrical energy into another form of energy such as chemical or kinetic energy, store it temporarily and then convert it back to electrical energy, therefore giving the utility considerable flexibility and control.

It is envisioned that the BESS could provide ancillary support to Eskom's variable national grid in terms of enhanced frequency control of the network, reactive power support and improved quality of supply performance from the energy generated by the Paulputs South WEF.

5.3 Local Need and Desirability:

Both national and provincial policies and planning documents support the development of renewable energy facilities. The development of, and investment in, renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all make reference to renewable energy. At a provincial level, the development of renewable energy is supported by the Northern Cape Provincial Growth and Development Strategy and Northern Cape Provincial Spatial Development Framework. The need and desirability for these types of developments play a role in South Africa meeting its energy and climate change targets and also provides a socio-economic boost at the local level in areas that are in need of it.

The land which is earmarked for construction and operation of the proposed development is currently used for low intensity grazing and has little potential for other types of land use. Grazing could continue on the site during the construction of the proposed development. In an area of low agricultural or other land use potential, and considering the need to meet South Africa's renewable energy generation targets, the proposed development is desirable at this time and place.

Assuming construction will take place at the same time as the Paulputs South WEF, the proposed development will create direct jobs largely during the construction period. Indirect jobs in accommodation, catering and other services that would support a wind farm development as well as training, business and skill development opportunities will be realised. REIPPPP local economic development requirements are expected to enhance these positive benefits. Several other renewable energy facilities located nearby will result in further enhancement of the positive socio-economic benefits.

A current requirement of the REIPPPP is that in the development of any WEF and associated infrastructure, the local economy must benefit through employment opportunities, skills development, and the development or enhancement of community infrastructure. The cumulative effect of the proposed development and other developments in the area has the potential to result in highly significant positive socio-economic opportunities for the region.

The study has concluded that there are no negative high residual impacts, including potential cumulative impacts associated with the proposed development.

6 APPROACH TO UNDERTAKING THE BASIC ASSESSMENT PROCESS

In terms of the EIA Regulations of December 2014 (and amended) published in terms of NEMA (Act No. 107 of 1998) as amended, the construction, operation and decommissioning of the proposed development is a listed activity requiring environmental authorisation. Due to the triggering of Activity 27 of Listing Notice 1 (including others), of the EIA Regulations, 2014 (as amended), a BA process must be undertaken in support of the application for authorisation.

6.1 The Basic Assessment Reporting Process

6.1.1 Methodology

A Basic Assessment is a consolidation of the two phases of an EIA process into a single phase and involves the identification and assessment of potential impacts associated with a proposed development. Plate 6.1 below provides a brief summary of the methodology that is applied in conducting the BA process.

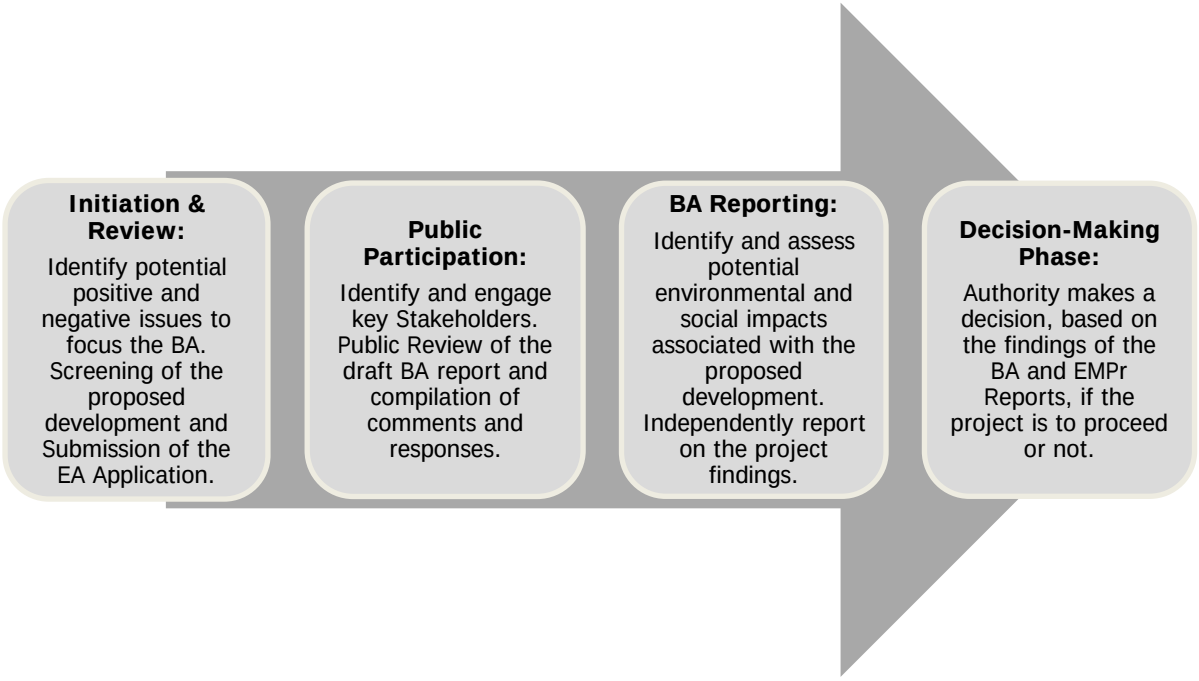

Plate 6-1: Summarised Methodology applied to conducting a BA process

6.1.2 Key Tasks involved in the BA Process

Key tasks in undertaking a full Basic Assessment process include:

- Compile and submit an application for Environmental Authorisation to DFFE.
- Conduct a public participation process in accordance with Chapter 6 of the EIA Regulations of 2014, as amended, including:
    - Notification of the BA process through the placement of an advertisement in a local newspaper and on site.
    - Identification of potential interested and affected parties (I&APs).
    - Written notification to affected and adjacent landowners and occupiers/tenants regarding the BA process.
    - Written notification to key stakeholders and relevant Organs of State regarding the BA process.
    - Consultation with stakeholders and I&APs throughout the BA process. Due to the localised nature of the development, it is expected that no public consultation meetings will be required to be undertaken.
    - Providing a 30-day comment period for the public to comment on the draft BA Report.
    - Compilation and maintenance of an I&AP database including details of all I&APs and consultation undertaken.
    - Compilation of a Comments and Responses report (CRR), capturing all issues and comments raised and responses provided.

- Assess impacts in terms of the requirements of the EIA Regulations, as amended.
- Prepare a Basic Assessment report in accordance with the requirements of the EIA Regulations, as amended.
- Prepare an Environmental Management Programme (EMPr) for the proposed development in accordance with the EIA Regulations, as amended.
- Provide all registered I&APs and relevant stakeholders and Organs of State an opportunity to comment on the environmental report prior to submission to DFFE for review and decision-making.
- Respond to all comments received and include the comments and responses (CRR) in the final report to DFFE.
- Inform all registered I&APs regarding the decision made by DFFE.

6.1.3 Timeframes of the BA Process

Broadly speaking, a BA report is based on information that is readily available. A BA report does not require a separate scoping phase since the issues, impacts and solutions associated with the activity are known with relative certainty and the environmental risks are manageable. As such, the timeframes, from the date of application to EA decision, are shorter - typically 197 days from the date of application (Plate 6-2), but may be less. Refer to Plate 6-2 below.

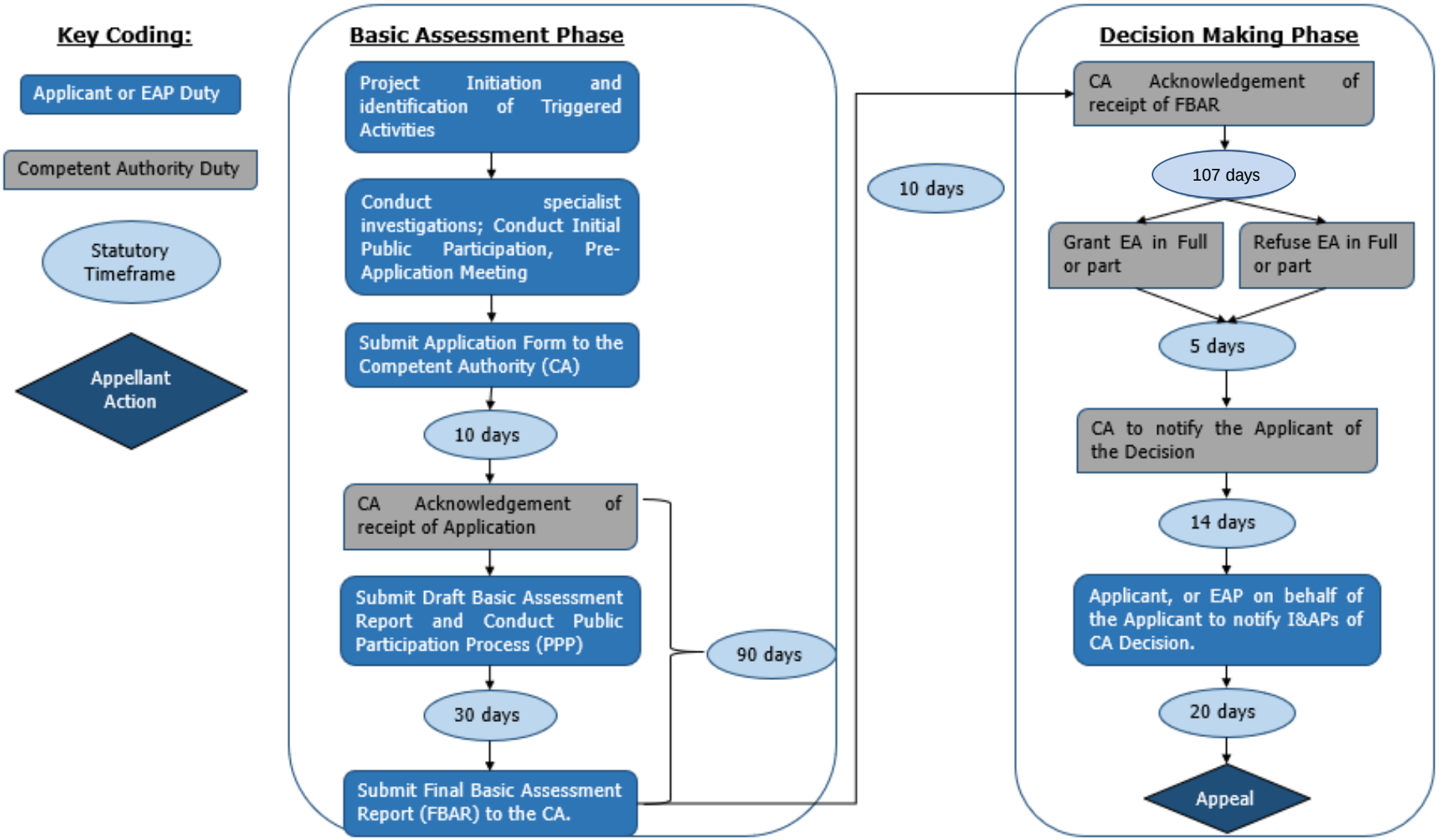

Plate 6-2: Basic Assessment statutory timeframes and process

6.2 The Public Participation Process

The Public Participation Process (PPP) has been designed to comply with the regulatory requirements set out in the EIA Regulations of 2014 (as amended). In addition, the public participation for this project has been aligned to the NEMA PPP Guidelines (2017) and is not intended to be a substitute for the provisions of the NEMA, the SEMAs or the Regulations, in any way.

Public Participation is an important part of any application and must be done appropriately to prevent the project being at risk from challenge that due process has not been followed.

The aim of PPP for the Amendment Process is outlined below:

- Facilitate I&APs to raise any issues of concern and/or suggestions for enhanced benefits;
- Verify that issues have been recorded and considered in the Amendment process by the project team;
- Host a facilitated public meeting, *if required*;
- Assist in identifying reasonable alternatives;
- Provide relevant local information and knowledge to the environmental assessment;
- Facilitate comment on the findings of the environmental assessments; and
- Obtain information on the outcome, i.e. the competent authority's decision, and how and by when the decision can be appealed.

6.2.1 Approval of the Public Participation Plan

A public participation plan (PP Plan) was compiled and submitted to the CA on the 26 August 2020. This plan was submitted in compliance with regulation GNR660 published on 05 June 2020 in terms of the Disaster Management Act (57/2002) and titled: Directions Regarding Measures to Address, Prevent and Combat the Spread of COVID-19 Relating to National Environmental Management Permits and Licences. In compliance with Section 5.1 and Annexure 2 of these regulations, a public participation plan must be presented to the competent authority for approval prior to implementation.

The plan was not granted written approval for the following reason:

> "Please note that the Department has no mandate to approve the Public Participation Plan during alert level 2 of Covid-19. The direction that required submission of PPP during level 3 is no longer applicable in level 2. However, you are required to ensure that the EIA Regulations 2014 as amended are strictly followed and ensure that the disaster management directions which are still applicable are considered"

Despite the above, Arcus have taken the decision to continue to follow the PP Plan that was submitted on 26 August 2020.

The public participation requirements for this application requires that the basic assessment report be subjected to a public participation process, which had been agreed to by the competent authority, and which was appropriate to bring the proposed change to the attention of potential interested and registered interested and affected parties, including organs of state, which have jurisdiction in respect of the relevant activity and the competent authority.

In terms of the above, and in accordance with the submitted Public Participation Plan, the following actions in Section 6.2.1 to 6.2.3 will be/have been undertaken for this basic assessment report

6.2.2 Identification of Key Stakeholders

The I&AP database of the authorised Paulputs WEF EIA (Arcus, 2019) process was used as a baseline for this BA application.

The Department of Forestry, Fisheries and Environment (DFFE) will act as the CA on the proposed amendment. A stakeholder database has been compiled and will be updated throughout the environmental regulatory process (Appendix C).

Registration of I&APs will continue throughout the process, and the I&AP database will be updated accordingly, based on comments received and included in the final amendment report.

All comments are included in the Comments and Responses Table, and responded to and addressed by the project team, i.e. EAP, Applicant and Specialists as applicable. The Comments and Responses Report will be provided in Final BA Report.

6.2.3 Public Participation Materials

Considering the legislative and good practice requirements, the following have been developed and distributed to stakeholders. The various PPP information materials which were used as part of the basic assessment process are included in Appendix C.

- Distribution of the Initial Notification: Letters announcing the basic assessment process and inviting I&APs to register on the project database were sent on 21 July 2021.
- Background Information Document (BID): The BID was distributed on 22 January 2021.
- Newspaper Advertisement: Advertisements were placed in the Gemsbok and Die Burger newspapers on 13 November 2020.
- Site Notice: Site notices and posters were erected around the site as well as in the town of Pofadder and Kakamas in February 2020.
- Notification Letter of Draft Report Availability: Notification letters announcing the availability of the basic assessment report were sent to the I&AP Database on the 30 July 2021.

Invitation to Comment: Members of the public, local communities, and stakeholders are invited to comment on the Amendment Report which is made available for public review and comment from **Friday, 30 July 2021 to Monday, 30 August 2021 (both days inclusive)** at the following locations.

Location	Physical Address	Contact person
Hard Copy Location:		
Pofadder Library	108 Water Street, Pofadder	J. Kamies – 054 933 0221
Electronic Copy Location		
Arcus Website	https://arcusconsulting.co.za/projects/	Ashleigh von der Heyden 021 412 1529
Comment Submission		
Comments can be submitted to: Arcus Consultancy Services South Africa (Pty) Ltd Office 607 Cube Workspace Icon Building Cnr Long Street and Hans Strijdom Avenue Cape Town 8001 T +27 (0) 21 412 1529 I E paulputs@arcusconsulting.co.za		

Registration of I&APs will continue throughout the basic assessment application process, and the I&AP database will be updated accordingly, based on comments received and included in the final basic assessment Report.

6.2.3.1 Comment and Responses

Comments received throughout the application process will be captured in a Comments and Reponses Report (CRR) to form part of the PPP Appendix.

Comments received before finalisation of this draft BA report have been included in the Comments and Response trail (Appendix C), and responded to and addressed by the project team, i.e. EAP, Applicant and Specialists as applicable. The Comments and Response Trail will be updated throughout the process as comments are received and will be included in Appendix C of the final BA Report.

The main correspondence received was from I&APs requesting to be registered on the I&AP database. A comment from a stakeholder was for clarity on the proposed development and agreements with the respective parties.

6.3 Environmental Screening Tool

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

Arcus finalised the screening tool assessment on 11 November 2020 (Volume II) for both the OHPL and the Substation. Based on the identified footprint sensitivities of the proposed development, the requirements for submission of the screening tool report is applicable as it triggers Regulation 19 of the NEMA EIA Regulations, 2014 (as amended).

Bearing in mind that the impacts of the OHPL and substation were previously assessed in the Paulputs WEF EIA (Arcus, 2019), Table 6-1 provides a summary of the specialist assessments identified by the tool, and the response to each assessment in terms of the proposed development.

Table 6-1: Specialist assessments identified in terms of the national web based screening tool for the proposed development

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	**Original EIA Conclusion**	**Screening Tool Sensitivity**	**Validation Conclusion**
Geology, Soils and Agriculture	The OHPL will be located on land zoned and used for agriculture (grazing). The assessment has found that the OHPL and Substation will only impact agricultural land which is of low agricultural potential and only suitable for grazing.	Due to the low agricultural potential of the site, and the consequent low agricultural impact, there are no restrictions relating to agriculture which preclude authorisation of the OHPL and Substation.	**Medium**	Because of the low sensitivity of the site and the negligible agricultural impact of grid infrastructure in this agricultural environment, the proposed development does not have an unacceptable negative impact on the agricultural production capability of the site. For the same reasons, micro-siting will have no influence on agricultural impacts in this environment and it is therefore confirmed that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities.
Geotechnical	Based on geological and geotechnical information obtained for Paulputs and interpretation thereof, there appears to be no geotechnical reason for the wind farm development not to proceed.		None	N / A
Aquatic	The proposed layout of the OHPL and Substation would seem to have limited impact on the aquatic environment.	Based on the site visit the significance of the impacts assessed for the aquatic systems after mitigation would be Low. The final number of actual water course crossings can be determined when micro-siting occurs, but presently 67 crossings have been identified that would trigger the need for a Water Use License application (WULA) (a potential General Application [GA]) in terms of Section 21 c and i of the National Water Act (Act 36 of 1998) (NWA), should any construction take place within these areas. Should any of the present road crossings need to be upgraded then the opportunity exists to improve the	**Very High**	The aforementioned OHPL, Substation and BESS has little bearing on the aquatic environment as the footprint would not result in any changes to the impacts previous assessed. Therefore the significance of the impact would remain low after mitigation during the construction, operation and decommissioning phases of the project as the with the exception of road crossings all the delineated systems with a High Sensitivity as is required by the Biodiversity Assessment Protocols – Aquatic Theme will be avoided.

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	**Original EIA Conclusion**	**Screening Tool Sensitivity**	**Validation Conclusion**
		current state (lack of habitat continuity) for example by replacing pipe culverts with box culverts. This opportunity to improve the hydrological conditions can be seen as a net benefit and has been assessed as part of the cumulative impact statement.		
Terrestrial Biodiversity	The OHPL and Substation is located within the Bushmanland Arid Grassland vegetation type, which is an extensive vegetation type considered to be generally low sensitivity with a low abundance of species of concern. Under the final layout assessed, it was found that there would not be a direct impact on the rocky outcrops. The abundance of listed fauna in the area is low and there while there are some habitats present that are considered to be of high faunal value, these occupy a small proportion of the site and have been avoided.	In terms of the limits of acceptable change within the different sensitivity categories provided for the development, the final development footprint is well within these limits and as such no limits of acceptable change have been exceeded by the development.	**Very High** for Terrestrial Biodiversity	Terrestrial Biodiversity Theme is Very High, with Critical Biodiversity Area 1 & 2, Ecological Support Area and FEPA quinary catchments indicated as being present. The proposed development would result in the limited transformation and loss of some natural habitat, limited to the footprints for pylons, the substations and BESS and an access road along the route, typically consisting of a two-track road. This loss will be highly localised but will result in a negligible cumulative loss of the vegetation type and species. The northern section of the powerline route also intersects with a designated CBA (2) and the southern end with a designated CBA (1)1, although there is no discernable difference between the habitat within the designated CBA's and surrounding areas. The footprint within these areas will be restricted to pylon footprints only and hence will be negligible in area.
Plant Species			**Medium** for Plant Species	Plant Species Theme is Medium with two flora species conservation concern (Crotalaria pearsonii & sensitive species 144) indicated as possibly occurring in the vicinity of the site. Numerous flora and fauna species protected in terms of the Northern Cape Nature Conservation Act

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	Original EIA Conclusion	Screening Tool Sensitivity	Validation Conclusion
				(Act 9 of 2009) are present or likely to be present and will require the appropriate permits before commencement. Several more sensitive habitats, generally confined to small areas, within the broader homogenous Bushmanland Arid Grassland landscape were noted and have been mapped and designated a higher sensitivity. This is due to the prevalence of various protected species that are not common to the surrounding grassland mozaic.
Animal Species			**High** for Animal Species	Animal Species Theme is Medium/High with possibly species including a single bird, Neotis ludwigii. Due to the small size of the overall footprint, risks to faunal species are likely to be low.
Avifauna	Activity and abundance of priority species and red data species were found to be very low to low. The diversity of these species recorded was also low. Abundances and diversity of small passerines was found to be low as well.	The OHPL and Substation does have the potential to negatively impact certain species, particularly Ludwig's Bustard. This impact is partially mitigatable and considered acceptable when all mitigations have been applied. All mitigation measures listed must be included in the EMPr or as a condition of the EA. From an avifaunal perspective, the project is acceptable and can be authorised.	None	It is unlikely that the OHPL, Substation and BESS would result in a change in impacts as assessed for the authorised EIA – including cumulative impacts. Impacts can be mitigated to acceptable levels provided the recommended mitigation measures of the original authorisation are implemented.
Bats	It is envisioned that the OHPL, Substation and BESS will have a low impact on bats in the proposed project vicinity.	Impacts can be mitigated to acceptable levels provided the recommended mitigation measures of the original authorisation are implemented.	None	It is unlikely that the OHPL, Substation and BESS would result in a change the significance in impacts as assessed in the FEIR – including cumulative impacts. Impacts can be mitigated to acceptable levels provided the recommended

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	**Original EIA Conclusion**	**Screening Tool Sensitivity**	**Validation Conclusion**
				mitigation measures of the original authorisation are implemented.
Noise	Construction noise impacts are no more than Low significance. Mitigation measures were recommended. Potential impacts of no more than Low intensity were identified for the operation of the OHPL and Substation no further mitigation is therefore required.	No significant impacts are therefore anticipated due to the OHPL and Substation and as such, it is the opinion of the author that the proposed development may be authorised. It is recommended that a condition is attached to the permission for the OHPL and Substation, requiring that noise due to the operation of the proposed development is not to exceed standard noise levels.	None	Overall, the OHPL, Substation and BESS will not result in any additional noise impact relative to that already assessed and authorised Paulputs WEF.
Heritage, Archaeology and Palaeontology	In terms of the powerlines, there is still a small chance that isolated water holes with associated archaeological sites can be located in open areas but these could only be identified once a final road layout is available and surveyed. The landscape is more natural than cultural but will experience visual impacts. The important part of this is that the N14 is considered a route of cultural significance and aesthetic value because of the qualities of the landscape through which it passes.	It is best practice to avoid all significant heritage sites but, if this is not possible, mitigation can still be effected if necessary. It is recommended that a pre-construction archaeological survey be carried out within the authorised footprint in order to identify any residual issues and recommend mitigation as may be required. It remains possible, that rare, isolated bones might be present and could be damaged or destroyed during	**High –** Heritage and Archaeology	Given that the project has been studied in its entirety, no new impacts are envisaged aside from a very minor potential increase in cumulative impacts. In light of the already authorised electrical projects in the area, including some that are already in operation, the intensity of this increase is deemed to be negligible. The site and its surrounds have already had an electrical layer added to the cultural landscape and the change proposed by the proposed OHPL, Substation and BESS will be negligible. As such, all assessment ratings

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	**Original EIA Conclusion**	**Screening Tool Sensitivity**	**Validation Conclusion**
	The existing power lines and substation within the area, present a far more limited impact and, if the wind farm is constructed then the proposed OHPL and Substation would have a negligible further impact.	construction activities. Mitigation would involve protecting and reporting any fossils that are found so that they can be examined and collected (if necessary) by a palaeontologist. Because impacts of high significance are not expected to occur, it is recommended that the proposed OHPL and Substation can be authorised.	**Medium** - Palaeontology	provided in the original impact assessment continue to apply.
Visual	Overall, sparse human habitation and the predominance of natural vegetation cover across much of the broader project area would give the viewer the general impression of a largely natural setting with some pastoral elements. The level of contrast will however be reduced by the presence of the KaXu, !Xina and Konkoonies SEFs, the Paulputs substation and the existing high voltage power lines in close proximity to the Paulputs WEF application site. The area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. The proposed 132kV power line and substation will have a moderate impact	No fatal flaws were identified for any of the substation sites or power line route options. The visual impacts associated with the proposed Paulputs WEF development (which includes the OHPL and Substation) infrastructure are of moderate significance. Given the low level of human habitation and the absence of sensitive receptors, the project is deemed acceptable from a visual perspective and the EA should be granted. The impacts associated with the construction, operation and decommissioning phases of the project can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.	None	The OHPL, Substation and BESS will not give rise to additional visual impacts or exacerbate the impacts previously identified in the VIA for the Paulputs WEF OHPL. Given the low level of human habitation and the absence of sensitive receptors in the area, the project is deemed acceptable from a visual perspective.

Environmental Aspect	PAULPUTS WEF EIA (AUGUST, 2019)		THIS BASIC ASSESSMENT REPORT	
	Original EIA Finding	**Original EIA Conclusion**	**Screening Tool Sensitivity**	**Validation Conclusion**
	on eleven (11) potentially sensitive receptors.			
Social	The findings of this Social Impact Assessment (SIA) conducted for the proposed OHPL and Substation indicates that during the construction and the operational phase of the proposed development project, various employment opportunities, with different levels of skills will be created. In addition this will also create local business opportunities benefitting the socio-economic development of the local communities of Pofadder and Kakamas.	The establishment of the proposed Paulputs WEF and OHPL and Substation is therefore supported by the findings of this SIA report and therefore, also creating a positive social benefit for society. The local communities will however benefit from the establishment of a Community Trust if it is managed effectively. The challenges posed by climate change and global warming will be addressed by the investment in renewable energy facilities like the proposed Paulputs WEF and OHPL and Substation.	None	The proposed OHPL, Substation and BESS will not result in any additional impacts, cumulative impacts or residual impact, nor will it change the significance of these impacts. Paulputs South must ensure compliance with the recommendations of Section 4 of the approved SIA for the Paulputs WEF and OHPL, Substation and BESS.
Traffic	The proposed grid is expected to be built over a period of 24 months. The grid build would run concurrently with the construction of the Paulputs South WEF and is not expected to generate significant traffic volumes on the road network. A Traffic Management Plan must be prepared to reduce limit traffic congestion and to enhance road safety, in light of the additional traffic due to the associated WEF; and to ensure safe site access and a Transport Management Plan must be prepared to address transport of abnormal super-load and abnormal load vehicles to and on-site.	It was concluded that the development of the grid and associated infrastructure will not have undue detrimental impact on traffic and that identified impacts can be suitable mitigated. It is the reasoned opinion of the specialist that the development of the grid can be approved, from a traffic and transport engineering perspective, subject to the specific requirements / mitigation measures included in the specialist report.	None	The proposed development does not change the Traffic Specialist Report findings and recommendations as stated in the authorised Paulputs WEF EIA. A transport management plan must be compiled and must consider the logistics of transporting abnormal loads to site. This plan must be compiled after preferred bidder is awarded.

Further, GN R320, promulgated 20 March, states that *'specific procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the NEMA must be included/considered when applying for Environmental Authorisation.*'

GN R320 prescribes the general requirements for undertaking a site sensitivity verification describes certain protocols for the assessment and minimum report content requirements of environmental impacts for environmental themes for activities requiring environmental authorisation.

6.4 Predicting Potential Impacts

The identification of potential impacts covers the three phases of the proposed development: construction, operation and decommissioning. During each phase, the potential environmental impacts may be different.

The EAP has experience in reporting on similar projects within the region which has informed the details of this BAR. Where specialist input was required, their assessments considered:

- The extent of the impact (local, regional or (inter) national);
- The intensity of the impact (low, medium or high);
- The duration of the impact and its reversibility;
- The probability of the impact occurring (improbable, possible, probable or definite);
- The confidence in the assessment; and
- Cumulative impacts.

Following the identification of potential environmental impacts through site visits and desktop screening (Arcus, August 2019), the baseline information gathered was used to predict changes to existing conditions and an assessment of the impacts imposed by these changes was then undertaken

6.5 Quantifying Potential Direct and Indirect Impacts

The potential impact that the proposed development may have on each environmental receptor could be influenced by a combination of the sensitivity and importance of that receptor and the predicted degree of alteration from the baseline state (either beneficial or adverse).

Environmental sensitivity (and importance) may be categorised by a multitude of factors, such as the rarity of the species; transformation of natural landscapes or changes to soil quality and land use.

The overall significance of a potential environmental impact is determined by the interaction of the above two factors (i.e. sensitivity/importance and predicted degree of alteration from the baseline).

Each specialist was supplied with a standard methodology structure to use whilst evaluating the significance of potential impacts. This is to ensure an objective assessment and evaluation of potential impacts, whilst enabling easier multidisciplinary decision-making. This methodology[17] is outlined below.

The table below, taken from the T Hacking, indicates the categories for the rating of impact magnitude and significance.

The assessment methodology that was used is in accordance with the revised EIA Regulations, 2014 (as amended). The significance of environmental impacts is a function of the environmental aspects that are present and to be impacted on, the probability of an impact occurring and the consequence of such an impact occurring before and after implementation of proposed mitigation measures.

6.5.1 Extent (spatial scale)

L	M	H
Impact is localized within site boundary	Widespread impact beyond site boundary; Local	Impact widespread far beyond site boundary; Regional/national

[17] Adapted from T Hacking, AATS – Envirolink, 1998: An innovative approach to structuring environmental impact assessment reports. In: IAIA SA 1998 Conference Papers and Notes.

6.5.2 Duration

L	M	H
Quickly reversible, less than project life, short term	Reversible over time; medium term to life of project	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

6.5.3 Intensity (severity)

Type of Criteria	Negative			Positive		
	H-	M-	L-	L+	M+	H+
Qualitative	Substantial deterioration death, illness or injury, loss of habitat /diversity or resource, severe alteration or disturbance of important processes.	Moderate deterioration, discomfort, Partial loss of habitat /biodiversity /resource or slight or alteration	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.	Minor improvement, restoration, improved management	Moderate improvement, restoration, improved management, substitution	Substantial improvement, substitution
Quantitative	Measurable deterioration Recommended level will often be violated (e.g. pollution)	Measurable deterioration Recommended level will occasionally be violated	No measurable change; Recommended level will never be violated	No measurable change; Within or better than recommended level.	Measurable improvement	Measurable improvement

6.5.4 Probability of Occurrence

L	M	H
Unlikely; low likelihood; Seldom No known risk or vulnerability to natural or induced hazards.	Possible, distinct possibility, frequent Low to medium risk or vulnerability to natural or induced hazards.	Definite (regardless of prevention measures), highly likely, continuous High risk or vulnerability to natural or induced hazards.

6.5.5 Status of the Impact

The specialist should describe whether the impact is positive, negative or neutral for each parameter. The ranking criteria are described in negative terms. Where positive impacts are identified, use the opposite, positive descriptions for criteria.

6.5.6 Degree of Confidence in Predictions:

The degree of confidence in the predictions, based on the availability of information and specialist knowledge, is to be stated.

6.5.7 Consequence: (Duration x Extent x Intensity)

Having ranked the severity, duration and spatial extent, the overall consequence of impacts is determined using the following qualitative guidelines:

Intensity = L				
Duration	**H**			
	M			Medium
	L	Low		
Intensity = M				
Duration	**H**			High
	M		Medium	
	L	Low		
Intensity = H				
Duration	**H**			
	M			High
	L	Medium		
		L	M	H
		Extent		

Positive impacts are ranked in the same way as negative impacts, but result in high, medium or low positive consequence.

6.5.8 Overall Significance of Impacts

Combining the consequence of the impact and the probability of occurrence provides the overall significance (risk) of impacts.

PROBABILITY	**Definite Continuous**	H	MEDIUM		HIGH
	Possible Frequent	M		MEDIUM	
	Unlikely Seldom	L	LOW		MEDIUM
			L	M	H
			CONSEQUENCE (from Table 5)		

6.5.9 Mitigation Measures

The BA proposes measures to avoid, reduce or remedy significant adverse impacts which were identified; these are termed mitigation measures. Where the assessment process identified any significant adverse impacts, mitigation measures were proposed to reduce those impacts where practicable. Such measures include physical design evolutions (such as movement of pylons) and management and operational measures. Design alterations, such as relocating pylons to avoid certain sensitive receptors, are mitigation embedded into the design of the proposed development, i.e. embedded mitigation.

This strategy of avoidance, reduction and remediation is a hierarchical one which seeks:

- First to avoid potential impacts;
- Then to reduce those which remain; and
- Lastly, where no other measures are possible, to propose compensatory measures.

Each specialist consultant identified appropriate mitigation and enhancement measures (where relevant).

6.6 Cumulative Impact Assessment

In accordance with the EIA Regulations, 2014 (as amended), consideration is also given to cumulative impacts.

By definition, cumulative impacts are those that result from incremental changes caused by past, present or reasonably foreseeable future actions together with the proposed development. Cumulative impacts are the combined impacts of several developments that are different to the impacts from the developments on an individual basis. For example, the landscape impact of a single OHPL, substation and BESS may be insignificant, but when combined with many OHPLs running across the landscape, it may become significant.

For the purpose of this assessment, cumulative impacts is defined and has been assessed in the future baseline scenario, i.e. cumulative impact of the proposed development = change caused by proposed development when added to the cumulative baseline. The cumulative baseline includes all other identified developments. In the cumulative assessment the effect of adding the proposed development to the cumulative baseline is assessed.

In line with best practice, the scope of this assessment will include all operational, approved or current and planned renewable energy applications (including those sites under appeal), within a 35 km radius of the site.

The renewable energy sites included in the assessment of cumulative impacts has been based on the knowledge and status of the surrounding areas at the time of finalising the BA Report.

Eleven renewable energy projects and their associated ancillary infrastructure were identified within a 35 km radius of the proposed development site. It is assumed that all of these renewable energy developments include OHPL infrastructure. All renewable energy projects within 35 km are listed in Table 3.3 below.

Table 6-2: Renewable energy developments proposed within a 35 km radius of Paulputs Proposed Development

Development	Current status of EIA/development	Technology	Capacity
KaXu Solar One SEF	In operation	Solar	100MW
Khoi-Sun SEF	EIA approved	Solar	75MW
Konkoonsies SEF	In operation	Solar	20MW
Konkoonsies II SEF	Construction underway	Solar	75MW
Paulputs PV 1 SEF	EIA approved	Solar	100MW
Paulputs PV 2 SEF	EIA approved	Solar	100MW
Paulputs PV 3 SEF	EIA approved	Solar	100MW
Skuitdrift SEF	EIA approved	Solar	10MW
Southern Cross SEF	EIA underway	Solar	20MW
Tutwa SEF	EIA underway	Solar	20MW
!Xina Solar One SEF	In Operation	Solar	100MW

All of these projects are Solar Energy Facilities and are relevant as they influence the various specialists' cumulative impact assessments for the proposed development.

Each of the specialists used existing publicly available information for the developments that occur within 35 km of the proposed development to assess the cumulative impacts. It should be noted that this assessment is qualitative and based on specialists' knowledge.

Depending on the specialist study this 35 km radius was increased to determine the full extent of cumulative impacts

7 ENVIRONMENTAL LESLATIVE FRAMEWORK

The legislation that is relevant to this BAR is briefly outlined below. These legislative requirements, guidelines, policies or frameworks are not intended to be definitive or exhaustive but serve to highlight key legislative responsibilities that this report considers or intends to apply.

In terms of the NEMA EIA Regulations, 2014 (as amended), the following Listing Notice Activities have been applied for as part of this application and BA process:

Table 7-1: Listing Notice Activities Triggered by the Proposed Development

Listing Notices 1 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
Listing Notice 1 GN R983 Activity 11	*The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.*	Electrical reticulation will be installed to transfer electricity from the turbines to an on-site substation. Cables will be installed underground where feasible. These internal transmission lines are expected to be of 33 kV capacity. 132 kV overhead powerlines will be installed to transfer electricity from the on-site substation to the existing Eskom Paulputs substation.
Listing Notice 1 GN R983 Activity 12	*The development of- (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs (a) within a watercourse; (c) if no development setback exists within 32 m of a watercourse, measured from the edge of a watercourse.*	The cumulative footprint of all proposed development within 32 m of a watercourse will exceed 100 square meters.
Listing Notice 1 GN R983 Activity 19	*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 metres from a watercourse;*	Construction of the proposed development could include the excavation of soil in watercourses/drainage line areas, and infilling/deposition will exceed 5 cubic metres and, in some instances, exceed 10 cubic metres.
Listing Notice 1 GN R983 Activity 27	*The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation*	The infrastructure associated with the on-site substation and BESS will require clearing of more than 1 hectare of indigenous vegetation but less than 20 hectares.
Listing Notice 1 GN R983 Activity 28	*Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;*	Construction of the proposed development will change the land use from agriculture to mixed - agriculture and electricity transmission. The proposed development is outside an urban area and has a footprint that will exceed 1 ha.
Listing Notice 1 GN R983 Activity 48	*The expansion of- Infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a*	Existing farm roads, tracks and bridges within 32 m of a watercourse will require expansion (upgrading). The cumulative footprint of all proposed development expansion within 32 m of a watercourse may exceed 100 square metres.

	watercourse, measured from the edge of a watercourse	
Listing Notice 3 GN R R.985 Activity 4	*The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *(g) Northern Cape* *(ii) Outside Urban Areas* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	Servitude roads and internal roads leading to the substation and BESS will be wider than 4m and less than 13.5 meters. The northern section of the powerline route also intersects with a designated CBA (2) and the southern end with a designated CBA (1). The route also traverses ESA patches.
Listing Notice 3 GN R R.985 Activity 12	*The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.* *(g) Northern Cape* *(ii) Within critical biodiversity areas identified in bioregional plans*	Clearance more than 300 square metres of indigenous vegetation within an CBA (1), CBA(2) and ESA. The northern section of the powerline route also intersects with a designated CBA (2) and the southern end with a designated CBA (1). The route also traverses ESA patches.
Listing Notice 3 GN R R.985 Activity 14	*The development of—* *(ii) infrastructure or structures with a physical footprint of 10 square metres or more;* *where such development occurs—* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *(g) Northern Cape* *(ii) Outside urban areas:* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	Bridges and infrastructure may be constructed within 32 m of watercourse(s). The site lies outside of an urban area. The northern section of the powerline route also intersects with a designated CBA (2) and the southern end with a designated CBA (1). The route also traverses ESA patches
Listing Notice 3 GN R R.985 Activity 18	*The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre* *(g) Northern Cape* *(ii) Outside Urban areas* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plan*	Existing farm roads will need to be widened or lengthened. The site lies outside of an urban area. The northern section of the powerline route also intersects with a designated CBA (2) and the southern end with a designated CBA (1). The route also traverses ESA patches
Listing Notice 3 GN R R.985 Activity 23	*The expansion of—* *(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;* *where such expansion occurs—* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *(g) Northern Cape* *(ee) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by*	The construction of the powerlines will include the expansion of existing bridges over watercourses. The site lies outside of an urban area and a portion of the site falls within a CBA 1.

	the competent authority or in bioregional plans;	

7.1 International Finance Corporation - Performance Standards & Guidelines

Where relevant, the proposed development would strive to satisfy and incorporate the International Finance Corporation (IFC) Performance Standards (PS), which serve as an international benchmark for identifying and managing environmental and social risks.

The IFC PS offer a framework for understanding and managing environmental and social risks for high profile, complex, international and potentially high impact projects. The IFC PS encompass the following eight topics:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- Performance Standard 2: Labour and Working Conditions;
- Performance Standard 3: Resource Efficiency and Pollution Prevention;
- Performance Standard 4: Community Health, Safety, and Security;
- Performance Standard 5: Land Acquisition and Involuntary Resettlement;
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Performance Standard 7: Indigenous Peoples; and
- Performance Standard 8: Cultural Heritage

7.2 National Legislation

This section deals with nationally promulgated or nationally applicable legislation associated with the proposed development.

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
The Constitution of South Africa, 1996 (Act 108 of 1996) Section 24 of the Act states that everyone has the right to an environment that is not harmful to their health or well-being; to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecological sustainable development and use of natural resources while promoting justifiable economic and social development. Section 32 of the Act states that every person has a right to information held by the State and to information held by other people that is required in the exercise or protection of a right. Lastly, Section 33 of the Act states that everyone has a right to just and procedurally fair administrative action.	As per the Requirements of NEMA and the NEMA EIA Regulations, 2014 (as amended) alternative activities that are less taxing on the environment and resources must be investigated where possible. This Draft BA Report will be made available for public review (as per the PPP section of this report). The Appeal Process will be described to all stakeholders through the EA notification described in the PPP section of this report.
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) NEMA authorises the Minister of the DFFE to issue Regulations relating to the administration of the Act[18], which has been done with the publication of the EIA Regulations, 2014 (as amended). Section 24(2) allows the Minister to identify activities which may not commence without environmental authorisation from the competent authority. This identification has been done in accordance with listing notices referred to as Listing Notice 1, Listing Notice 2 and Listing Notice 3. The NEMA also allows the Minister to determine which authority will be the competent authority to receive and evaluate applications for EAs: • Listing Notice 1 identifies activities of limited scale and effect, which need to be assessed by a fairly simple process referred to as a BA, where after a Basic Assessment Report (BAR) is submitted to the competent authority. • Listing Notice 2 identifies activities of significantly greater magnitude, which require evaluation through an initial Scoping Phase followed by an EIA and an EMPr. This process is generally referred to as the S&EIR process. • Listing Notice 3 relates to activities limited to specified geographical areas and matters of concern to the various provinces which require a BAR process to be dealt with by the provincial authority concerned.	It is the objective of this BA to align to NEMA. The NEMA is the overarching Act governing sustainable development and the NEMA principles apply to all grid infrastructure, Battery Storage and Utilities scale renewable energy projects - and any matter or activity relating to such operation. The Proposed Development triggers activities in respect of a Basic Assessment process (Listing Notice 1 and 3). Listed activities as per the EIA 2014 Regulations, as amended, have been identified (refer to Section 8.5 below). In addition, the project falls within the Northern Strategic Transmission Corridor – thus negating a Basic Assessment. The respective EA and BAR was lodged with the DFFE on the 14 November 2020.

18 Sections 24(5) and Section 44

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
Regulation 16(1) prescribes the general application requirements and states that an application for an EA must be made on the official application form obtainable from the DMRE (the competent authority) and must, amongst others, include proof of payment of the prescribed application fee. Regulation 19 provides for the submission of the BAR to the CA (DFFE) for consideration and states that the BA report must contain all the information set out in Appendix 1 to the EIA 2014 Regulations, as amended. In terms of regulation 20, the DFFE must, after considering the BAR, either accept the EA, with or without conditions, or refuse the EA. Once the EA is accepted by the CA, the Applicant must notify I&APs of the CA's decision.	
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA) As part of the waste management matters dealt with in the NEM: WA, waste activities are outlined in GN 921 of 29 November 2013[19]: List of Waste Management Activities that have, or are likely to have, a Detrimental Effect on the Environment. GN R921 provides that the waste management activities listed in Category A and B thereof may not commence, be undertaken or conducted without a Waste Management Licence (WML). Activities listed in Category C of GN 921 may only be commenced with, undertaken or conducted in accordance with the National Norms and Standards published in terms of the NEM: WA.[20] The CA for WML Applications is the DFFE and Provincial counterparts.	A Waste Management Licence (WML) is not applicable for the proposed development. The handling and management of waste (all waste categories) has been dealt with in the attached Generic EMPr's as well as in Section 8 below.
National Water Act, 1998 (Act No. 36 of 1998) (NWA) In terms of the NWA, the national government, acting through the Minister of Human Settlements, Water and Sanitation, is the public trustee of South Africa's water resources, and must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons (section 3(1)). In terms of the NWA a person may only use water without a license if such water use is permissible under Schedule 1 (generally domestic type use) if that water use constitutes a continuation of an existing lawful water use (water uses being undertaken prior to the commencement of the NWA, generally in terms of the Water Act of 1956), or if that water use is permissible in terms of a general authorisation issued under section 39 (general authorisations allow for the use of certain section 21 uses provided that the criteria and thresholds described in the general authorisation is met). Permissible water use furthermore includes water use authorised by a license issued in terms of the NWA. Section 21 of the NWA defines water uses which are governed in terms of the Act and for which a WUL is required. In terms of section 40(1) of the NWA "a person who is required or wishes to obtain	The aforementioned proposed development has little bearing on the aquatic environment as the footprint would not result in any changes to the impacts previous assessed. Therefore, based on the site visit the significance of the impacts assessed for the aquatic systems after mitigation would be Low. The final number of actual water course crossings can be determined when micro-siting occurs, but presently 67 crossings have been identified that would trigger the need for a Water Use License application (WULA) (a potential General Application [GA]) in terms of Section 21 c and i of the National Water Act (Act 36 of 1998) (NWA), should any construction take place within these areas. Should any of the present road crossings need to be upgraded then the opportunity exists to improve the current state (lack of habitat continuity) for example by replacing pipe culverts with box culverts. This opportunity to improve the hydrological

19 Published in Government Gazette 37083
20 The following National Norms and Standards have been published: Norms and Standards for Storage of Waste, 2013 (GN 926 of 29 November 2013); Standards for Extraction, Flaring or Recovery of Landfill Gas, 2013 (GN 924 of 29 November 2013); and Standards for Scrapping or Recovery of Motor Vehicles, 2013 (GN 925 of 29 November 2013

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
a licence to use water must apply to the relevant responsible authority for a licence." The water uses triggered, in terms of Section 21 for this project are: • impeding or diverting the flow of water in a watercourse; • altering the bed, banks, course or characteristic of a watercourse; It is not likely that sub-sections (a), (b), (d), (e), (f), (g), (h), (j) or (k) will apply to the proposed development. The IWULA must be prepared and submitted in accordance with the Water Use Licence Application and Appeals Regulations 2017 published in GNR 267 on 24 March 2017 and must generally be supported by a Technical Report and Integrated Water and Waste Management Plan (IWWMP) with conceptual design drawing of all water related infrastructure including infrastructures that could potentially contaminate the receiving environment. Other key chapters of the NWA include: • Chapter 3 – Protection of water resources. • Section 19 – Prevention and remedying effects of pollution. • Section 20 – Control of emergency incidents. • Chapter 4 – Water use.	conditions can be seen as a net benefit and has been assessed as part of the cumulative impact statement.
<u>National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEM:BA)</u> The NEM:BA provides for the management and conservation of South Africa's biodiversity within the framework of NEMA, as well as the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources. SANBI website and GIS tools were utilised to determine whether any nationally protected and threatened ecosystems occur on site. Therefore, NEMA Listing Notice 3 activities have been included in the EA application and described in this BAR (Section 8.5) Two vegetation units are present in the area – Besemkaree Koppies Shrubland and Northern Upper Karoo, with Besemkaree Koppies Shrubland being on the project site and having a Least Threatened (NEMBA) or Least Concern (IUCN) conservation status. The Northern Cape Critical Biodiversity Area (CBA) informs that no CBAs occur on the project site, however it falls within an ESA mostly due to the presence of the large Important Bird Area (IBA) surrounding De Aar. The proposed development site falls within an area identified in the National Parks Area Expansion Strategy (NPAES).	A part of the site is located within a CBA 1, which raises the suitability of development within this part of the site into question. Correspondence with DENC indicates that this area has been identified as a CBA based on the presence of *Aloidendron dichotomum* within the site. This species was confirmed present at the site at a low density, both within and outside of the area demarcated as a CBA. With the appropriate avoidance, direct impact on this species can be well-mitigated. In terms of the limits of acceptable change within the different sensitivity categories provided for the development, the final development footprint is well within these limits and as such no limits of acceptable change have been exceeded by the development. Although the development would result in some habitat loss across the site, this is not likely to affect the local population of *Aloidendron dichotomum*. A more direct threat would likely be poaching and harvesting of young trees by construction or operational phase personnel on the site.

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
	Specific mitigation should be implemented during construction and operation to reduce this risk, including setting up and implementing a long-term population monitoring programme within the site for this species. Overall, provided that impact on *Aloidendron dichotomum* can be avoided, then development within the CBA area is considered acceptable from an ecological stand point. However, as this area still contributes to meeting targets, represents habitat for *Aloidendron dichotomum* and is currently in a moderate condition, the overall extent of the development footprint in this area should be limited to ensure that its ecological function is not compromised. The final development footprint within the CBA is estimated at 15 ha which is within the recommended 20 ha footprint limit provided to the developer for this area and as such is considered acceptable.
National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003 as amended) (NEM:PAA) The National Environmental Management Protected Areas Act (No. 57 of 2003) (NEM:PAA) concerns the protection and conservation of ecologically viable areas representative of South Africa's diversity and its natural landscapes and seascapes, and includes *inter alia*: • The establishment of a national register of all national, provincial and local protected areas; • The management of those areas in accordance with national standards; and • Inter-governmental co-operation and public consultation in matters concerning protected areas. Sections 48 to 53 of the NEM:PAA lists restricted activities that may not be conducted in a protected area. Section 48 states that no person may conduct commercial prospecting or mining activities in a: • Special nature reserve or nature reserve; • Protected environment without the written permission of the Minister and the Cabinet member responsible for minerals and energy affairs; and • Protected area referred to in Section 9: (b) world heritage sites; and (d) specially protected forest areas, forest nature reserves and forest wilderness areas declared in terms of the National Forests Act (No. 84 of 1998);	As read in addition to the above. SANBI website and GIS tools were utilised to determine if the proposed development site overlaps with CBAs. The Regulations were utilised to determine the need for any additional listed scheduled activities under GNR 985.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) The Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) includes the use and protection of land, soil, wetlands and vegetation and the control of weeds and invader plants. This is	The protection of land, soil, watercourses and vegetation and the control of weeds and invader plants will be contained within Chapter 8 of the BAR in terms of impact management measures.

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
the only legislation that is directly aimed at conservation of wetlands in agriculture. The Act contains a comprehensive list of species that are declared weeds and invader plants dividing them into three categories. These categories are as follows: • Category 1: Declared weeds that are prohibited on any land or water surface in South Africa. These species must be controlled, or eradicated where possible; • Category 2: Declared invader species that are only allowed in demarcated areas under controlled conditions and prohibited within 30m of the 1:50 year floodline of any watercourse or wetland; and • Category 3: Declared invader species that may remain but must be prevented from spreading. No further planting of these species is allowed. In terms of the Act, landowners are legally responsible for the control of alien species on their properties. Failure to comply with the Act may result in various infringement consequences and in some instances imprisonment and other penalties for contravening the law.	Generic EMPr mentions further measures by which Paulputs South are legally obligated to implement.
<u>The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA):</u> Section 38 (1) of the National Heritage Resources Act, 1999 (NHRA) lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed development include the following: "*(a) The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;* *(c) any development or other activity which will change the character of a site; and* *(i) exceeding 5000 m² in extent*." The NHRA requires that a person intending to undertake such an activity must notify the relevant national and provincial heritage authorities at the earliest stages of initiating such a development. The relevant heritage authority would then in turn, notify the person whether a Heritage Impact Assessment Report should be submitted. According to Section 38(8) of the NHRA, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (No. 73 of 1989) (ECA) (now replaced by NEMA) or any other applicable legislation. The decision-making authority must ensure that the heritage evaluation fulfils the requirements of the NHRA and take into account any comments and recommendations made by the relevant heritage resources authority. As such, a Heritage Impact Assessment will form part of this Basic Assessment process.	Given that the project has been studied in its entirety, no new impacts are envisaged aside from a very minor potential increase in cumulative impacts. In light of the already authorised electrical projects in the area, including some that are already in operation, the intensity of this increase is deemed to be negligible. The site and its surrounds have already had an electrical layer added to the cultural landscape and the change proposed by the present project will be negligible. As such, all assessment ratings provided in the original impact assessment continue to apply.

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
In South Africa, the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The NHRA also protects intangible heritage such as traditional activities, oral histories and places where significant events happened.	
National Road Traffic Act, 1996 (Act No. 93 of 1996) (NRTA) The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. The South African National Roads Authority (SANRAL) and the Northern Cape Department of Transport (DoT) would act as a Competent/Commenting Authority.	An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits which will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads (transport vehicles exceeding the dimensional limitations (length) of 22m). Depending on the trailer configuration and height when loaded, some of the substation components and the BESS containers may not meet specified dimensional limitations (height and width) and will therefore require a permit.
National Forests Act, 1998 (Act No. 84 of 1998) (NFA)) and National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998). This act lists protected tree species and prohibits certain activities. The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister". The purpose of the National Veld and Forest Fire Act, as amended by the National Fire Laws Amendment Act, is to prevent and combat veld, forest and mountain fires throughout South Africa. The Act applies to the open countryside beyond the urban limit and puts in place a range of requirements. It also specifies the responsibilities of land owners. The term 'owners' includes lessees, people in control of land, the executive body of a community, the manager of State land, and the chief executive officer of any local authority. The requirements include, but are not limited to, the maintenance of firebreaks and availability of firefighting equipment to reasonably prevent the spread of fires to neighbouring properties.	A licence is required for the removal of protected trees. It is therefore necessary to conduct a pre-construction walkthrough survey that will determine the number and relevant details pertaining to protected tree species present in the OHPL corridor and in the substation yard that cannot be reasonably avoided for the submission of relevant permits to authorities prior to the disturbance of these individuals. The Ecological Impact Assessment undertaken as part of the BA Report included a site visit which allowed for the identification of any protected tree species that may require a license in terms of the NFA within the project development site (refer to Volume II of this BAR).
Hazardous Substances Act, 1973 (Act No. 15 of 1973) The Regulations for Hazardous Chemical Substances apply to an employer or a self-employed person who carries out work at a workplace which may expose any person to the intake of hazardous chemical	No hazardous substances are expected to occur or be stored on site for this proposed development.

<table>
<tr><th>Applicable National Legislation and Guidelines used to compile the report.</th><th>Reference where Applied</th></tr>
<tr><td>substances at that workplace. Regulations 14 and 15 provide for the labelling, packaging, transportation and storage and the disposal of hazardous chemical substances respectively. These regulations set out specific requirements which form part of an employer's duty to provide and maintain, as far as reasonably practicable, a working environment that is safe and without risk to the health of his or her employees.</td><td>Although a battery is not regarded as above, there may indeed be instances where a battery is not fully assembled and the electrolyte (or substances making up such electrolyte) intended for such battery, may potentially be stored on site, in a container (e.g. tanks), prior to filling. In this instance, should the electrolyte be stored in a container, such facility or infrastructure will indeed be regarded as a facility or infrastructure for the storage, or storage and handling of a dangerous good, as these would have as its purpose then, not the storage of energy, but indeed the storage of that substance (if indeed a dangerous good). Refer to Section 4 of this BAR.</td></tr>
<tr><td><u>Promotion of Access to Information Act, 2000 (Act No. 2 of 2002) (PAIA)</u>
The PAIA gives effect to the constitutional right of access to any information held by the state and any information that is held by another person and that is required for the exercise or protection of any rights; and to provide for matters connected therewith.</td><td>The requirements of the Act were considered when assessing and involving the public and registered interested and affected parties.</td></tr>
<tr><td><u>National Dust Control Regulations, 2013</u>
The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004), makes provision for national dust control regulations. These regulations prescribe dust fall standards for residential and non-residential areas. These Regulations also provide for dust monitoring, control and reporting.
The acceptable dust fall rates are:
<table>
<tr><th>Restriction Area</th><th>Dust Fall (D) (mg/m^2/day, 30 day average)</th><th>Permitted Frequency of exceedance</th></tr>
<tr><td>Residential</td><td>D<600</td><td>Two within a year, not sequential months</td></tr>
<tr><td>Non- Residential</td><td>600 <D< 1200</td><td>Two within a year, not sequential months</td></tr>
</table>
</td><td>The proposed development is cognisant of the obligation to control dust and particulate matter (PM) 10 and 2.5 which may result from the proposed development.
Principles of this plan have been taken into consideration during the compilation of this BAR.</td></tr>
<tr><td><u>The National Development Plan, 2030</u>
The NDP strives to ensure a tightening of the accountability chain, where, in relation to this BAR, environmental non-compliance in terms of Section 16(1)(b) of NEMA, is addressed at all levels of government.
The environmental sustainability and resilience objectives include, inter alia:
• Implementing a set of indicators for natural resources, accompanied by publication of annual</td><td>The project – if approved – will assist in minimising GHG emissions. The proposed development is critical to the successful operation of the Paulputs South WEF, which is a green energy/renewable energy project.
If awarded preferred bidder status, the Paulputs South WEF will provide a constant electricity feed to the national grid that would thus be stable should the BESS be approved.</td></tr>
</table>

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
• compliance reports; • Achieving the peak (in 2025) plateau and decline trajectory for greenhouse gas (GHG) emissions coupled with the entrenchment of an economy-wide carbon price; • Improving disaster preparedness for extreme climate events. The Northern Cape is currently experiencing a drought; and • Increasing investment in new agricultural technologies, research and the development of adaptation strategies for the protection of rural livelihoods and expansion of commercial agriculture.	
The One Environmental System In terms of the One Environmental System established by the NEMLAA, an EA decision in respect of the proposed development must be issued within 107 days from receipt of the BAR. This system aims to streamline the licensing processes for environmental authorisations and water use.	It is the intention of the EAP on behalf of Paulputs South (the Applicant) to submit the required documents within the prescribed timeframes. The Competent Authority is identified as the DFFE.
The Public Participation Guidelines in terms of the National Environmental Management Act, 1998 Environmental Impact Assessment Regulations, 2017 This document aims to assist with the participation process of all interested and affected parties regarding any proposed development. This guideline provides information and guidance for proponents or applicants, interested and affected parties, competent authorities and environmental assessment practitioners on the public participation requirements of the act, as well as provides information on the characteristics of a vigorous and inclusive public participation process.	This guideline was used to ensure that all of the required steps are followed to ensure that a complete and successful public participation process is conducted.
Integrated Environmental Management Guideline on Need and Desirability, 2017 This document assists Environmental assessment practitioners on the best practice as well as how to meet the peremptory requirements prescribed by the legislation as well as sets out both the strategic and statutory context for the consideration of the need and desirability of a development involving any one of the NEMA listed activities. This document further sets out a list of questions which should be addressed when considering need and desirability of a proposed development.	This guideline was used to ensure that the need and desirability of the proposed development was correctly and thoroughly considered.
Action Plan of the Environmental Initiative of the New Partnership of Africa's Development, 2003. This Action Plan was established with the aim of encouraging sustainable development, conservation and acceptable use of biodiversity in Africa. It has been recognised that a healthy and productive environment is a prerequisite for the success of New Partnership of Africa's Development (NEPAD), together with the need to systematically address and sustain ecosystems, biodiversity and wildlife. Six areas have been identified: • Combating land degradation, drought and desertification; • Conserving Africa's wetlands;	The prevention and control of IAS has been described in Section 8 of this BAR. In addition, the proposed development is not reliant of large amounts of water for construction, operation or decommissioning and would thus not contribute to drought or desertification.

Applicable National Legislation and Guidelines used to compile the report.	Reference where Applied
• Preventing and controlling invasive alien species (IAS); • Conservation and sustainable use of coastal and marine resources; • Combating climate change in Africa; and • Cross-border conservation and management of natural resources.	
South Africa's National Biodiversity Strategy and Action Plan The National Biodiversity Strategy and Action Plan (NBSAP) sets out a framework and a plan of action for the conservation and sustainable use of South Africa's biological diversity and the equitable sharing of benefits derived from this use. The NBSAP was prepared by the former Department of Environmental Affairs and Tourism (DEAT), during the period May 2003 to May 2005. The goal of the NBSAP is to conserve and manage terrestrial and aquatic biodiversity to ensure sustainable and equitable benefits to the people of South Africa, now and in the future. Through the NSBA, it is recognised that biodiversity cannot be conserved through protected area networks only. All stakeholders, from private landowners and communities to business and industry must get involved in biodiversity management.	The proposed development is cognisant of the obligation to protect and preserve the integrity of the environment as well as its biodiversity. Principles of this plan have been taken into consideration during this BAR.
National Environmental Management Act; National Appeal Regulations, 2014 The purpose of these regulations is to regulate the procedure contemplated in section 43(4) of the National environmental management act relating to the submission, processing and consideration of a decision on an appeal. This Act is used to help guide and understand the appeal process and the procedures may follow.	The requirements of the Act will be considered if an appeal may need to be or is lodged for the project.

7.3 Provincial Legislation

This section deals with provincially promulgated or provincially applicable legislation associated with the proposed development.

Applicable Provincial Legislation and Guidelines used to compile the report.	Reference where Applied
The Nature and Environmental Conservation Ordinance No. 19 of 1974; and Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009). The competent or commenting authority is the Northern Cape DENC. These were developed to protect both animal and plant species within the various provinces of the country which warrant protection. These may be species which are under threat or which are already considered to be endangered and species are listed in the relevant documents. The provincial environmental authorities are responsible for the issuing of permits in terms of this legislation	The proposed development is cognisant of the obligation to protect and preserve the integrity of the environment as well as its biodiversity. Principles of this plan have been taken into consideration during this BAR.
Northern Cape Provincial Spatial Development Framework (PSDF), 2012	The proposed development (which supports the successful operation of the Paulputs South WEF) will enable additional uptake

Applicable Provincial Legislation and Guidelines used to compile the report.	Reference where Applied
The PSDF states that the main goal for the province is to enable sustainability through sustainable development. The PSDF identifies key sectoral strategies and plans which are considered to be the key components of the PSDF. Sectoral Strategy 19 refers to a provincial renewable energy strategy. With this, the overall energy objective of the Norther Cape Province includes *"includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts."*	of renewable energy into the national grid which will promote the province's objectives.

In addition to the above, the renewable energy industry has substantial support in the South African planning context, which is detailed in the following national and provincial plans:

- National Development Plan;
- National Integrated Energy Plan (2016)
- Renewable Energy Development Zones (REDZ) as read in GNR 114 and GNR 113 of 16 February 2018;
- National Integrated Resource Plan for Electricity (2010-2013); and
- National Infrastructure Plan.

7.4 Regional Programmes and Frameworks

An evaluation of the 'need and desirability' of the project considers the strategic context of the project with regard to the municipal Integrated Development Plans (IDPs), Environmental Management Frameworks (EMFs) and Spatial Development Frameworks (SDFs) as follows:

Applicable Regional IDPs, SDFs and EMFs.	Reference where Applied
Namakwa District Municipality Rural Development Plan (RDP), 2017 – 2022 Renewable energy developments are considered to be development priorities within the RDP. The need to evaluate localisation possibilities for all renewable energy technologies is emphasised in the Plan.	The development of renewable energy projects (including the proposed Development) will contribute to the achievement of the need for the development of renewable energy developments within the Province.
Namakwa District Municipality Integrated Development Plan (IDP), 2017 – 2022 The plan identifies the need for support to the local municipalities to deliver basic services such as water, sanitation, housing, electricity and waste management. The IDP also seeks to establish good governance by enforcing the climate change response plan.	The establishment of the Proposed Development may contribute to the delivery of basic services, however only to a limited extent. The proposed Paulputs North WEF and Paulputs South WEF facilities and the Proposed Development will contribute to the application of the climate change response plan, through zero production of greenhouse gas emissions during the operation of the facilities and associated grid.

Applicable Regional IDPs, SDFs and EMFs.	Reference where Applied
Khâi-Ma Local Municipality Integrated Development Plan (2017/18 – 2021/22) The Vision set for the Khâi-Ma Local Municipality is "Creating an economically viable and fully developed municipality, which enhances the standard of living of all the inhabitants/ community members of the Khâi-Ma Local Municipality through good governance, excellent service delivery and sustainable development". Simply put, the vision is "Improved and sustainable standard of living for all". Linked to the Vision is the Mission statement, which is the "Provision of transparent, accountable and sustainable service delivery". The IDP identifies a number of Key Performance Areas (KPAs) identified by communities during Phase 1 of the IDP Process. The KPAs that are relevant to the proposed project include: • KPA 1: Service Delivery and Infrastructure Development; and • KPA 2: Local Economic Development. The priority issues identified in the IDP that are relevant to the project and are linked to the KPAs include lack of Basic Services (KPA 1); Poverty and Unemployment (KPA 2); Lack of sport and recreational facilities and services (KPA 1); and Lack of sufficient and proper health services (HIV/AIDS) (KPA 1). Some of the key social challenges identified by the community during the IDP process include increase in drug abuse, increase in young children (under 10 years) actively abusing alcohol, increase in teenage pregnancies, increase in crime linked to alcohol and drug abuse, high levels of youth unemployment, and increase in the prevalence of HIV & Aids The renewable energy sector is also recognised as a key sector.	The proposed development is directly aligned to KPA 1 and 2 and the IDP. The IDP notes that a number of new opportunities have opened up for the Namakwa area since the need to facilitate the generation of sustainable energy was introduced in South Africa by Eskom and the South African government. The IDP notes that there are a number of solar projects proposed in the area and that the economic benefits from these projects are eagerly anticipated.

8 BASELINE ENVIRONMENT

This section highlights the significant findings of the site visits and desktop studies undertaken by the specialists as part of the Approved Paulputs WEF EIA (Arcus, 2019). The approved EIA assessed the approved Paulputs WEF site in its entirety as well as each OHPL and substation option.

The baseline environment as described in the Paulputs WEF EIA (Arcus, 2019) is outlined below.

8.1 Climate

Climatic data available for Pofadder, indicates that the portion of the Northern Cape in which the wind farm is proposed experiences an arid climate comprising hot, dry summers and cool, very dry winters. Climatic data available from January 2009 to December 2018 indicates that the average maximum daily temperatures vary from 34°C in January to 18°C in July (WWO, 2019). Corresponding average minimum temperatures for these months are 24°C and 8°C, respectively.

The mean annual precipitation over this ten-year period is approximately 108 mm per annum, falling mainly during the summer months due to low pressure systems developing over the hot arid landscape which draws cooler moist air from the coastline, resulting in periodic and brief thunder showers. The average monthly rainfall distribution is shown in Plate 8.1. The low rainfall is a very significant agricultural constraint that seriously limits the level of agricultural production possible. Water availability is severely constrained.

Climate is a pivotal factor for geotechnical considerations as it determines the mode and rate of rockmass weathering and thus the formation of soils. Evaporation far exceeds precipitation and in general the region lacks surface water. This indicates that, although chemical decomposition of rockmasses may occur in localities where water may be abundant (viz. preferential drainage paths such as fault and joint planes), mechanical disintegration of rockmasses is the predominant weathering mechanism in Pofadder and surrounds.

8.2 Geology, Soils and Agriculture

There are no perennial drainage courses on the proposed development site, only non-perennial ones typical of very arid environments, which only flow occasionally after significant rainfalls.

The proposed development site is classified with a predominant land capability evaluation value of 4, although it varies from 3 to 7 across the 26.5 km OHPL corridor. Agricultural limitations that result in the low land capability classification of the Paulputs WEF site are predominantly due to the extremely limited climatic moisture availability. The long-term grazing capacity of the site is low at 36 hectares per large stock unit.

The majority of land which will be traversed by the OHPL options is bare, with some woodland/open bush and low shrubland areas. The predominant agricultural activity of the region is livestock farming of sheep. The climate does not support any cultivation and low intensity natural grazing is the only current and viable agricultural activity. The only agricultural infrastructure in the area are wind pumps, stock watering points and fencing surrounding grazing camps. There are no farmsteads (that is a residential and administrative node of buildings and infrastructure from which a farm is managed) impacted by the proposed development, however there are dwellings that exist.

The underlying geology is predominantly migmatite, gneiss and granite and the proposed OHPL and substation are located across three land types: Ag3, Ag2, and Ag37.

The agricultural potential assessed for the proposed site is low. Agricultural potential and conditions are also very uniform across the site, and the choice of placement of facility infrastructure, including access roads and transmission lines, has negligible influence on the significance of agricultural impacts. From an agricultural point of view, no areas of the site need to be avoided and no buffers are required.

8.3 Freshwater and Wetlands

The OHPL and substation yard, assessed as part of the approved Paulputs WEF site, occurs within mainstem catchment systems. These systems consist of short tributaries of the Orange (Gariep) River and are largely in a natural state. Thus, the systems are considered alluvial river systems, characterised as natural sediment transport mechanisms within the regional environment

The current impacts which occur in localised areas include erosion due small road crossings and tracks; and grazing. There are no wetlands assessed within the corridor proposed for the OHPL, nor at the site proposed for the substation. This was confirmed during the site visits (Arcus, 2019).

In terms of the National Freshwater Ecosystems Priority Areas (NFEPA) assessment, all the watercourses within Paulputs WEF site (including this proposed development) have been assigned a condition score of AB (Nel et al. 2011), indicating that they are largely intact and of biological significance. This is largely due to these catchments falling within the Orange River, within a section rated B (Largely Natural). However, as the systems are mostly ephemeral, they do not support any wide riparian zones and the vegetation was considered terrestrial.

The NFEPA (Nel et al., 2011) also earmarked sub-quaternaries, based either on the presence of important biota (e.g. rare or endemic fish species), or conversely the degree of riverine degradation, i.e. the greater the catchment degradation the lower the priority to conserve the catchment. The important catchments areas are then classified as Freshwater Ecosystems Priority Areas (FEPAs). Portions of the OHPL corridor fall within the Fish FEPA, associated with the Kaboep River, although no permanent fish habitat occurs at all.

There are significant watercourses delineated with a 45 m buffer within the approved Paulputs WEF site, any activities within these areas or the 32 m buffer will require a Water Use license (possible General Authorisation) under Section 21 c & i of the National Water Act (Act 36 of 1998).

8.4 Present Ecological State and Conservation Importance'

The Present Ecological State (PES) of a river represents the extent to which it has changed from the reference or near pristine condition (Category A) towards a highly impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E).

The PES scores for the main watercourses identified as part of the Paulputs WEF (Table 8.1) were rated as per DWS, 2014 - where A = Natural or Close to Natural.

Table 8-1: Present Ecological State of Main Watercourses in the Study Area

Subquaternary Catchment Number	Present Ecological State	Ecological Importance	Ecological Sensitivity
3445	B	High	High
3449	C	High	High

These scores were substantiated by field observations and due to the overall lack of impacts or disturbances these scores should be upheld. This was further substantiated by the inclusion of the lower portions of the Kaboep River and upper Samoep River into Critical Biodiversity Areas (Type 1 and 2) and Ecological Support Area (ESA).

8.5 Flora and Terrestrial Fauna

8.5.1 Habitats

The project area earmarked for the OHPL, substation and BESS is generally characterised by an extensive flat to gently undulating landscape with scattered rocky hills (koppies) and occasional dunes bisected by alluvial washes and watercourses in low lying areas. Soils are typically sandy, with underlying shallow gravelly soils exposed in places. The vegetation is generally speaking typical of Bushmanland Arid Grassland. It is noted that Bushmanland Arid Grassland shares numerous common species with the nearby Lower Gariep Broken Veld and Bushmanland Sandy Grassland, where Broken Veld is typically in rocky areas and having a dominant shrub and herb component and Sandy Grassland is typically of an alluvial nature with a dominant presence of grasses and annuals becoming prominant after rains.

Alien invasive species including trees and ephemeral weeds are generally absent or restricted to disturbed areas such as along road reserves and around dwellings or historical dwellings. The general area has overall low levels of utilization, primarily for grazing, with sheep and goats currently being favoured.

Variations in soils and substrate allow for some variation in composition and several distinct communities are present. The above vegetation offers habitat for a limited suite of animal species, mostly tolerant of the arid conditions, while the above variation also allow for a greater availability of microhabitats for a diverse range of flora and fauna different species, some of which may have habitat preferences, such as gravelly plains, sandy or dune areas, rocky hills and outcrops or alluvial areas including associations with the non-perennial aquatic habitat along watercourses and washes

8.5.2 Critical Biodiversity Areas

The proposed 132kV powerline is situated within an area designated Other Natural Area for the south and central portion of the route with Critical Biodiversity Areas (CBA) 1 limited to a short section of powerline near the Paulputs South WEF BESS and substation and Critical Biodiversity Area 2 along the northern stretch where it falls within the Mattheus-Gat Conservation Area Important Bird Area (IBA). The powerline footprint will be limited to pylon footprints and the access track and will thus not result in any significant loss of area designated as Critical Biodiversity Area 1 or 2. The BESS is situated outside of the CBA 1 area and the small footprints of the pylons will not significantly affect the CBA coverage.

The proposed 132kV powerline will traverse a narrow band of Ecological Support Areas (ESA) surrounding the non-perennial watercourse that runs parallel to but outside of the powerline corridor other than where a crossing from the east to the west side is required. Due to the arid nature of the area, watercourses are likely to serve as important ecological corridors. In terms of recommended land uses for the various CBA classes, powerlines and other linear infrastructure, are generally considered to be compatible with Ecological Support Areas and importantly the aerial powerline and access track are unlikely to result in any significant disruptions or barriers to terrestrial ecological processes, being the primary objective of ESAs.

8.5.3 Vegetation Types

The footprint of the substation and OHPL options is restricted to the Bushmanland Arid Grassland vegetation type. Soils typical of this vegetation type are red-yellow apedal

(without structure), freely drained soils, with a high base status and mostly less than 300 mm deep. In proximity to the site is Lower Gariep Broken Veld in higher lying rocky hills and Bushmanland Sandy Grassland in lower lying areas (both least Concern).

The vegetation units are all categorised as having a Least Concern Conservation Status and are not under threat, with more than 60 % considered to be natural. The conservation targets are 21 % and are poorly protected, despite being some of the most extensive units.

The following vegetation communities can be differentiated within the broader landscape:

- Arid Grassland: Open Plains
- Arid Grassland: Low Hills
- Arid Grassland: Dunes
- Arid Grassland: Rocky Hills (Koppies)
- Alluvial Vegetation
- Transformed Areas

Plate 8-1: Open Plains vegetation (sandy)

Plate 8-2: Open Plains vegetation (gravel)

8.5.4 Fauna Species

Within the site, the most important ecosystem services are the provision of habitat for faunal species (foraging) and potentially livestock/game farming, as well as several mineral resources (mining). There is minimal change to ecosystem services from pre-development conditions because of surrounding historical rural development and historical agricultural use of the site. The habitats and microhabitats present are not unique, and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. Site does provide habitat for a range of faunal species. Many borrows were noted across the site during the site visit, and burrowing animals are likely a substantial component of the local ecology. Minimising the clearing footprint for pylons and access roads will reduce the overall impact to faunal.

Several mammal species are likely to be found in the wider area and common to the site. Other less common species may be transient to the site. Should they be present, they are likely to be mobile species that would move away from disturbance and with intact habitat available in the immediate surrounds would unlikely be negatively affected by the activity. Mammal species confirmed to be present during the site visit, in previous studies from the site and surrounding area include Cape Fox, Bat-eared Fox, Steenbok, Cape Hare, Aardwolf, South African Ground Squirrel, Hairy-footed Gerbil, Aardvark, Aardwolf, African Wild Cat, Cape Hare, Hewitts' Red Rock Rabbit, Yellow Mongoose, Cape Mongoose, Striped Polecat, Cape Fox, Bat-eared Fox, Black-backed Jackal, Small-spotted Genet, Springbok, Gemsbok and Meerkat. None of these species are likely to be affected other than minor displacement during construction of the powerline. The only listed mammal which may occur at the site is the Black-footed cat (*Felis nigripes)*, which is listed as Vulnerable. Although the Black-footed Cat could potentially occur in the area as the habitat is favourable for this species, it is widely distributed across the arid and semi-arid areas of South Africa and the powerline impact to the species would be negligible in relation to the distribution of this species.

Species previously observed at the site and during previous studies in the vicinity include Namaqua Sand Lizard (*Pedioplanis namaquensis*), Ground Agama (*Agama aculeata*),

Western Rock Skink (*Mabuya sulcata*), Namaqua Dwarf Legless Skink (*Acontias tristis*), Horned Adder (*Bitis caudalis*) and Karoo Sand Snake (*Psammophis notostrictus*). The only listed species known from the vicinity is the Black Spitting Cobra, (*Naja nigricollis woodi*). This species is likely to occur in the vicinity of the rocky hills and outcrops as well as other areas with sufficient cover. Although a regional endemic, this species is common within its range and the extent of habitat loss resulting from the powerline would be negligible. The rocky hills and outcrops are likely the most important reptile habitat for a variety of lizards, geckos, skinks and snakes. This habitat is limited in extent, and it is unlikely that to be affected. The predominant sandy open plain habitat has relatively low reptile diversity and the overall extent of habitat loss associated with the powerline is negligible.

The site is within the distribution range of several amphibian species, however since there is no perennial water in the area, risk is low for most species and diversity is low. Sand Frogs may be present in sandy areas. Other species are unlikely to be affected as no natural wetlands will be directly affected by the clearing of vegetation. Areas having standing water in rocky areas or crevices that have water after rain which could serve as breeding areas for tadpoles after rain for species such as toads and marbled rubber frogs. Earth dams, near water reservoirs and troughs and near drainage lines could also serve as occasional sites for amphibians. None of the more sensitive areas are likely to be affected by the proposed powerline.

Baboon Spiders and Scorpions are more than likely present and should form part of the faunal search and rescue, being ToPS protected. No other invertebrate species of concern are noted to occur nor would be affected significantly by the proposed powerline.

8.5.5 Flora Species

Several endemic and range restricted species are known from the surrounding area. None listed as per the National Screening Tool were confirmed to be present, although it is possible that some individuals of these species could occur, since several similar species were noted to be present as isolated individuals and/or small scattered populations. Note, there is a residual very-low possibility that these species could be present, and cannot be discounted without extensive seasonal sampling, which is generally outside the scope of such an assessment, unless a specific risk is identified.

Based on existing records for the region, there are few plant species of high conservation concern. Although species such as Sensitive Species 144, *Boscia foetida* and *Hoodia gordonii* are present in the broader landscape, they are uncommon within the proposed powerline area and as such, this does not elevate the sensitivity. No *Vachellia* (Acacia) *erioloba* trees were observed within the site, the closest noted to the west, towards Pofadder along the N14 road, possibly originating from planted trees at road stops.

It is important to note that a permit would be required for any impacts on nationally protected tree species, while a permit from DENC would also be required for general clearing and any clearing or removal of provincially protected species. These permits would be informed by a preconstruction walk-through of the final development footprint.

8.5.6 Sensitive Species and Species of Special Concern

No Endangered or Critically fauna species were confirmed to be present, but several are known to be present in proximity to the site.

A number of endemic and range restricted species are known from the general surrounding area and there is a residual likelihood that they could be present, but cannot be discounted without comprehensive seasonal sampling, unless a specific risk is identified. Due to the localised nature of the impact, with vegetation clearing only required for site development,

as well as the level of degradation, the risk of a species suffering any significant population loss is low.

The site falls within the general distribution range of many endemic species and other species with a highly localised distribution, some of which are Critically Endangered, Endangered, Vulnerable, Near Threatened or Rare. Some of these species are also only from a single or a few populations. As per Table 6 in the Terrestrial Biodiversity Assessment (Volume II), no Endangered or Critically Endangered flora species were confirmed to be present nor are known to be present in the affected area. The remaining species, which could potentially be present, include two Vulnerable species, one of which being *Crotalaria pearsonii* appears to be recorded in rocky areas to the west and is unlikely to occur. It may be present on the rocky hills on the western side of the powerline route, but such areas will not be affected.

Plate 8-3: Basic Assessment statutory timeframes and process

Sensitive Species 144 is noted to be present in vicinity and can be locally common. It is not common within the wider WEF area and none were observed directly within the powerline corridor, other than associated with the rocky hills, which should be avoided. The species can be easily avoided during pylon construction, and it is unlikely that any will be affected by the proposed powerline. None were present within the proposed BESS site.

Several species not having an elevated conservation status but protected in terms of the Northern Cape Nature Conservation Act (NCA) are present. These species generally have a widespread distribution. Based on observations made during the site visit, several listed species are typically geophytic or succulent species and tend to be present as broadly scattered individuals or occur in small, localised clusters. The more specialised rocky habitats within the broader sand plains have been identified and indicated as being of higher sensitivity. These habitats are likely less resilient to disturbance compared to the vegetation communities present in the widespread sandy habitat and being localised, can be more easily avoided during placement of pylons, by spanning the affected areas, or minimising the number of pylons and access roads within such areas.

Due to the prevalence of many species belonging to various broadly protected groups, such as the *Aizoaceae, Crassulaceae, Iridaceae, Asphodelaceae and Amarylidaceae*, protected in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009) being present, permits will be required as well as a pre-commencement flora search and rescue. A final site walkdown to undertake micro-siting of the pylon footprints during the appropriate season (early spring), will further reduce any risk.

The DENC conducted a site visit on 19 August 2019 (Arcus, 2019) and their comment concluded that '…*the environmental sensitivities over the project area is adjudged to be low for this development*…'.

8.5.7 Site Sensitivity Assessment

There are rocky outcrops that were identified as part of the approved EIA (Arcus, 2019). These areas are considered sensitive and development should avoid impending on these areas. It was however concluded that the extent of these areas in the approved Paulputs WEF site is limited. Since the OHPL will not traverse these areas there will be an insignificant impact posed.

In addition to rocky outcrops, the specialists identified small areas with dunes and associated dune vegetation. These areas are isolated within the Paulputs WEF development site, and are considered sensitive due to their vulnerability to disturbance.

The OHPL and substation options will be developed on land which has open grassy plains considered to be low sensitivity. Identified within the Paulputs WEF site are areas of gravelly hills, which considered to be moderate sensitivity and also considered suitable for development.

Sensitive features which occur within the approved Paulputs WEF site, and which may not be impeded on by the proposed OHPL option and substation, include:

- The rocky outcrops; and
- The bedrock pans which occur along the power line corridors.

Features where the development footprint should be minimised include the washes within the site and the dunes which occur along the power line corridor.

The overall diversity of fauna and flora for the authorised Paulputs WEF project was concluded as relatively low and the affected habitats are not considered to be of broader ecological significance as they are typical of the area and widely available.

The abundance of protected plant species *Hoodia gordonii, Aloidendron dichotomum* and *Boscia foetida* within the site is low, and is not likely that the local populations of these species would be compromised by the proposed development.

Overall, site is considered to have an overall Low Sensitivity due to the low (Least Concern) conservation status of the vegetation units represented as well as the very sparse and scattered distribution of Species of Conservation Concern. Specific niche areas, such as rocky hills, deemed to have an elevated sensitivity, are present and are mapped accordingly. It is feasible for the powerline pylons to avoid these areas.

8.6 Avifauna

Andrew Pearson of Arcus Consultancy Services compiled the original Avifaunal Assessment of the Authorised Paulputs WEF. The Original assessment confirmed the impacts of the WEF, OHPL options and Substation Options on avifauna within the area. The original assessment found that avifauna activity was recorded across all survey methods during four seasonal surveys on the WEF and Control sites. A total of 73 species were recorded. This is a relatively low diversity of species compared with many other WEF sites in South Africa in the experience of the specialists. Of the species recorded, 63 were recorded on or

near the WEF site, and six of these were Red data species: Karoo Korhaan (*Near-threatened*), Ludwig's Bustard (*Endangered*), Verreaux's Eagle (*Vulnerable*), Lanner Falcon (*Vulnerable*), Martial Eagle (*Endangered*) and Sclater's Lark (*Near-threatened*). A total of 11 priority species were recorded on the WEF site

The original assessment found that the authorised Paulputs WEF site is not situated within an Important Bird Area (IBA). However, the Mattheus-Gat Conservation Area (Global IBA) borders the Paulputs WEF site to the south west, which is one of a few sites protecting the globally threatened Red Lark. The Paulputs WEF site potentially supports 16 of the 23 Namib-Karoo biome-restricted assemblage species and a host of other arid-zone birds. It is seasonally frequented by nomadic larks, such as Stark's Lark, and sparrow-larks, which are abundant after good rains.

A Martial Eagle nest site was located on a high voltage powerline pylon approximately 12 km from the approved Paulputs WEF site boundary (Arcus, 2019). Construction of additional pylons in the area around the project site may provide additional nesting substrate for this species. Possible impacts on this species will need to be closely monitored during operational monitoring, with an adaptive management strategy in place should negative impacts be observed. A Verreaux's Eagles nest site was located approximately 1.8 km from the proposed development site boundary.

Collision (and electrocution) impacts with the existing power lines in the district have been identified as a high threat to large terrestrial birds such as cranes, bustards, and raptors. Power lines can, however, also be beneficial to large raptors such as Martial Eagle which prefer to breed on pylons in areas where large trees are uncommon. Both Martial Eagle and Verreaux's Eagles nests were identified within 12km of the proposed Paulputs South WEF. Possible impacts on this species will need to be closely monitored during operational monitoring, with an adaptive management strategy in place should negative impacts be observed.

In terms of the proposed OHPL, the area earmarked for the OHPL corridor does not contain the red dune and sandy plains habitat suitable for Red Lark, and the Red Lark has not been recorded in the Southern African Bird Atlas Project (SABAP) 1 or SABAP2 data. Therefore, an impact on this species by the proposed development is unlikely. Likewise, Sclater's Lark has not been recorded by SABAP2. It was however recorded during SABAP1 for the larger quarter degree square. The OHPL, Substation and BESS site is more likely to impact on priority species listed in the IBA. These species include the Kori Bustard, Ludwig's Bustard, Black Harrier, Martial Eagle, Secretarybird, Verreaux's Eagle, Booted Eagle, Black-chested Eagle, Cape Eagle-Owl and Spotted Eagle-Owl.

8.7 Bats

Bat activity within the general area is dominated by Egyptian free-tailed bat. Their activity was found to be lower at height and greater near trees, shrubs and aquatic habitats as these provide a more suitable foraging habitat in an otherwise arid landscape. During the original Bat Assessment Study for the Paulputs WEF EIA, searches for bats roosting habitats did not reveal any evidence of roosting bats. No confirmed bat roosts were identified within 500 m of the proposed OHPL, Substation and BESS.

8.8 Noise

OHPL, Substation and BESS construction and operation typically do not generate noise impacts greater than that of a low significance. Construction noise impacts are no more than Low significance. Mitigation measures were recommended.

In term of the OHPL, Substation and BESS, potential impacts of no more than Low intensity were identified for the operation of the OHPL.

8.9 Heritage, Archaeology and Palaeontology

It was concluded in the approved EIA (Arcus, 2019) that there is minimal historical development within the Paulputs WEF site. The general area is underlain by Precambrian basement rocks that are entirely unfossiliferous. They are intruded by small-scale, ring-shaped Jurassic dolerites that are of zero palaeontological sensitivity. There are late Caenozoic superficial deposits including alluvium, gravels and aeolian sands generally of low to very low palaeontological sensitivity. When they occur along water courses, the superficial deposits may contain very rare inclusions of isolated mammalian bones and teeth or freshwater molluscs which can be more significant. Organic-rich alluvial deposits can also contain pollens, spores and diatoms. On the Paulputs WEF site there are feldspathic gravels ("Grus") derived from weathering of local granites of low palaeontological sensitivity.

Overall, it was expected that there be no palaeontologically sensitive areas that would be impacted by the proposed development. No fossils were seen during the Paulputs WEF archaeological survey with all surface sediments tending to be granitic and hence not fossiliferous.

Archaeological resources were found to be thinly spread throughout the Paulputs WEF site. They were concentrated around landscape features such as rock outcrops and pans. Although water courses are known to have sites located along their margins, they are generally very rare in such contexts because the streams likely only flow for a few hours.

No graves or burial sites were identified in or near the Paulputs WEF site and it is unlikely these resources will be impacted on by the proposed development. Lastly, two farm complexes of cultural significance lie about 2.0 – 2.5 km from the proposed power line corridor and were thus not considered in the approved EIA.

In terms of the powerlines, there is still a small chance that isolated water holes with associated archaeological sites can be located in open areas but these could only be identified once a final road layout is available and surveyed. The existing power lines and substation within the area, present a far more limited impact and, if the wind farm is constructed then the proposed OHPL would have a negligible further impact.

8.10 Visual

In terms of the visual character of the broader site area, human influence is visible with the construction of the N14 national route, and there are numerous small patches of land scattered across the region which are classified as 'Mines / Quarries'. These areas appear to be small quarries or 'diggings' and are mostly located adjacent to the public roads, especially along the N14. There are no towns or built-up areas which could influence the overall visual character and thus there are very low levels of human development and visual degradation. Sparse human habitation and the predominance of natural vegetation cover across much of the broader site area would give the viewer the general impression of a largely natural setting with some pastoral rural elements resulting from sheep rearing activities.

There are however some significant anthropogenic elements identified within the area including an electrical substation (Paulputs), associated high voltage power lines and the constructed and construction work of solar farms with their associated infrastructure. This would suggest that further transformation of the landscape is taking place. Other, less prominent elements present in the area include telephone poles, windmills, gravel access roads and farm boundary fences.

The OHPL and substation will be developed on a topography characterised by flat, gently undulating plains interspersed with isolated hills and koppies. Areas of greater relief include the Ysterberg and the Swartberg hills to the north-west. The flat terrain characteristic

results in wide-ranging vistas throughout the approved WEF site, and the horizon is usually visible across an entire 360° arc of the viewer's vista. The view shed is only marginally constrained where isolated hills and koppies occur. Power lines are less prominent and visible structures than wind turbines, the pylons and the steel structures of the proposed substation are also likely to be visible from many of the locally-occurring receptor locations.

8.11 Social

8.11.1 Administrative and Regional Context

The proposed development is located near the town of Pofadder, which is a very small town situated on the N14 national road from Upington to Springbok. The surrounding area is very arid and locals of Pofadder earn their income more from sheep and goat farming. The town is also considered as the service centre for the surrounding farm areas. Kakamas is also a town situated on the N14 national road on-route to Pofadder and is situated on the banks of the Orange River. For this reason, this town earn their main income from farming practices like grapes and citrus farming. Due to this towns' close proximity to the Orange River, this town is also considered attractive for tourism activities in the area.

The proposed development is located in the Northern Cape Province of South Africa and is situated in two (2) of the five (5) district municipalities, i.e. the Namakwa District Municipality and the ZF Mgcawu District Municipality and falls within the Khâi-Ma Local Municipality and Kai !Garib Local Municipality. The administrative seat of the Khâi-Ma Local Municipality is located in the town of Pofadder.

8.11.2 Demographic and Economic Context

Northern Cape Province

The Northern Cape Province, located in the north western corner of South Africa is the largest province, covering approximately 372 889 km², which is 30.5 % of the total land surface of the country. In terms of population, this province has the smallest population in the country, despite its size, with a total population of 1 193 780 in 2016 (Stats SA, 2018).

The 2011 Census data (Stats SA, 2011) revealed that the sex structure of the province was almost equal with approximately 51 % (512 126) of the total population being female and approximately 49 % (479 793) being male. The same trend can be viewed in the 2016 Community Survey with an equal distribution (50 % female and 50 % male). The 2016 Community Survey further reports that the population in the Northern Cape Province aged between 0 - 14 years dropped by 2.3 % from the 2011 Census data (30.1 % in 2011; 27.8 % in 2016). An increase from 34.8 % in 2011 to 36.5 % in 2016 for the population aged between 15 and 35 years was reported. The adult population aged between 35 and 64 years decreased from 29.4 % in the 2011 Census to 29.2 % in 2016, whereas the population of elderly persons grew from 5.7 % in the 2011 Census to 6.6 % in the 2016 Community Survey (Stats SA, 2018). In terms of access to services it was reported in the 2016 Community Survey that 88.5 % of the province's population has access to basic services like water, and 63.2 % have access to sanitation services (Stats SA, 2011; 2018).

The economy of the Northern Cape relies heavily on two sectors, namely the mining and agriculture sectors. These two sectors employ approximately 57 % of all employees in the province. The Northern Cape PSDF of 2012 reports that the percentage of the people living in the Northern Cape Province that live below the poverty line has decreased from 40 % in 1995 to 27 % in 2011, while the poverty gap has decreased from 11 % in 1995 to 8 % in 2011.

As reported by the Northern Cape Provincial Government, unemployment still remains a big challenge in the province. Unemployment was reported to be at 24.9 % during the

fourth quarter of 2013. Unemployment also declined from 119 000 unemployed people in the fourth quarter of 2012 to 109 000 unemployed people in the fourth quarter of 2013. The PSDF further reports that the unemployment level in the province is lower than the national average, but that the "not economically-active" population is higher than the average for South Africa. According to the PSDF of 2012 the community and social services sector is the largest employer in the province at 29 %, followed by the agricultural sector (16 %), wholesale and retail trade (14 %), finance (8 %), manufacturing (6 %), and mining (6 %); where the mining sector is the largest contributor to the provincial Gross Domestic Product (GDP) at 26 %.

In terms of education the average adult education attainment levels in the province are lower than the adult education attainment levels of South Africa as a whole. Approximately 19.7 % of the Northern Cape adults have no schooling in comparison to South Africa's 18.1 %. The Northern Cape has the second lowest percentage of adult individuals (5.5 %) that obtained a tertiary education in South Africa (PSDF, 2012). The overall economic growth of the province has shown significant recovery since 2000 / 2001 when it had a negative economic growth rate of -1.5 %. However, the province is still the smallest contributing province to South Africa's economy (only 2 % to South Africa's GDP per region in 2007).

Namakwa District Municipality

The Namakwa District Municipality (NDM) is one of five district municipalities in the Northern Cape Province and comprises of seven local municipalities. The NDM according to the 2011 Census is 126 836 km² in size, which is the largest district municipality in the Northern Cape. The administrative seat of the district municipality is located in the town of Springbok (Stats SA, 2011).

The IDP of the district reveals that the community services sector is the main sector that contributes to the district's economy, followed by the agricultural and mining sector. It further indicates that the district experienced a sharp decrease in GDP growth rated in 2009, which was attributed to the global economic downturn. However, the district forecast a positive GDP growth over the medium term. Between the years 2003 and 2013 the tertiary sector contributed most to the economy with an average annual contribution of 63.1 %. This data however is dated, and new data has not come to the forefront yet. The Northern Cape Province's labour market is faced with a high unemployment rate and the same scenario prevails in the Namakwa District. According to the NDM (2018) in 2014, 34 840 of the district's population were employed, with 9 515 people unemployed in the district, whereas 44 355 are economically active and 32 557 are not economically active. The IDP recognizes that employment in the district remains a challenge that needs to be addressed for economic development. The municipality had a poverty rate of 50.4 % in 2004 and 26.2 % in 2014 (NDM IDP, 2018). The IDP further stipulates that *"proper planning and implementation processes of programs that intend to create job opportunities need to be intensified*" to improve the labour market of the Namakwa District Municipality (NDM, 2018).

Khai-Ma Local Municipality

The Khâi-Ma Local Municipality (KLM) is located within the Namakwa District Municipality. This municipal area is approximately 16 628 km^2 in geographical size. The KLM municipal area consists of five towns and their surrounding suburbs. The administrative seat of the KLM is located in the town of Pofadder (Stats SA, 2011).

The Census data from 2011 reveals that from the 5 904 people in the KLM that are economically active, 22.1 % are unemployed. The data further reveals that 322 are classified as "discouraged work-seekers" (Stats SA, 2011). According to the KLM IDP of 2012 - 2017 the poverty levels of the KLM are high (KLM, 2012). The reasons ascribed to this is the high levels of unemployment in the local municipality and an increase in the

prevalence of illnesses like HIV/AIDS and TB. The IDP further states that communal farming on peri-urban land causes environmental challenges. HIV/AIDS levels are considered high, especially along the national transport routes. The IDP states that there is an out-migration of skilled people, due to a lack of local economic opportunities in the KLM; the increasing temperatures in the area may lead to an increase in the unemployment rate; and the socio-economic conditions of the KLM are poor which in turn can have a negative effect on the sustainability of infrastructure and service delivery in the KLM. Despite the poor figures reported above, the KLM in its IDP reported that one of their main objectives remain Local Economic Development. For this the KLM set forth a local economic development plan in the IDP to strategize on how to create employment opportunities in the KLM, to alleviate poverty, and to redistribute resources and opportunities for the benefits of the people in the KLM (KLM, 2012).

ZF Mgcawu District Municipality

The ZF Mgcawu District Municipality (ZDM) forms the mid-northern section of the province on the frontier with Botswana. This district borders with four district municipalities and also borders with the Republic of Botswana and Namibia. The ZF Mgcawu District comprises of six Local Municipalities, is 102 524 km^2 in size with a total population of 236 783 people.

The IDP identifies that its key economic activities are: agriculture, agricultural enterprises, livestock farming, irrigation farming, tourism and heritage, and minerals and mining. In terms of the minerals and mining in the ZDM, the municipality accounts for approximately 30 % of the province's economy. The tourism sector however, is regarded as the most important sector in the ZDM, besides mining. According to the IDP it is regarded as the fastest growing industry that contributes to the economy of the ZDM. The real area for potential economic growth lies within tourism development. The mining and agricultural sectors thus largely dominate the economy of the ZDM.

Kai !Garib Local Municipality

The Kai !Garib Local Municipality (KGLM) is situated along the Orange River and covers an area of approximately 26 358 km^2 in size. The Census 2011 data reports that the total population of the KGLM is 65 869 people. The Census 2011 data further reports that 30 949 people in the KGLM are economically active, of which 10 % are unemployed (Stats SA, 2011). The KGLM (2018) reports that the economy of the KGLM is heavily dependent on the agricultural sector. The main national roads running through this local municipal area assists in the economic growth of the KGLM. The IDP (KGLM, 2018) further reports that 49 % of the agricultural sector contributes to the employment sector in the KGLM, making it the biggest contributor to the employment sector. This is followed by the government as an employer (17 %), the household sector (14 %), finance (8 %) and trading (7 %) sectors.

8.12 Traffic and Transportation

The various roads along the N7 are all two-way single carriageways, with varying posted speeds and shoulder widths. Shoulder width varies on road sections along the route and sections of the N7 have passing lanes (i.e. in Piekenierskloof Pass). The N7 mountainous sections through Piekenierskloof Pass requires special attention for particularly long super-load vehicles.

During the site visit on 24 August 2018 (for Arcus, August 2019), a normal traffic day, it was observed that the above roads has sufficient spare capacity to accommodate the proposed development traffic, as well as expected traffic from other similar (wind/solar) energy projects in the Paulputs area. It was also observed that the N14 carries lower traffic volumes than the N7 and has abundant spare capacity. There are no traffic counts available for the N14 in the vicinity of the site but the traffic counts on the N14, between Springbok and Pofadder relatively close to the site are shown below. This is also apparent from the

N7 traffic count data in year 2017 which shows the N7 operating well below capacity. By observation, the Regional routes carry substantially lower traffic volumes and have ample spare capacity to accommodate proposed development traffic, as well as expected traffic from other similar (wind and solar) energy projects in the Paulputs area.

9 ASSESSMENT OF POTENTIAL IMPACTS FOR THE OHPL, SUBSTATION AND BATTERY ENERGY STORAGE SYSTEM.

This Section will provide the assessment of impacts of the OHPL and substation options as read in the Approved Paulputs WEF EIA (Arcus, August 2019). The specialist assessment have addressed the impacts of the BESS and a high-level BESS risk assessment is contained at the end of this Section.

9.1 Geology, Soils and Agriculture

The components of the project that can impact on soils, agricultural resources and productivity are:

- Occupation of the land by the total, direct, physical footprint of the proposed project including all roads.
- Construction activities that may disturb the soil profile and vegetation, for example for levelling, excavations, etc.

The significance of all potential agricultural impacts is kept low by two important factors:

- Electricity grid infrastructure has negligible impact on agriculture after construction because all viable agricultural activities in the project area (only grazing) can continue, undisturbed below power lines.
- The proposed site is on land of extremely limited agricultural potential that is only viable for low intensity grazing. Grazing can continue in tandem with the wind farm and OHPLs.

Below are impacts assessed and approved in the Paulputs WEF EIA. Impacts and mitigations remain unchanged for this amendment.

9.1.1 Construction / Operation / Decommissioning Phases

Impact Phase: Construction/ Operation/ Decommissioning							
Potential impact description: Soil degradation Soil degradation can result from erosion and topsoil loss. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard surface areas including roads. Loss of topsoil can result from poor topsoil management during construction related soil profile disturbance. Soil degradation will reduce the ability of the soil to support vegetation growth.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	M	Negative	M	M	H
With Mitigation	L	M	L	Negative	L	L	H
Can the impact be reversed?			Soil degradation can be reversed only to some extent and only with substantial inputs over a significant period of time.				
Will impact cause irreplaceable loss or resources?			No, because only a very small amount of grazing land is lost and such land is not a scarce resource.				
Can impact be avoided, managed or mitigated?			Yes, see below				
Mitigation measures to reduce residual risk or enhance opportunities:							

- Implement an effective system of storm water run-off control using bunds and ditches, where it is required that is at all points of disturbance where water accumulation might occur. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion. - Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. - If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.

9.1.2 Cumulative Impacts

Impact Phase: Cumulative							
Potential impact description: Regional loss of agricultural land use. Agricultural grazing land directly occupied by the development infrastructure, which includes roads and hardstands, will become unavailable for agricultural use. However, only a very small proportion of the total land surface is impacted in this way.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	L	Negative	L	L	H
With Mitigation	L	M	L	Negative	L	L	H
Can the impact be reversed?			Yes, once the wind farm is decommissioned, the footprint of the infrastructure can again be utilised as grazing land.				
Will impact cause irreplaceable loss or resources?			No, because only a very small amount of grazing land is lost and such land is not a scarce resource.				
Can impact be avoided, managed or mitigated?			No				
Mitigation measures to reduce residual risk or enhance opportunities: - None							

9.2 Freshwater and Wetlands

During the impact assessment undertaken as part of the authorised Paulputs EIA phase (Arcus, 2019) a number of potential key issues / impacts were identified and these were assessed based on the methodology supplied by Arcus.

- Impact 1: Loss of riparian systems and disturbance of the alluvial watercourses in the construction and decommissioning phases
- Impact 2: Impact on riparian systems through the possible increase in surface water runoff on riparian form and function during the operational phase
- Impact 3: Increase in sedimentation and erosion in the construction, operational and decommissioning phases
- Impact 4: Potential impact on localised surface water quality during the construction and decommissioning phases
- Impact 6: Cumulative impacts for the overall project due to the high number of projects surrounding this application

Below are impacts assessed and approved in the Paulputs WEF EIA. Impacts and mitigations remain unchanged for this amendment.

9.2.1 Construction / Operation / Decommissioning Phase

Impact Phase: Construction / Operation / Decommissioning

Potential impact description: Loss of riparian systems and disturbance of the alluvial watercourses in the construction, operational and decommissioning phases

Should any of the proposed transmission lines and/or roads be placed within the delineated watercourse, a physical loss of associated vegetation as well damage to the bed and banks of the observed systems could occur. Although true aquatic obligate vegetation was seen, any disturbance of these areas could result in disturbance of the systems resulting in erosion / sedimentation, loss of habitat and corridor (ESA) fragmentation.

These disturbances will be the greatest during the construction and again in the decommissioning phases as the related disturbances could result in loss and/or damaged vegetation, while to a lesser degree in the operation phase (i.e. as and when maintenance of roads occur).

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H

Can the impact be reversed?	Yes – through removal of hard surfaces and careful reinstatement of natural ground levels coupled to revegetation
Will impact cause irreplaceable loss or resources?	No – significant water courses remain within the greater catchment
Can impact be avoided, managed or mitigated?	Yes – refer to mitigations below

Mitigation measures to reduce residual risk or enhance opportunities:

- Where new water course crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (reduce footprint as much as possible).
- During the construction and operational /decommissioning phase, monitor culverts to see if erosion issues arise and if any erosion control is required.
- Where possible culvert bases must be placed as close as possible with natural levels in mind so that these don't form additional steps / barriers.
- Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.
- It is also advised that an Environmental Control Officer (ECO), with a good understanding of the local flora be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas within aquatic environment, using selected species detailed in the aquatic assessment report.
- All alien plant re-growth must be monitored, and should it occur these plants should be eradicated. The scale of the operation does however not warrant the use of a Landscape Architect and / or Landscape Contractor.

Impact Phase: Operation / Decommissioning

Potential impact description: Impact on riparian systems through the possible increase in surface water runoff on downstream riparian form and function, due to impacts to the hydrological regime such as alteration of surface run-off patterns

This could occur within the operational and decommissioning phase when any of the hard or compacted surfaces (roads or hard stand areas for pylons) increase the volume and velocity of the surface runoff. This could impact the hydrological regime through the increase in flows that are concentrated in an area, and as most plants are drought tolerant an increase in water will allow for other species to develop and outcompete typical plant species found within the region. This then affects the structure (i.e. larger taller grasses / shrubs / trees) and function (greater attenuation of flows, restricting any runoff from reaching downstream areas). The opposite can also happen. If flows are too concentrated with high velocities, scour and erosion results, with a complete reduction or disturbance of riparian habitat.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	H

With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?			Yes – through removal of hard surfaces and careful reinstatement of natural ground levels coupled to revegetation				
Will impact cause irreplaceable loss or resources?			No – significant water courses remain within the greater catchment				
Can impact be avoided, managed or mitigated?			Yes – refer to mitigations below				
Mitigation measures to reduce residual risk or enhance opportunities: - Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. - Any storm-water within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities - No stormwater runoff must be allowed to discharge directly into any water course along roads, and flows should thus be allowed to dissipate over a broad area covered by natural vegetation. - Stormwater from buildings and substation must be managed using appropriate channels and swales when located within steep areas or have steep embankments							

Impact Phase: Construction / Operation / Decommissioning							
Potential impact description: Increase in sedimentation and erosion within the development footprint Impacts include changes to the hydrological regime such as alteration of surface run-off patterns, runoff velocities and or volumes which could occur during the construction, operational and decommissioning phases							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?			Yes – through removal of hard surfaces and careful reinstatement of natural ground levels coupled to revegetation				
Will impact cause irreplaceable loss or resources?			No – significant water courses remain within the greater catchment				
Can impact be avoided, managed or mitigated?			Yes – refer to mitigations below				
Mitigation measures to reduce residual risk or enhance opportunities: - Any storm-water within the site must be handled in a suitable manner, i.e. trap sediments and reduce flow velocities. Any management actions must be dealt with in the Stormwater Management Plan (SWMP) typically submitted post EA, forming part of the WULA.							

Impact Phase: Construction / Operation / Decommissioning							
Potential impact description: Impact on localised surface water quality During construction / decommissioning and to a limited degree the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope via the ephemeral systems.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	L	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?			Yes - through typical measures associated with the cleanup of spills				

Will impact cause irreplaceable loss or resources?	No – due to limited flows within these systems
Can impact be avoided, managed or mitigated?	Yes – refer to mitigations below
Mitigation measures to reduce residual risk or enhance opportunities: - Strict use and management of all hazardous materials used on site in line with the specific material safety data sheets, e.g. fuels must be stored within a contained / bunded site with the necessary and spill kits available. - Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.). - Containment of all contaminated water by means of careful run-off management on the development site. - Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. - Strict control over the behaviour of construction workers, with regard littering, use and storage of chemicals. - Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Environmental Management Plan (EMP) for the project and strictly enforced.	

9.2.2 Cumulative Impacts

Impact Phase: Cumulative							
Potential impact description: Overall cumulative impact The worse-case scenario has been assessed below, i.e. only the minimum of mitigation be implemented by the other projects, and that flows within these systems are sporadic							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	M	High
With Mitigation	L	L	L	Negative	L	L	L
Can the impact be reversed?	Yes – due to the nature of the projects and surrounding aquatic ecosystems						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes – see list below						
Mitigation measures to reduce residual risk or enhance opportunities: - Improve the current stormwater and energy dissipation features not currently found along the tracks and roads within the region - Install properly sized culverts with erosion protection measures at the present road / track crossings							

9.3 Flora and Terrestrial Fauna

The main impacts likely to result from the proposed activity include the following:

- Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.
- Loss of flora Species of Conservation Concern during pre-construction site clearing activities. Numerous Species of Conservation Concern are potentially present within the affected area, which could be destroyed during site preparation.
- Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.

- Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.
- Disturbances to ecological processes. Activity may result in disturbances to ecological processes.
- Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of Species of Conservation Concern.
- Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.
- Loss of faunal SCC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.

9.3.1 Construction Impacts

Development of the entire site will result in Construction impacts of Medium Significance to Vegetation, Flora, Fauna and Ecological Processes which can be mitigated to Low Significance through careful siting of footprints, to avoid sensitive areas, and implementation of mitigation measures.

Impact Phase: Construction

Potential impact description: Disturbance and Loss of the Natural Habitat due to the clearing of vegetation

Permanent or temporary loss of indigenous vegetation cover may occur. This is due to site clearing during construction. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.

Due to site clearing activities there is an increased susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	M	H	M
With Mitigation	L	M	L	Negative	L	H	M

Can the impact be reversed?	In general, most direct impacts will have a moderate to high reversibility in the typical Bushveld Grassland habitat, as well as within the transformed or degraded areas. While it may be possible to re-instate a natural vegetation after disturbance to some extent, it is unlikely that the niche habitats such as Rocky Hills/Outcrops or Quartz patches can be re-instated or rehabilitated as effectively
Will impact cause irreplaceable loss or resources?	No, there are no species of high conservation concern at the site and the affected habitats are widespread and not of high concern.
Can impact be avoided, managed or mitigated?	No, habitat loss associated with the development cannot be avoided, but it can be reduced to some extent and restricted to the less sensitive parts of the site.

Mitigation measures to reduce residual risk or enhance opportunities:

- No development of infrastructure within identified High sensitivity areas.
- A flora search and rescue procedure is recommended before clearing commences, as several PNCO protected species are present. The necessary permits will also need to be obtained prior to clearing.
- Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.

- Environmental Control Officer (ECO) to provide supervision and oversight of vegetation clearing activities.
- All cleared areas that are not under hard infrastructure will need to be rehabilitated with locally occurring species.
- Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place
- All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area.
- Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.
- A final site walkdown to undertake micro-siting of the pylon footprints during the appropriate season (early spring), will further reduce any risk
- Erosion management should take place according to an Erosion Management Plan and Rehabilitation Plan for the project.
- Access roads and other hardened surfaces should have runn-off control which redirect waterflow which may pose an erosion risk.
- All erosion issues identified are to be rectified immediately using appropriate erosion control structures and revegetation techniques.
- After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust

Impact Phase: Construction

Potential impact description: Loss of Species of Conservation Concern (both fauna and flora)

This will occur during pre-construction site clearing activities. Several special of concern are known from surrounding areas, which could be destroyed during site preparation. The OHPL traverses an extensive tract of CBA 2. This would result in some habitat loss as well as potentially affect specific features of conservation concern within the CBAs. The total footprint in these areas would however be low. The total footprint in these areas would however be low. Due to the localised nature of the impact, the risk of a species suffering any significant population loss is very low. No Flora species of conservation concern observed directly within the powerline corridor, other than associated with the rocky hills, which should be avoided. The species can be easily avoided during pylon construction, and it is unlikely that any will be affected by the proposed powerline. None were present within the proposed BESS site.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	M	H	M
With Mitigation	L	M	L	Negative	L	H	M

Can the impact be reversed?	In general, most direct impacts will have a moderate to high reversibility in the typical Bushveld Grassland habitat, as well as within the transformed or degraded areas. While it may be possible to re-instate a natural vegetation after disturbance to some extent, it is unlikely that the niche habitats such as Rocky Hills/Outcrops or Quartz patches can be re-instated or rehabilitated as effectively
Will impact cause irreplaceable loss or resources?	No. No species of high conservation concern are likely to be compromised by the development.
Can impact be avoided, managed or mitigated?	Partly. While there is some scope for avoidance of sensitive habitats, some disturbance and habitat loss are an inevitable consequence of development that cannot be avoided.

Mitigation measures to reduce residual risk or enhance opportunities:

- Avoidance of / Minimise the development footprint within identified areas of high fauna importance such as rocky outcrops, drainage lines and dunes.
- A faunal search and rescue be undertaken before clearing commences at each pylon. The search and rescue should to check for presence of faunal species and should pay particular attention to tortoises, Baboon Spiders, Scorpions and less mobile reptiles. These can be moved into adjacent area. Should any reptiles be found during constructions, a retile handler should also be called on.
- Any fauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer.
- All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.

- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- If trenches need to be dug for electrical cabling or other purpose, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are standing open should have places where there are soil ramps allowing fauna to escape the trench.
- Limit access to the site and ensure that construction staff and machinery remain within the demarcated construction areas during the construction phase.
- Environmental induction for all staff and contractors on-site.
- A final site walkdown to undertake micro-siting of the pylon footprints during the appropriate season (early spring), will further reduce any risk

Impact Phase: Construction

Potential impact description: Direct and indirect faunal impacts

There will be impacts posed to faunal processes. Construction activities will result in the loss of habitat for faunal species. Fauna within the habitat are generally mobile and many are likely to be transient across the area. As with all construction sites there is a latent risk that there will be some accidental mortalities. Generally, the fauna are mobile and will vacate the area once construction commences. A latent risk of mortality due to vehicular activity is possible. Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. The risk of Species of Conservation Concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	M	H	M
With Mitigation	L	M	L	Negative	L	H	M

Can the impact be reversed?	In general, most direct impacts will have a moderate to high reversibility in the typical Bushveld Grassland habitat, as well as within the transformed or degraded areas. While it may be possible to re-instate a natural vegetation after disturbance to some extent, it is unlikely that the niche habitats such as Rocky Hills/Outcrops or Quartz patches can be re-instated or rehabilitated as effectively
Will impact cause irreplaceable loss or resources?	No. No species of high conservation concern are likely to be compromised by the development.
Can impact be avoided, managed or mitigated?	Partly. While there is some scope for avoidance of sensitive habitats, some disturbance and habitat loss are an inevitable consequence of development that cannot be avoided.

Mitigation measures to reduce residual risk or enhance opportunities:

- Avoidance of / Minimise the development footprint within identified areas of high fauna importance such as rocky outcrops, drainage lines and dunes.
- Search and rescue for reptiles and other vulnerable species during construction, before areas are cleared.
- Any fauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer.
- All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- If trenches need to be dug for electrical cabling or other purpose, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are standing open should have places where there are soil ramps allowing fauna to escape the trench.
- Limit access to the site and ensure that construction staff and machinery remain within the demarcated construction areas during the construction phase.
- Environmental induction for all staff and contractors on-site.
- A final site walkdown to undertake micro-siting of the pylon footprints during the appropriate season (early spring), will further reduce any risk

Impact Phase: Construction							
Potential impact description: Invasion by Alien Invasive Species Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	L	Negative	M	H	M
With Mitigation	L	M	L	Negative	L	H	M
Can the impact be reversed?	In general, most direct impacts will have a moderate to high reversibility in the typical Bushveld Grassland habitat, as well as within the transformed or degraded areas. While it may be possible to re-instate a natural vegetation after disturbance to some extent, it is unlikely that the niche habitats such as Rocky Hills/Outcrops or Quartz patches can be re-instated or rehabilitated as effectively						
Will impact cause irreplaceable loss or resources?	No. No species of high conservation concern are likely to be compromised by the development.						
Can impact be avoided, managed or mitigated?	Partly. While there is some scope for avoidance of sensitive habitats, some disturbance and habitat loss are an inevitable consequence of development that cannot be avoided.						
Mitigation measures to reduce residual risk or enhance opportunities: - Avoidance of / Minimise the development footprint within identified areas of high importance such as rocky outcrops, drainage lines and dunes. - Alien species are to be removed as soon as they are identified and must not be allowed to established - The presence of aliens on site must be monitored and removed on a monthly basis. - Aliens should be eradicated in a manner which does not cause propagation (seeds must not be dispersed during removal). - An Alien Invasive management plan is to be implemented for the site. - An action plan based on the management of alien species on site must be compiled and implemented by the ECO - No illegal harvesting of vegetation, this includes the uses of vegetation for burning, materials etc. - All construction vehicles should adhere to a low speed limit. - All removed trees must either be removed from site or disposed of at a registered waste disposal facility. Alternatively, the plant material can be mulched using a woodchipper on site. And seed-bearing material is to be disposed of at a registered landfill. - A final site walkdown to undertake micro-siting of the pylon footprints during the appropriate season (early spring), will further reduce any risk							

9.3.2 Operational Impacts

Development of the entire site will result in anticipated Operational impacts of Medium Significance to Vegetation, Flora, Fauna and Ecological Processes which can be mitigated to Very Low Significance through implementation of mitigation measures.

Impact Phase: Operation							
Potential impact description: Loss of natural vegetation during operational maintenance. The control of Alien Species during operational Maintenance. Susceptibility of the site to erosion due to clearing of vegetation and hardened surfaces constructed. Limited amount of vegetation clearing is expected during the operational phase of the OHPL, Substation and BESS. These activities are typically related to clearing of newly established vegetation along servitudes or within the directly used project footprint. Vegetation clearing will be kept to a minimum. This impact may also be positive in the sense that alien species could be removed in areas of disturbance, thereby keeping their spread low.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**

Without Mitigation	L	M	L	Negative	M	H	M
With Mitigation	L	M	L	Negative and Positive	VL	H	M
Can the impact be reversed?			Yes.				
Will impact cause irreplaceable loss or resources?			No.				
Can impact be avoided, managed or mitigated?			Yes.				

Mitigation measures to reduce residual risk or enhance opportunities:

- Cleared areas that have been rehabilitated following construction must be maintained and monitored by the ECO.
- All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area.
- Alien species are to be removed as soon as they are identified and must not be allowed to established
- The presence of aliens on site must be monitored and removed on a monthly basis.
- Aliens should be eradicated in a manner which does not cause propagation (seeds must not be dispersed during removal).
- An Alien Invasive management plan is to be implemented for the site.
- An action plan based on the management of alien species on site must be compiled and implemented by the ECO
- No illegal harvesting of vegetation, this includes the uses of vegetation for burning, materials etc.
- All construction vehicles should adhere to a low speed limit.
- All removed trees must either be removed from site or disposed of at a registered waste disposal facility. Alternatively, the plant material can be mulched using a woodchipper on site. And seed-bearing material is to be disposed of at a registered landfill.
- Erosion management should take place according to an Erosion Management Plan and Rehabilitation Plan for the project.
- Access roads and other hardened surfaces should have run-off control which redirect water flow which may pose an erosion risk.
- Regular monitoring for erosion during operation to ensure that no erosion problems have developed subsequent to construction.
- All erosion issues identified are to be rectified immediately using appropriate erosion control structures and revegetation techniques.

Impact Phase: Operation

Potential impact description: Loss of Species of Conservation Concern (both fauna and flora)

Disturbances due to operational activities (noise, human presence, machinery etc.) may deter some species. The OHPL traverses an extensive tract of CBA 2. This would result in some habitat loss as well as potentially affect specific features of conservation concern within the CBAs. The total footprint in these areas would however be low. Due to the localised nature of the impact, the risk of a species suffering any significant population loss is very low.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	M	H	M
With Mitigation	L	M	L	Negative	VL	H	M
Can the impact be reversed?			In general, most direct impacts will have a moderate to high reversibility in the typical Bushveld Grassland habitat, as well as within the transformed or degraded areas. While it may be possible to re-instate a natural vegetation after disturbance to some extent, it is unlikely that the niche habitats such as Rocky Hills/Outcrops or Quartz patches can be re-instated or rehabilitated as effectively				

Will impact cause irreplaceable loss or resources?	No. No species of high conservation concern are likely to be compromised by the development.
Can impact be avoided, managed or mitigated?	Partly. While there is some scope for avoidance of sensitive habitats, some disturbance and habitat loss are an inevitable consequence of development that cannot be avoided.
Mitigation measures to reduce residual risk or enhance opportunities: - Avoidance of sensitive areas. These areas should be clearly demarcated. - Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. - All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill - All vehicles accessing the site should adhere to a low speed limit on site (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises	

Impact Phase: Operation

Potential impact description: Direct and indirect faunal impacts

Operational activities and the noise they generate may deter some sensitive fauna from the area. Species which rely on hearing for predator avoidance or communication may be particularly susceptible although most animals are able to make some behavioral adjustments to compensate for increased background noise levels. This is a low-level continuous impact which could have significant cumulative impact on sensitive species.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	M	H	M
With Mitigation	L	M	L	Negative	VL	H	M

Can the impact be reversed?	In general, most direct impacts will have a moderate to high reversibility in the typical Bushveld Grassland habitat, as well as within the transformed or degraded areas. While it may be possible to re-instate a natural vegetation after disturbance to some extent, it is unlikely that the niche habitats such as Rocky Hills/Outcrops or Quartz patches can be re-instated or rehabilitated as effectively
Will impact cause irreplaceable loss or resources?	No. No species of high conservation concern are likely to be compromised by the development.
Can impact be avoided, managed or mitigated?	Yes
Mitigation measures to reduce residual risk or enhance opportunities: - Open space management plan for the development, which makes provision for favourable management of the facility and the surrounding area for fauna. - Appropriate design of roads and other infrastructure where appropriate to minimise faunal impacts and allow fauna to pass through or underneath these features. - No electrical fencing within 20cm of the ground as tortoises become stuck against such fences and are electrocuted to death. - Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. - If any parts of the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs) as far as possible, which do not attract insects. - All vehicles accessing the site should adhere to a low speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises.	

9.3.3 Decommissioning Impacts

Impact Phase: Decommissioning

Potential impact description: Faunal Impacts

The impacts on fauna at decommissioning would be similar to those at construction, but of a lower severity as the activity will be taking place within the development footprint. The increased levels of noise, pollution, disturbance and human presence during decommissioning would have some negative impacts on fauna. Sensitive and shy fauna are likely to move away from the area during this period as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the decommissioning activities and might be killed. Vehicular traffic would be high and will pose a risk of collisions with susceptible fauna. Slower types such as tortoises, snakes and amphibians would be most susceptible. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the decommissioning phase as a result of the large number of personnel that are likely to be present. This would however be a transient impact which would ultimately result in an increase in available habitat for some fauna.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	M	H

Can the impact be reversed?	Yes, faunal disturbance would be transient and restricted to the actual decommissioning period.
Will impact cause irreplaceable loss or resources?	No. No species of high conservation concern are likely to be compromised by the decommissioning of the development.
Can impact be avoided, managed or mitigated?	Yes to a large extent. Although there would be some unavoidable disturbance at decommissioning, this would be transient and in the long-term the site would be returned to a less disturbed and more natural state.

Mitigation measures to reduce residual risk or enhance opportunities:

- Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities should be removed to a safe location prior to the commencement of decommissioning activities.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- All vehicles accessing the site should adhere to a low speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises.
- No excavated holes or trenches should be left open for extended periods as fauna may fall in and become trapped.
- All above-ground infrastructure should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact, however, this should be in accordance with the facilities' decommissioning and recycling plan, and as per the agreements with the land owners concerned.

Impact Phase: Decommissioning

Potential impact description: Soil Erosion

The removal and clearing of the site infrastructure would create some soil disturbance which would leave these areas vulnerable to erosion. The disturbed areas should be rehabilitated at decommissioning with indigenous species sourced from the local environment to reduce this risk.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	L	M	H
With Mitigation	L	L	L	Negative	L	L	H

Can the impact be reversed?	Yes. This impact will not occur if appropriate avoidance measures are put in place.
Will impact cause irreplaceable loss or resources?	No. If this impact is addressed, then no significant loss of resources will occur.

Can impact be avoided, managed or mitigated?	Yes, with the appropriate mitigation, this impact can be avoided.
Mitigation measures to reduce residual risk or enhance opportunities: - Using geotextiles and other active rehabilitation measures during and after decommissioning to soil loss and movement at the site. - There should be regular monitoring for erosion for at least 2 years after decommissioning at the substation and BESS site by the applicant or appointed entity to ensure that no erosion problems develop as result of the disturbance, and if they do, to immediately implement erosion control measures. - All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. - All disturbed and cleared areas should be revegetated with indigenous perennial shrubs and succulents from the local area.	

9.3.4 Cumulative Impacts

The total impact arising from the project (under the control of the developer), other activities (that may be under the control of others, including other developers, local communities, government) and other background pressures and trends which may be unregulated. The project's impact is therefore one part of the total cumulative impact on the environment.

Cumulative impacts exist because of the powerline, and are regarded as being low due to the widespread nature of the vegetation unit and the low impact of the proposed activity which is unlikely to pose significant risk to potential localised populations of species of conservation concern.

9.4 Avifauna

The key potential impact types on avifauna from the OHPL and associated infrastructure are:

- Electrocution;
- Collision with power lines;
- Disturbance and displacement; and
- Habitat destruction.

Below are impacts assessed and approved in the Paulputs WEF EIA. Impacts and mitigations remain unchanged for this amendment.

9.4.1 Construction Impacts

Impact Phase: Construction

Potential impact description: Habitat destruction

During the construction of the OHPL infrastructure, some habitat destruction and alteration will take place. This happens with the construction of access roads, the clearing of servitudes and areas for tower/pylon placements, and the levelling of substation yards. The removal of vegetation which provides habitat for avifauna and food sources may have an impact on birds breeding, foraging and roosting. This habitat destruction is a direct impact that is restricted to the site. If no mitigation (rehabilitation) occurs the impact can be permanent.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	M	L	H
With Mitigation	L	M	L	Negative	L	L	H
Can the impact be reversed?			Partially with rehabilitation				
Will impact cause irreplaceable loss or resources?			No				

Can impact be avoided, managed or mitigated?	Yes

Mitigation measures to reduce residual risk or enhance opportunities:

- High traffic areas and buildings such as offices, batching plants, storage areas etc. must be situated in areas that are already disturbed, if available;
- Existing roads and farm tracks must be used where possible;
- The minimum footprint area possible of infrastructure must be used, including road widths and lengths;
- Highly sensitive zones and no-go areas (e.g. nesting areas) must be cordoned off, clearly marked and avoided unless absolutely necessary;
- No off-road driving;
- Prior to construction, the avifaunal specialist must conduct a site walkthrough, covering the final road and power line routes, to identify any nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities need to be excluded and/or the schedules adjusted;
- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the EMPr

Impact Phase: Construction

Potential impact description: Disturbance and Displacement

Disturbances and noise from staff and construction activities can impact on certain sensitive species particularly whilst feeding and breeding, resulting in effective habitat loss through a perceived increase in predation risk. There are various potentially sensitive species occurring on the site including Northern Black Korhaan and Karoo Korhaan. This can cause these species to be displaced, either temporarily (i.e. for some period during the construction activity) or permanently (i.e. they do not return), into less suitable habitat which may reduce their ability to survive and reproduce.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	L	M
With Mitigation	L	L	L	Negative	L	L	M

Can the impact be reversed?	Yes
Will impact cause irreplaceable loss or resources?	No
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures to reduce residual risk or enhance opportunities:

- A site specific EMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the EMPr and should apply good environmental practice during construction;
- Prior to construction, the avifaunal specialist must conduct a site walkthrough, covering the final road and power line routes, to identify any nests/breeding/roosting activity of sensitive species, as well as any additional sensitive habitats. The results must inform the final construction schedule, including abbreviating construction time, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise;
- During Construction, if any of the Priority Species or Red Data species are observed to be roosting and/or breeding in the vicinity (within 500 m of the power line), the Avifaunal Specialist is to be contacted immediately for further instruction, while a 'no go' buffer of 300 m is to be instituted around the nest site until the specialist has given further instructions;
- No nests are to be disturbed or moved;
- Sensitive zones and no-go areas are to be designated by the specialist (e.g. nesting sites) and must be clearly marked, cordoned off and avoided unless absolutely necessary;
- Environmental Control Officers to oversee activities and ensure that the EMPr is implemented and enforced.

9.4.2 Operational Impacts

Impact Phase: Operation

Potential impact description: Disturbance and Displacement

Disturbance and displacement by operational activities such as power line maintenance, fencing, and noise can lead to birds avoiding the area for feeding or breeding, and effectively leading to habitat loss and a potential reduction in breeding success.

In South Africa the results available thus far have shown little evidence that displacement and disturbance of priority species has occurred (Ralston Paton et al. 2017). However, due to the limited number of operational wind farms in South Africa and short monitoring efforts, the precautionary principle should be applied, and disturbance and displacement must still be regarded as a potential impact.

It is expected that some species potentially occurring on the site will be susceptible to disturbance and displacement, for example smaller passerines such as larks, warblers, flycatchers and chats, as well as large terrestrial Red Data species such as Karoo Korhaan and Ludwig's Bustard. Priority species nesting on the project site (including on new infrastructure e.g. powerline pylons) may be disturbed during routine maintenance.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	M
With Mitigation	L	M	L	Negative	L	L	M

Can the impact be reversed?	Yes
Will impact cause irreplaceable loss or resources?	No
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures to reduce residual risk or enhance opportunities:

- A site specific EMPr must be implemented, which gives appropriate and detailed description of how operational and maintenance activities must be conducted to reduce unnecessary disturbance. All contractors are to adhere to the EMPr and should apply good environmental practice during all operations.
- The on-site Environmental Manager must be trained by an avifaunal specialist to identify the potential priority species and Red Data species as well as the signs that indicate possibly breeding by these species. If a priority species or Red Data species is found to be breeding (e.g. a nest site is located) on the OHPL, the nest/breeding site must not be disturbed and an avifaunal specialist must be contacted for further instruction.

Impact Phase: Operation

Potential impact description: Collisions with power lines

Collisions with power lines are a well-documented threat to birds in southern Africa (Shaw *et al.* 2018 & 2010, van Rooyen 2004).

Collisions with overhead power lines occur when a flying bird does not see the cables, or is unable to take effective evasive action, and is killed by the impact or impact with the ground. Especially heavy-bodied birds such as bustards, cranes and waterbirds, with limited manoeuvrability are susceptible to this impact (van Rooyen 2004). Many of the collision and electrocution sensitive species are also considered threatened in southern Africa. The Red Data (Taylor *et al.* 2015) species vulnerable to power line collisions are generally long-living, slow-reproducing species. Some require very specific conditions for breeding, resulting in very few successful breeding attempts, or breeding might be restricted to very small areas. These species have not evolved to cope with high adult mortality, with the results that consistent high adult mortality over an extensive period could have a serious effect on a population's ability to sustain itself in the long or even medium term. Species that may be particularly affected on the proposed development site include Ludwig's Bustard, Kori Bustard, Karoo Korhaan and Northern Black Korhaan. Ludwig's Bustard and Kori bustard are known to be particularly prone to collision (Shaw *et al.* 2018, pers. comm. R. Simmons, J. Smallie, M. Martins and BARESG, Shaw *et al.* 2010). For Ludwig's Bustard, the threat of collisions with high-voltage transmission lines (>132kV has been found to be higher than for low voltage distribution lines (≤132kV), however the expanse of smaller lines in South Africa may contribute a greater total impact. Collisions have also been shown to be less likely near roads, therefore any new lines should be placed along roads wherever possible (Shaw *et al.* 2018). Martial Eagle has also been documented as colliding with transmission and distribution lines, and while these incidences occur much less frequent than for bustards and korhaans, the impact on this endangered, slow-breeding species' population may be of significance (Shaw *et al.* 2018).

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence

Without Mitigation	L	H	H	Negative	H	H	H
With Mitigation	L	H	H	Negative	M	L	M
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures to reduce residual risk or enhance opportunities:

- Place new overhead power lines adjacent to existing power lines or linear infrastructure where possible (e.g. roads and fence lines);
- If the route runs along existing infrastructure, a longer route is deemed acceptable if it is constructed in such way that the pylons of the new OHPL are 'staggered' and fall between the pylons of the existing lines as far as possible;
- Attach appropriate marking devices [Bird Flight Diverters (BFDs)] on all spans of all new overhead power lines to increase visibility;
- BFDs must be maintained and replaced where necessary, for the life span of the project and any collision incidents be reported to the Endangered Wildlife Trust (EWT). Prior to construction, an avifaunal specialist must be consulted to provide recommendations regarding the most appropriate (and latest available technology) device to be used. The specialist should also conduct a pre-construction walk-though of the final approved power line routes, once the pylon positions have been pegged, to determine which (if any) spans may require specialised marking with nocturnal solar powered LED devices;
- The operational monitoring programme implemented for the Paulputs South WEF must include monitoring of any overhead power lines, including the new OHPL line.

Impact Phase: Operation

Potential impact description: Electrocution

Electrocution of birds from electrical infrastructure including overhead lines is an important and well documented cause of bird mortality, especially for raptors and storks. Electrocution may also occur within newly constructed substations. Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. With regard to the OHPL infrastructure, overhead power line infrastructure with a capacity of 132 kV or more does not generally pose a risk of electrocution due to the large size of the clearances between the electrical infrastructure components. Electrocutions are therefore more likely for larger species whose wingspan is able to bridge the gap such as eagles or storks. A few large birds (such as Verreauxs' Eagle and Martial Eagle), susceptible to electrocution (particularly in the absence of safe and mitigated structures) occur in the area. Electrocution is also possible on electrical infrastructure within the substation particularly for species such as crows and owls.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	M	H
With Mitigation	L	H	M	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures to reduce residual risk or enhance opportunities:

- Any new overhead power lines must be of a design that minimizes electrocution risk by using adequately insulated 'bird friendly' structures, with clearances between live components of 1.8 m or greater and which provides a safe bird perch. A replica or 'mock up' of the exact pole structures (including bend point

structures), or at least a 3D model simulation that specifically shows how the jumpers will be placed and insulated, must be examined and approved by the bird specialist in consultation with EWT.

9.4.3 Cumulative Impacts

Impact Phase: Cumulative							
Potential impact description: The main cumulative threat to birds in the area is expected to be from habitat loss and powerline collisions, as each of the proposed facilities will require a OHPL to the Paulputs substation. This impact is only partially mitigatable, and only if all new overhead powerlines are fitted with BFD markers and are of a bird friendly design.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	H	M	H	Negative	H	M	H
With Mitigation	H	M	H	Negative	M	M	M
Can the impact be reversed?			Yes				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			Yes				
Mitigation measures to reduce residual risk or enhance opportunities: - All mitigation measures listed above and recommended for other projects must be adhered to. - The applicant and/or operational project company should proactively collaborate with other renewable energy operators in the area. Operational monitoring data must be shared with Birdlife SA.							

9.5 Bats

During the original Bat Assessment Study for the Paulputs WEF EIA, searches for bats roosting habitats did not reveal any evidence of roosting bats. No confirmed bat roosts were identified within 500 m of the proposed OHPL, Substation and BESS. Further, it is unlikely that the OHPL would result in a change to the significance in impacts as assessed in the FEIR – including cumulative impacts.

All significance was rated as low before mitigation and it is the opinion of the specialist that no mitigation measures are required for this OHPL amendment.

9.6 Noise

As only four potential noise-sensitive developments have been identified (of which one is currently unoccupied), the extent of effects is considered to be Low.

Noise due to the construction and operation of the proposed development has been determined at the closest, and therefore most noise-sensitive developments, in accordance with internationally recognised methodologies.

The predicted noise levels have then been assessed against a number of criteria incorporating South African and international guidance. The worst-case level of impact was found to be Low at the closest noise-sensitive development, with no impacts anticipated for more distant noise-sensitive developments.

9.6.1 Construction Impacts

Noise sources during construction would consist of the equipment and vehicles used in the construction process. The duration of effects would be limited to no more than 24 months, and therefore considered to be Low.

Impact Phase: Construction

Potential impact description: Noise Noise from equipment and vehicles used during construction of the Development.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	L	Neutral	L	L	H
With Mitigation	L	L	L	Neutral	L	L	H
Can the impact be reversed?	YES - construction period is temporary.						
Will impact cause irreplaceable loss or resources?	NO – construction period is temporary.						
Can impact be avoided, managed or mitigated?	YES – through application of good practice during construction.						
Mitigation measures to reduce residual risk or enhance opportunities: - Construction activities shall be limited to agreed times; - Deliveries of plant and materials by HGV to site shall only take place by designated routes and within agreed times; - The site contractors shall be required to employ the best practicable means of reducing noise emissions from plant, machinery and construction activities; - Where practicable, the work programme will be phased; - Where practicable, noise from fixed plant and equipment will be contained within suitable acoustic enclosures or behind acoustic screens; - Where practicable, night time working should not be carried out; - Local residents shall be notified in advance of any night-time construction activities likely to generate significant noise levels; and - Any plant and equipment normally required for operation at night (23:00 - 07:00), e.g., generators, should be suitably screened or located such that noise levels from the plant do not exceed 45 dBA, L_{Feq} at the nearest noise-sensitive receptors.							

9.6.2 Decommissioning Phase

Noise sources during decommissioning would be similar to, though fewer than, those during construction and the duration shorter. Effects during decommissioning would therefore be no greater than those during construction. The impact of noise effects during decommissioning is assessed as Low, and therefore Not Significant.

Impact Phase: Decommissioning							
Potential impact description: Decommissioning Noise The maximum operational noise level from the Development has been estimated to be 44 dB, L_{Aeq} at the closest identified potential noise-sensitive development.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	L	Neutral	L	L	H
With Mitigation	L	L	L	Neutral	L	L	H
Can the impact be reversed?	YES - construction period is temporary.						
Will impact cause irreplaceable loss or resources?	NO – construction period is temporary.						
Can impact be avoided, managed or mitigated?	YES – through application of good practice during construction.						
Mitigation measures to reduce residual risk or enhance opportunities: - Decommissioning activities shall be limited to agreed times;							

- Deliveries of plant and materials by HGV to site shall only take place by designated routes and within agreed times;
- The site contractors shall be required to employ the best practicable means of reducing noise emissions from plant, machinery and decommissioning activities;
- Where practicable, the work programme will be phased;
- Where practicable, noise from fixed plant and equipment should be contained within suitable acoustic enclosures or behind acoustic screens;
- Where practicable, night time working will not be carried out.
- Local residents shall be notified in advance of any night-time activities likely to generate significant noise levels; and
- Any plant and equipment normally required for operation at night (23:00 - 07:00), e.g., generators, should be suitably screened or located such that noise levels from the plant do not exceed 45 dBA, L_{Feq} at the nearest noise-sensitive receptors.

9.6.3 Cumulative Impacts

There are no significant cumulative noise impacts relating to the OHPL which would require further investigation.

9.7 Heritage, Archaeology and Palaeontology

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many vantage points is undesirable.

9.7.1 Construction Phase

9.7.1.1 Impacts to Archaeological Resources and Graves

Impacts to archaeological resources and graves would occur during the construction phase when the ground surface is disturbed, when vegetation is cleared and foundations are excavated. These would be direct impacts. However, the very minimal amount of archaeology likely to be present in the development footprint and the rarity of graves means that the impacts would be of limited intensity.

The assessment of impacts to archaeology and graves for the power line is identical to that for the wind energy facility and for that which was assessed in the Paulputs WEF EIA report of 2019. The very light footprint of a power line means that the probability of impacts occurring remains low. There is no difference for a substation and, because of the minimal amount of archaeology on the landscape, the length of the associated power line also makes no difference to the assessment.

Impact Phase: Construction							
Potential impact description: Impacts to archaeological resources and graves Archaeological resources on the ground (artefacts, occupation debris) and graves can be damaged and/or destroyed during construction activities.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	M	Negative	L	L	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?			No				
Will impact cause irreplaceable loss or resources?			Yes				

Can impact be avoided, managed or mitigated?	Yes, archaeological mitigation can be easily implemented. Graves can be exhumed and/or relocated.
Mitigation measures to reduce residual risk or enhance opportunities: - Commission a pre-construction archaeological survey to check the actual footprint of the development. This survey will identify any sites that require mitigation. - Protect and report any graves or dense concentrations of artefacts found during vegetation clearing or excavation of foundations.	

9.7.1.2 Impacts to Palaeontological Resources

Impacts to palaeontological resources could occur during the construction phase. The chances of fossils being found on the site are very low because the nature of the geology is generally not conducive to fossils being present. It remains possible, however, that rare, isolated bones might be present and could be damaged or destroyed during construction activities.

The assessment of impacts to palaeontology for the power line is identical to that for the wind energy facility and for that which was assessed in the Paulputs WEF EIA report of 2019. There is no difference for the power line alternatives, because of the very low chance of encountering fossils.

Impact Phase: Construction							
Potential impact description: Impacts to palaeontological resources Palaeontological resources in the ground (fossil bones) can be damaged and/or destroyed during construction activities.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	M	Negative	L	L	H
With Mitigation	L	H	L	Positive	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	Yes						
Can impact be avoided, managed or mitigated?	Yes, palaeontological mitigation can be implemented but the chances of it being effective are limited.						
Mitigation measures to reduce residual risk or enhance opportunities: - Protect and report any fossil bones found during vegetation clearing or excavation of foundations.							

9.7.1.3 Impacts to Cultural Landscapes from the OHPL

The cultural landscape and N14 traversing it would be impacted during all stages of the development since it is the presence of the powerline and associated construction equipment within the rural/natural landscape that results in impacts. The landscape is large and can likely absorb the development. Furthermore, several power lines and substations are already present nearby, both associated with the national grid and the existing solar energy facilities. The intensity of impacts is thus likely to be low. The impacts will be of local extent but, if construction goes ahead, they would definitely occur. The significance of impacts before mitigation is likely to be medium. No mitigation measures that can reduce impacts are feasible but best practice visual mitigation measures such as ensuring effective rehabilitation of areas disturbed during construction should be implemented.

9.7.2 Construction / Operation / Decommissioning Phase

Impact Phase: All Phases

Potential impact description: Impacts to the cultural landscape The rural/natural landscape is affected by the visual intrusion into it of electrical infrastructure and construction equipment and machinery.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	L	Negative	M	H	H
With Mitigation	L	H	L	Negative	M	H	H
Can the impact be reversed?			Yes				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			No, but minor visual mitigation measures should still be applied as best practice.				
Mitigation measures to reduce residual risk or enhance opportunities: - Ensure effective rehabilitation of areas not required during operation (e.g. temporary laydown areas); and - Any other best practice visual mitigation measures suggested by the visual specialist.							

9.7.3 Cumulative Impacts

9.7.3.1 Impacts to Archaeology and Graves

Cumulative impacts to archaeological resources and graves would occur during the construction phase when the ground surface is disturbed as vegetation is cleared and foundations are excavated. These would be direct impacts. In this relatively arid environment archaeological resources tend to occur in close proximity to water sources and to rocky outcrops and hills. These are areas typically protected from development which means that cumulative impacts are of limited concern in terms of archaeology. Furthermore, mitigation of archaeological sites is easily effected which means that the cultural significance of the archaeology is largely retained. Together these factors determine a low intensity of cumulative impacts to archaeology in this general area. Overall, cumulative impacts to archaeology and graves are of little concern and there are no fatal flaws.

Impact Phase: Cumulative							
Potential impact description: Impacts to archaeological resources and graves Archaeological resources on the ground (artefacts, occupation debris) and graves can be damaged and/or destroyed during construction activities.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	L	Negative	L	L	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?			No				
Will impact cause irreplaceable loss or resources?			Yes				
Can impact be avoided, managed or mitigated?			Yes, archaeological mitigation can be easily implemented. Graves can be exhumed and/or relocated.				
Mitigation measures to reduce residual risk or enhance opportunities: - Commission pre-construction archaeological surveys to check the actual footprint of the developments. Such surveys would identify any sites that require mitigation.							

- Protect and report any graves or dense concentrations of artefacts found during vegetation clearing or excavation of foundations.

9.7.3.2 Impact to Palaeontology

Cumulative impacts to palaeontological resources could occur during the construction phase. The chances of fossils being found in the broader area are very low because the nature of the geology is generally not conducive to fossils being present. The majority would likely be associated with alluvial deposits along water courses which are generally excluded from development. It remains possible, however, that rare, isolated bones might be present and could be damaged or destroyed during construction activities. Because of the rarity of such finds, the great difficulty in spotting them during excavation and consequent low likelihood that they would be reported and rescued, the impact intensity could be medium. Destruction of fossils is permanent but the chances of this occurring are generally very low. Before mitigation the impacts are likely to be of low significance. Post-mitigation significance remains at the low level. There are no fatal flaws in terms of cumulative impacts to palaeontological resources.

Impact Phase: Cumulative							
Potential impact description: Impacts to paleontological resources Paleontological resources in the ground (fossil bones) can be damaged and/or destroyed during construction activities.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	M	Negative	L	L	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?			No				
Will impact cause irreplaceable loss or resources?			Yes				
Can impact be avoided, managed or mitigated?			Yes, paleontological mitigation can be implemented but the chances of it being effective are limited.				
Mitigation measures to reduce residual risk or enhance opportunities: - Protect and report any fossil bones found during vegetation clearing or excavation of foundations.							

9.7.3.3 Impacts to Cultural Landscape

The cultural landscape and N14 traversing it would be impacted during all stages of the development since it is the presence of the infrastructure and associated construction equipment (industrial character) within the rural/natural landscape that results in impacts. Although not within a Renewable Energy Development Zone, several solar energy facilities, substations and power lines are already present in the area and it is seen as desirable to cluster such facilities in the landscape rather than spreading them out. Although the industrial nature of renewable energy facilities and electrical infrastructure is distinctly different to the surrounding landscape, the landscape is large and can likely absorb these developments, especially if they are kept in a cluster. Because they are generally lower to the ground and merge with the landscape when seen from afar, the solar energy facilities result in less cumulative impacts than WEFs do. The intensity of impacts is thus likely to be medium. The impacts will be of local extent because they are clustered but, if construction goes ahead, they would definitely occur. The significance of impacts before mitigation is likely to be medium. Because mitigation cannot hide the facilities, the significance of impacts after mitigation remains medium. There are no fatal flaws in terms of cumulative impacts to the cultural landscape.

Impact Phase: Cumulative							
Potential impact description: Impacts to the cultural landscape The rural/natural landscape is affected by the visual intrusion into it of electrical infrastructure and construction equipment and machinery.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	H	M	Negative	M	H	H
Can the impact be reversed?			Yes				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			No, but minor visual mitigation measures should still be applied as best practice.				
Mitigation measures to reduce residual risk or enhance opportunities: - Cluster renewable energy facilities and related infrastructure; - Ensure effective rehabilitation of areas not required during operation (e.g. temporary laydown areas); - Minimise lighting; and - Any other best practice visual mitigation measures suggested by the visual specialist.							

9.8 Visual

At each sensitive receptor location, a matrix was applied taking into consideration the distance of a receptor location from the proposed development (zones of visual impact), the presence of screening elements (topography, vegetation etc.), and visual contrast of the development with the landscape pattern and form. A high impact rating has been assigned to receptor locations that are located within 500m of the nearest power line assessment corridor. Beyond 10km, the visual impact of a WEF diminishes considerably, as the development would appear to merge with the elements on the horizon.

All eleven (11) receptor locations identified within 5kms of the proposed power line assessment corridors would experience moderate levels of visual impact from the OHPL infrastructure.

Night-time impacts

The visual impact of lighting on the nightscape is largely dependent on the existing lighting present in the surrounding area at night. Much of the study area is characterised by natural areas with pastoral elements and low densities of human settlement and as a result, relatively few light sources are present in the broader area surrounding the proposed development site. The closest built-up area is the town of Pofadder which is situated approximately 35km south-west of the application site and is thus too far away to have significant impacts on the night scene. At night, the general study area is characterised by a picturesque dark starry sky and the visual character of the night environment across the broader area is largely 'unpolluted' and pristine. Sources of light in the area are largely limited to isolated lighting from surrounding farmsteads and transient light from the passing cars travelling along the N14 national route.

Power lines and associated towers or pylons are not generally lit up at night and, thus light spill associated with the proposed OHPL infrastructure is only likely to emanate from the proposed on-site substation. Lighting from this facility is expected to intrude on the nightscape to some degree. As such, the OHPL infrastructure is not expected to result in significant lighting impacts.

9.8.1 Construction and Decommissioning Phases

Visual impacts during the decommissioning phase are potentially similar to those associated with the construction phase.

Impact Phase: Construction and Decommissioning							
Potential impact description: On-site infrastructure associated with the authorised Paulputs WEF • Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. • Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. • Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. • Surface disturbance during construction would expose bare soil which could visually contrast with the surrounding environment. • Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust emissions which would have a visual impact.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	M	Negative	M	M	M
With Mitigation	M	L	L	Negative	L	M	M
Can the impact be reversed?	YES – the negative effects of construction will cease once construction is complete						
Will impact cause irreplaceable loss or resources?	YES – there will be marginal loss of resources						
Can impact be avoided, managed or mitigated?	YES – mitigation measures can reduce impacts						
Mitigation measures to reduce residual risk or enhance opportunities: - Carefully plan to mimimise the construction period and avoid construction delays. - Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. - Vegetation clearing should take place in a phased manner. - Maintain a neat construction site by removing rubble and waste materials regularly. - Make use of existing gravel access roads where possible. - Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. - Unless there are water shortages, ensure that dust suppression techniques are implemented: o on all access roads; o in all areas where vegetation clearing has taken place; and o on all soil stockpiles.							

Impact Phase: Construction and Decommissioning							
Potential impact description: Grid infrastructure associated with the authorised Paulputs WEF • Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. • Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. • Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. • Surface disturbance during construction would expose bare soil which could visually contrast with the surrounding environment. • Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. • Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	M	Negative	M	M	M

With Mitigation	M	L	L	Negative	L	M	M
Can the impact be reversed?			YES – the negative effects of construction will cease once construction is complete				
Will impact cause irreplaceable loss or resources?			YES – there will be marginal loss of resources				
Can impact be avoided, managed or mitigated?			YES – mitigation measures can reduce impacts				
Mitigation measures to reduce residual risk or enhance opportunities: - Carefully plan to mimimise the construction period and avoid construction delays. - Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. - Vegetation clearing should take place in a phased manner. - Maintain a neat construction site by removing rubble and waste materials regularly. - Make use of existing gravel access roads where possible. - Limit the number of vehicles and trucks travelling to and from the construction site, where possible. - Unless there are water shortages, ensure that dust suppression techniques are implemented: o on all access roads; o in all areas where vegetation clearing has taken place; and o on all soil stockpiles.							

9.8.2 Operational Impacts

Impact Phase: Operation							
Potential impact description: On-site infrastructure associated with the authorised Paulputs WEF • The on-site infrastructure required by the WEF could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts. • The on-site infrastructure may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. • Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. • The night time visual environment could be altered by operational and security lighting emanating from the on-site substation and the operation and maintenance buildings.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	L	Negative	L	L	M
With Mitigation	L	M	L	Negative	L	L	M
Can the impact be reversed?			YES – if any of the WEF is decommissioned				
Will impact cause irreplaceable loss or resources?			YES – there will be marginal loss of resources				
Can impact be avoided, managed or mitigated?			YES – mitigation measures can reduce impacts				
Mitigation measures to reduce residual risk or enhance opportunities: - Light fittings for security at night should reflect the light toward the ground and prevent light spill. - The operation and maintenance buildings should not be illuminated at night. - Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. - The operation and maintenance buildings should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible. - Where possible, underground cabling should be utilised. - Unless there are water shortages, dust suppression techniques are to be implemented on all access roads.							

Impact Phase: Operation
Potential impact description: OHPL infrastructure associated with the authorised Paulputs WEF

- The proposed power line and substation could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts.
- The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.
- Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers.
- The night time visual environment could be altered as a result of operational and security lighting at the proposed substation.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	L	M	M
With Mitigation	L	M	L	Negative	L	M	M

Can the impact be reversed?	YES – if the power lines are decommissioned
Will impact cause irreplaceable loss or resources?	YES – there will be marginal loss of resources
Can impact be avoided, managed or mitigated?	YES – mitigation measures can reduce impacts

Mitigation measures to reduce residual risk or enhance opportunities:

- Where possible, limit the amount of security and operational lighting present at the on-site substation.
- Light fittings for security at night should reflect the light toward the ground and prevent light spill.
- Where possible, limit the number of maintenance vehicles using access roads.
- Non-reflective surfaces should be utilised where possible.

9.8.3 Cumulative Impacts

Eleven renewable energy projects were identified within a 35 km radius of the OHPL infrastructure. All of these projects are Solar Energy facilities (SEFs) with associated grid infrastructure, and as such are expected to have different impacts when compared to WEF projects. These renewable energy developments are however relevant as they influence the cumulative visual impact of the proposed development.

All eleven projects are concentrated in close proximity to Paulputs substation and the surrounding landscape has already undergone noticeable change, which will be exacerbated with the development of additional grid infrastructure in the area. Transformation will however be reduced by the fact the landscape in the vicinity of the proposed OHPL has already been disturbed by the Paulputs substation and the existing high voltage power lines feeding into it.

The further concentration of powerlines will inevitably change the visual character of the area and alter the inherent sense of place, introducing an increasingly industrial character into a largely natural area, and thus giving rise to cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures put forward by the visual specialists in their respective reports.

Impact Phase: Cumulative Construction

Potential impact description: Cumulative Construction

- Visual intrusion of the additional construction activities may be exacerbated, particularly in more natural undisturbed settings.
- Additional construction activities in the area would generate additional traffic on gravel roads in the area thus resulting in increased impacts from dust emissions and dust plumes.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	L

With Mitigation	M	M	M	Negative	M	M	L
Can the impact be reversed?	YES – The impact is partly reversible. The negative effects of construction will cease once construction is complete						
Will impact cause irreplaceable loss or resources?	YES – there will be some loss of resources						
Can impact be avoided, managed or mitigated?	YES – mitigation measures can reduce impacts						
Mitigation measures to reduce residual risk or enhance opportunities: - Carefully plan to mimimise the construction period and avoid construction delays. - Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. - Vegetation clearing should take place in a phased manner. - Maintain a neat construction site by removing rubble and waste materials regularly. - Make use of existing gravel access roads where possible. - Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. - Where possible, ensure that dust suppression techniques are implemented: o on all access roads; o in all areas where vegetation clearing has taken place; and o on all soil stockpiles.							

9.9 Social

9.9.1 Construction Phase

Key potential positive and negative social impacts which can be associated with the construction phase of the proposed development.

Impact Phase: Construction							
Potential impact description: The creation of local employment and business opportunities, and opportunities for skills development and on-site training.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	M	Positive	M	M	H
With Mitigation	H	HL	H	Positive	H	H	H
Can the impact be reversed?	Yes, by not developing or implementing the proposed project						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures to reduce residual risk or enhance opportunities: - The project proponent should liaise with the Khâi-Ma and Kai !Garib Local Municipalities to establish a local skills database for the associated areas. The existence of such a skills database should be made available to the contractors before the commencement of the construction phase to establish the extent of the available service providers in the local municipalities. - The key stakeholders, local authorities and the community need to be informed regarding the outcome of the decision of the development. The potential employment opportunities and the employment procedure that the project proponent intends to follow should be clearly communicated before the commencement of the construction phase. - Reasonable and practical efforts should be made by the project proponent to appoint local contractors by implementing a “locals first” policy. However, due to the technical nature of this project it is likely that skilled positions will be filled by people from outside the local areas. - Efforts should be made to employ local contractors first, and also contractors that are compliant with the Broad Based Black Economic Empowerment (BBBEE) criteria. - The recruitment selection process should also seek to promote gender equality.							

Impact Phase: Construction							
Potential impact description: The potential maximising of opportunities to local and regional SMMEs and other business for service delivery.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	M	Positive	M	M	H
With Mitigation	H	L	H	Positive	H	H	H
Can the impact be reversed?	Yes, by not developing or implementing the proposed project						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures to reduce residual risk or enhance opportunities: - The project proponent should liaise with the Khâi-Ma and Kai !Garib Local Municipalities to establish a database for the local companies/service providers of the associated areas. This database should be made available to the contractors before the initiation of the construction phase to notify and invite such service providers to tender for project-based services. However, it should be noted that a competitive tender process may not guarantee the employment of local service providers/companies and this should also be clearly communicated to potential contractors. - Efforts should be made by the project proponent to assist local Broad Based Black Economic Empowerment (BBBEE) companies regarding the application and submission of tenders. - Strategies need to be identified by the local municipalities and the local business sectors, in order to maximise the potential benefits which can be associated with the establishment of the development.							

Impact Phase: Construction							
Potential impact description: In-migration or potential influx of job seekers which potentially might have impacts on family structures, community and social networks, and basic community services of the Khâi-Ma and Kai !Garib Local Municipalities.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	L	Negative	L	M	M
With Mitigation	M	L	L	Negative	L	M	M
Can the impact be reversed?	Yes, by not proceeding with the development or the implementation of the project.						
Will impact cause irreplaceable loss or resources?	No, not at a community level.						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures to reduce residual risk or enhance opportunities: - The project proponent should implement a “locals first” policy, where the local community of Pofadder and Kakamas should be employed first, specifically for un-skilled and low-skilled employment opportunities. - The project proponent should implement a policy that no employment opportunities will be available at the gate. - It should be noted that although the significance of this impact is low, the influx of job seekers cannot be avoided or prevented.							

Impact Phase: Construction							
Potential impact description: The presence of construction workers on-site an in the area on the local communities, on their social networks and on family structures							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**

Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	M	H
Can the impact be reversed?	Yes, by not proceeding with the development or the implementation of the project.						
Will impact cause irreplaceable loss or resources?	No, not at a community level.						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures to reduce residual risk or enhance opportunities:

- The project proponent and appointed contractors need to develop a code of conduct which must be signed by construction workers prior to the construction phase. The code of conduct should clearly outline the acceptable behaviour and activities of construction workers. In doing so construction workers will be legally informed and held liable for any damages or losses. It is however important that dismissals or fines must comply with the South African labour legislation.
- Transportation for the construction workers needs to be arranged by the project proponent on a daily basis, and enable the proponent to effectively monitor the movement of construction workers to and from the project site. Where necessary arrangements need to be made by the project proponents to enable construction workers to return to their hometowns over weekends/on a regular basis to reduce the potential risks posed to local family structures and social networks.
- No staff should be accommodated over-night on the construction site, except for the presence of security staff throughout the night on site due to security reasons for the landowners and their workers.
- HIV/AIDS awareness programmes should be implemented by the project proponent for the construction workers during the construction phase.

Impact Phase: Construction

Potential impact description: Potential safety risk for farmers, risk of livestock theft and farming infrastructure, which are associated with the construction phase and the presence of the workers on the proposed construction site.

	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes by compensating potential losses that were stolen, and repairing any damages caused.						
Will impact cause irreplaceable loss or resources?	No.						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures to reduce residual risk or enhance opportunities:

- The project proponent/ appointed contractors should provide transportation to the construction workers on a daily basis. This will ensure the potential risk regarding the trespassing of construction workers on farmers' properties, be reduced.
- No staff should be accommodated over-night on the construction site, except for the presence of security staff throughout the night on site.
- The project proponent and appointed contractors need to develop a code of conduct which must be signed by construction workers prior to the construction phase. The code of conduct should clearly outline the acceptable behaviour and activities of construction workers. In doing so construction workers will be legally informed and held liable for any damages/theft. Construction workers found guilty of such an offence should be charged and dismissed. It is however important that dismissals or fines must comply with the South African labour legislation.

- The project proponent should enter into an agreement with the farmers prior to the construction phase, whereby the damages/losses to farming property/infrastructure be compensated for, if it can be proven to be associated with the construction activities of the proposed development.
- The project proponent should hold the appointed contractors liable for the compensation to farmers for any damages or losses that can be associated with the construction phase of the proposed project. This should also be included in the Code of Conduct signed by all key stakeholders.
- Procedures regarding waste management on the construction site should be clearly outlined in the Environmental Management Programme (EMPr), to reduce the risk it poses to livestock.

Impact Phase: Construction							
Potential impact description: The potential impacts of heavy vehicles and construction related activities, damage to roads, and dust pollution.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	M	H
Can the impact be reversed?	Yes, through the rehabilitation of affected areas.						
Will impact cause irreplaceable loss or resources?	No.						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures to reduce residual risk or enhance opportunities:

- Transportation of construction material on the N14 national road to the site should be planned to avoid weekends as well as holiday periods.
- The representatives of the Khâi-Ma and Kai !Garib local municipalities as well as the land owners should be notified in advance the dates and times for when the roads will used for the transportation of abnormal loads.
- Measures for dust suppressions should be implemented on a regular basis to minimise potential dust pollution. Examples of measures include wetting of gravel roads.
- All vehicles related to the construction related activities should adhere to the speed limits.
- Vehicles that are used for the transportation of loose building materials, for example sand, should be fitted with covers to avoid any spillage.
- The appointed contractors should ensure that all vehicles are road-worthy and that the drivers of all vehicles have the relevant licensing documents. Drivers must be made aware of the speed limits and potential road safety issues.
- Appropriate waste management strategies need to be implemented on a regular basis by the contractor for any waste generated during the construction phase and should also be included in the Environmental Management Programme (EMPr).
- The Environmental Management Programme (EMPr) should include measures to be implemented, to ensure that speed limits are adhered to at all times and that gates are closed at all times.
- The contractor must repair any damage to the roads caused by construction related traffic. The costs with regards to the repair of roads must be borne by the contractor.

Impact Phase: Construction							
Potential impact description: The increased risk of potential veld fires associated with the construction phase.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, by compensating potential losses that were caused during the fires, and repairing any damages caused.						

Will impact cause irreplaceable loss or resources?	No.
Can impact be avoided, managed or mitigated?	Yes
Mitigation measures to reduce residual risk or enhance opportunities: - Firebreaks must be implemented by the contractor around the perimeters of the construction site. - No construction staff should be accommodated on the site over-night except for the presence of security personnel. - No smoking should be permitted on the site. - The appointed contractor should ensure that no open fires for the use of cooking or heating should be allowed, except for designated areas. - Adequate fire-fighting equipment should be provided by the contractors and should be readily available and serviced on a regular basis. Additionally, all staff should be training in fire-fighting and how to use the related fire-fighting equipment. - The appointed contractors should ensure that any construction related activities that might pose potential fire risks, for example welding and grinding, are confined to the designated areas and that it is properly managed. - The necessary precautionary measures need to be taken during high wind conditions and dry months. - In the event of a fire due to construction related activities, the contractor must repair any damages caused to the farmers. The farmers need to be compensated for any damages caused due to fires borne during construction related activities. The costs with regards to firefighting should also be borne by the contractor. - The project proponent should enter into an agreement with the farmers prior to the construction phase, whereby the damages/losses to farming property/infrastructure due to fire risks be compensated for, if it can be proven to be associated with the construction activities of the proposed development.	

9.9.2 Operation Phase

Key potential positive and negative social impacts which can be associated with the operational phase of the proposed development.

Impact Phase: Operation							
Potential impact description: The creation of local employment and business opportunities, skills development and training which can be associated with the operational phase.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	L	Positive	M	M	H
With Mitigation	M	M	M	Positive	M	H	H
Can the impact be reversed?	Yes, by not proceeding with the implementation project and removing it.						
Will impact cause irreplaceable loss or resources?	No.						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures to reduce residual risk or enhance opportunities: - The enhancement measures suggested in the construction phase should have already been implemented prior to the implementation phase. - Skills development programmes and training should be provided and implemented to maximise the number of employment opportunities for the local communities of Pofadder and Kakamas. - The project proponent together with the Khâi-Ma and Kai !Garib Local Municipalities should explore the option for establishing a Community Development Trust. - The project proponent and the local municipalities, together with the Tourism Centre, need to explore the possibility of establishing a visitor centre for the proposed project. - The potential opportunities for local content, procurement as well as community shareholding should be explored and maximised.							

Impact Phase: Operation

Potential impact description: Potential up – and downstream economic opportunities for the community associated with the operational phase.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	L	Positive	M	M	H
With Mitigation	M	M	M	Positive	M	M	H
Can the impact be reversed?	Yes, by not proceeding with the project and removing it.						
Will impact cause irreplaceable loss or resources?	No.						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures to reduce residual risk or enhance opportunities: - The enhancement measures suggested in the construction phase should have already been implemented prior to the implementation phase. - The project proponent together with the Khâi-Ma and Kai !Garib Local Municipalities should explore the option for establishing a Community Development Trust. - The project proponent and the local municipalities, together with the Tourism Centre, need to explore the possibility of establishing a visitor centre for the proposed project. - The potential opportunities for local content, procurement as well as community shareholding should be explored and maximised.							

9.9.3 Decommissioning Phase

Key potential social impacts which can be associated with the decommissioning phase of the proposed development.

Impact Phase: Decommissioning							
Potential impact description: Potential loss of employment opportunities and associated income due to the decommissioning of the proposed development.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	M	H
Can the impact be reversed?	Yes, by not proceeding with the project and removing the infrastructure.						
Will impact cause irreplaceable loss or resources?	No.						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures to reduce residual risk or enhance opportunities: - An Environmental Rehabilitation Trust Fund should be established to cover all the costs associated with the decommissioning phase and the rehabilitation of the affected / impacted areas. Funds should be funded by a percentage of the revenue generated from the sale of the energy to the national grid over the lifespan (20–25 years) of the authorised Paulputs WEF. - All related infrastructures associated with the authorised Paulputs WEF should be dismantled and transported off-site.							

9.9.4 Cumulative Impacts

Impact Phase: Cumulative							
Potential impact description: The creation of local employment and business opportunities, skills development and training which can be associated with cumulative impacts.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**

Without Mitigation	M	H	M	**Positive**	M	M	H
With Mitigation	M	H	M	**Positive**	H	M	H
Can the impact be reversed?			Yes, by not proceeding with the implementation of the project and removing it.				
Will impact cause irreplaceable loss or resources?			No.				
Can impact be avoided, managed or mitigated?			Yes				
Mitigation measures to reduce residual risk or enhance opportunities: - The proposed establishment of the proposed development situated within the Kai !Garib and Khâi-Ma Local Municipalities in the Northern Cape Province of South Africa should be supported and developed.							

9.10 Traffic and Transportation

9.10.1 Construction Impacts

Impact Phase: Construction							
Potential impact description: Storage of Cargo Cargo (machinery, equipment, etc.) off-loaded at Saldanha Port will need to be transported to a holding area (storage facility) close to Saldanha Port, before being transported to site.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	H	Negative	L	L	M
Can the impact be reversed?			Yes				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated.				
Mitigation measures to reduce residual risk or enhance opportunities: This should form part of the Transport Management Plan: - Provide a holding facility for cargo, close to Saldanha Port, to prevent unnecessary travel on the road network and to limit associated traffic loading to roads in close proximity to Saldanha Port.							

Impact Phase: Construction							
Potential impact description: Route Constraints Constraints for super-load vehicles en-route to site could result in unacceptable traffic impact (compromised road safety and increased traffic congestion). Super-load (extra-long, low or tall vehicles exceeding abnormal load vehicle dimensional and mass limitations as defined in TRH11) will experience constraints along the chosen route, i.e. inadequate space to accommodate vehicle turning movements at R27 interchange under construction, spatial constraints at various intersections due to intersection geometry and street furniture (i.e. R27 / R399 intersection, R399 / N7 intersection, N7 traffic roundabout at Piketberg, N7/R355 and R355/N14 and N14 Voortrekker Road (N14) intersections and N14/MR759 intersection), tight horizontal curves on R399 and on N7 in Piekenierskloof Pass might be inadequate for very long vehicles resulting in abnormally long vehicles centre-line tracking (encroaching into the opposing lane).							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	H	L	H	Negative	H	H	H

With Mitigation	H	L	L	Negative	M	L	H
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.						
Mitigation measures to reduce residual risk or enhance opportunities: - Implement an approved Transportation Plan to ensure safe transport of materials and equipment to site.							

Impact Phase: Construction							
Potential impact description: Traffic Congestion Traffic congestion, impedance to traffic flow due to increase in traffic volumes en-route to site.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	H	L	M	Negative	M	M	M
With Mitigation	H	L	M	Negative	L	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.						
Mitigation measures to reduce residual risk or enhance opportunities: - Implement approved Traffic Management Plan and approved Transportation Plan to ensure safe transport of materials, equipment, etc. to site and to limit traffic congestion.							

Impact Phase: Construction							
Potential impact description: Safety on site (Grid) Whether laying cables underground or installing pylons and overhead lines, where the grid construction activities overlap with the WEF construction activities/work zones on-site, there is risk of vehicle crashes with workers in the work zone.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	H	Negative	L	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Managed						
Mitigation measures to reduce residual risk or enhance opportunities: - Implement approved Traffic Management Plan.							

Impact Phase: Construction
Potential impact description: N14 Safety (Grid)
Grid build on WEF site south of the N14 will entail the Grid crossing the N14 with potential risk of vehicle crashes during installation.

Where installing pylons and overhead lines, there is risk of vehicles crashing into equipment or people in the work zone where the Grid construction activities extend into the N14 road reserve.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	H	Negative	L	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Managed						
Mitigation measures to reduce residual risk or enhance opportunities: - Obtain wayleaves and adhere to safety requirements when working in the N14 road reserve, (i.e. temporarily close road to traffic, ideally when traffic flow is low (i.e. weekend, off-peak) with approval of road authorities and with assistance of traffic law enforcement).							

Impact Phase: Construction							
Potential impact description: Intersection Safety (Grid) Additional traffic at the M14/MR759 intersection and at the MR759/Paulputs Site Access increases risk of vehicle crashes.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	H	Negative	L	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.						
Mitigation measures to reduce residual risk or enhance opportunities: - Implement approved Traffic Management Plan to ensure safe access to site from the N14.							

9.10.2 Operational Impacts

Impact Phase: Operation							
Potential impact description: Negligible Impacts (Grid) Very low vehicle trip generation with Negligible Impacts							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	H	Negative	L	L	M
With Mitigation	n/a	n/a	n/a	Negative	n/a	n/a	n/a
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	No impacts.						

Mitigation measures to reduce residual risk or enhance opportunities: - The impact is of such a low significance, that even without mitigation measures the impact will be negligible.

9.10.3 Decommissioning Impacts

Impact Phase: Decommissioning							
Potential impact description: Intersection Safety (Grid) Additional heavy vehicle traffic at the M14/MR759 intersection and at the MR759/Paulputs Site Access increases risk of vehicle crashes.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	H	Negative	L	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.						
Mitigation measures to reduce residual risk or enhance opportunities: - Implement approved Traffic Management Plan to ensure safe access to site from the N14.							

9.10.4 Cumulative Impacts

The cumulative grid staff related vehicle trips, to and from the various sites from nearby towns such as Pofadder, Kakamas and Keimoes, would increase from 4 to 35 peak hour trips. The trip generation for the grid is negligible.

Impact Phase: Cumulative							
Potential impact description: Negligible Impacts (Grid) Very low vehicle trip generation with negligible impacts.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	H	Negative	L	L	M
With Mitigation	n/a	n/a	n/a	Negative	n/a	n/a	n/a
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	No						
Mitigation measures to reduce residual risk or enhance opportunities: - Cumulative Impacts are negligible. The impact is of such a low significance, that even without mitigation measures the impact will be negligible.							

10 HIGH-LEVEL BESS RISK ASSESSMENT

The risks associated with battery technologies are typically well researched and documented. The main concerns relating to a BESS are fire hazards and the potential for a condition known as '*thermal runaway*'. Thermal runaway occurs in situations where an increase in temperature changes the conditions in a way that causes a further increase in

temperature, often leading to a destructive result. As far as general environmental risks, the main concerns are surrounding the disposal of the batteries at end of their life.

The Risk Assessment mitigation measures provided below can be incorporated into a Battery Safety Management Plan, which is to be kept in both electronic and hard copy format on the project site. This Risk Assessment has been prepared to ensure that safety risks related to the BESS are understood, accounted for and mitigated as far as practicable.

The following international guidance has been considered during the preparation of this Risk Assessment:

- Allianz Risk Consulting (ARC), Tech Talk Volume 26 (2019). Battery Energy Storage Systems (BESS) using Li-ion batteries[21];
- National Fire Protection Association (NFPA) 855, Standard for the Installation of Stationary Energy Storage Systems, (2020 edition currently under development and not yet available)[22];
- UL 9540, Standard for Energy Storage Systems and Equipment[23]; and
- Consolidated Edison and New York State Energy Research and Development Authority - Considerations for ESS Fire Safety (February 2017)[24].
- The Energy Operators Forum "Good Practice Guide" (December 2014)[25];
- Institute of Engineering and Technology - Code of Practice for Electrical Energy Storage Systems (August 2017)[26]; and
- The Energy Institute: Battery Storage Guidance Note 1 - Battery Storage Planning (August 2019)[27].

At the time of writing, the above standards and legislation is not specifically applicable to the proposed BESS, but notwithstanding provided valuable guidance for the preparation of this Risk Assessment.

The Risk Assessment Matrix below assesses several potential situations which could result in a possible detrimental environmental hazard. These are:

1. The actual **risks** associated with the delivery, connection, operation, maintenance, disconnection and disposal of the batteries.
2. The **resultant** impact that these risks would cause;
3. The **likelihood** of these actual risks occurring.
4. Appropriate and practical **mitigation** measures and/or management actions to reduce likelihood of the risk occurring and/or the impact.
5. The **significance/Risk Rating** of the impacts should these risks take place.

The BESS has been considered by Specialists as forming part of the Substation Yard footprint. The BESS is proposed to be located on the area previously assessed in the original EIA on the footprint earmarked for temporary laydown.

[21] https://www.agcs.allianz.com/news-and-insights/risk-advisory/tech-talk-volume-26-bess-english.html

[22] https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=855

[23] https://standardscatalog.ul.com/standards/en/standard_9540_1

[24] https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Energy-Storage/20170118-ConEd-NYSERDA-Battery-Testing-Report.pdf

[25] https://www.eatechnology.com/engineering-projects/electrical-energy-storage/

[26] https://shop.theiet.org/code-of-practice-for-electrical-energy-storage-systems

[27] https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fpublishing.energyinst.org%2Ftopics%2Fpower-generation%2Fbattery-storage%2Fbattery-storage-guidance-note-1-battery-storage-planning&data=01%7C01%7C%7Cfbce9f4783304951211308d72af01893%7C6b5953be6b1d4980b26b56ed8b0bf3dc%7C0&sdata=%2FgEjqDC2nzzxcKTWFaKkUEiiTiiOzTamrAsxsMz9Y4M%3D&reserved=0

Table 10-1: High-Level BESS Risk Assessment

Possible Risk	Resultant Impact	Likelihood of occurrence	Management / Mitigation	Risk Rating
Spillages **Thermal Runaway** **Poor Maintenance**	- Electrocution - Potential spillage of electrolytes or refrigerant - Vented gasses - Staff and personal injury - Contaminated Runoff - Soil and microbe contamination - Groundwater seepage - Downstream effects on the current terrestrial ecosystem.	**Low**	- Training of all staff and employees on how to handle spillages, fires and electrocutions - Records kept for well managed operations and maintenance. - Bunding of containers - Implementation of spill handling and management in line with the generic EMPr - Demarcate all no-go and sensitive areas - Avoid the placement of batteries near watercourses and sensitive features - MSDS Records to be kept, as well as incidents reporting register. - Source batteries from reputable suppliers - Battery inspection prior to installation. - Maintenance. - Appropriate battery design and venting control - Source from reputable manufacturers. - Safe and appropriate storage in line with the above and the generic EMPr. Safe handling which must include battery inspection prior to installation. - Development and implementation of Thermal Management Plan prior to installation/construction.	**Low**
Explosion / Overheating	- On-Site Fire - Fire Spread - Staff and personal injury	**Medium**	- Procuring components and using construction techniques which comply with all relevant legislation; - Including automatic fire detection systems in the development design; - Including automatic fire suppression systems in the development design; - Including redundancy in the design of the BESS to provide multiple layers of protection; - Designing the BESS and substation yard to contain and restrict the spread of fire through the use of fire-resistant materials, and adequate separation between elements of the BESS; and	**Medium**

			- Ensuring that Staff appointed to work within the BESS and substation area, as well as First Responders receive adequate emergency response training to a fire. - Work with first responders and relevant personnel to develop a Tactical Fire Response Plan in case of an incident	
Inappropriate Storage	- On site fires. - Electrical failure - Electrocution - Potential spillage of electrolytes or refrigerant - Vented gasses - Staff and personal injury - Contaminated Runoff - Soil and microbe contamination - Groundwater seepage - Downstream effects on the current terrestrial ecosystem.	**Low**	- Training of all staff and employees on how to handle spillages, fires and electrocutions - Records kept for well managed operations and maintenance. - Bunding of containers - Implementation of spill handling and management in line with the generic EMPr - Demarcate all no-go and sensitive areas - Avoid the placement of batteries near watercourses and sensitive features - MSDS Records to be kept, as well as incidents reporting register. - Source batteries from reputable suppliers - Battery inspection prior to installation.	**Low**
Limited Employee Training and Experience	- Time lag for first respondent - Inability to contain spillage - Fire - Electrocution - Damage to exiting/surrounding infrastructure	**Low**	- During the construction phase of Paulputs South WEF, first responders from the nearest major center (such as fire fighters and paramedics) must be given appropriate training on dealing with any emergency situation that may occur as a result of the BESS. Such training must be provided by the technology suppliers or an appointed service provider.	**Low**
Inappropriate disposal at the end of life	- Potential scenario of fluids from the batteries leaking into environment. The release of such chemicals through leaching, spills or air emissions can harm communities, ecosystems and food production. - The potentially toxic materials contained in batteries means	**Medium**	- The recycling of batteries and their potential use as e-waste. - Disposal at a licensed hazardous waste site. - Prior to construction of the Paulputs South WEF, the Applicant is to develop a dedicated Battery Recycling Programme to be adopted on-site. - Records of disposal at a licensed facility must be kept.	**Medium**

	that they are classified as hazardous materials in terms of NEM:WA. There are only a few licensed hazardous waste sites in South Africa and recycling of batteries and e-waste has been identified as a sure way of improving the lifespans of such sites.			

In terms of minimising fire risk within the BESS and Substation site, the following design and implementation recommendations are proposed and should be considered prior to installation/construction of the BESS. These recommendations should form part of the Tactical Fire response plan where applicable.

Table 10-2: Proposed Design and Installation Considerations for the BESS:

Initial Design Recommendations:
1. Fire department • Invite the fire department to the project site to discuss BESS hazards. An adequate emergency response is the key to avoiding an uncontrolled fire. Keep in mind that some fire fighters will not fully understand the hazards and may assume that lithium-ion batteries are the same as lithium batteries. • Key questions to discuss with the fire department include: – What is the main difference between extinguishing and cooling? – How to handle a damaged battery? – How to manage the flammable and toxic gases? • Plan training exercises with the fire department when the system is commissioned. • Standard Operating Procedures (SOP) & Standard Operating Guidelines (SOG) are of major importance and should be updated and tested on a regular basis.
2. Construction and location • Install the BESS outdoors, a minimum of 20 m from important buildings or equipment. Maintain a minimum of 3 m separation from lot lines, public ways and other exposures. • Within the module, maintain a minimum of 1 m separation distance between enclosures for all units up to 50 kWh when not listed, or up to 250 kWh when listed. • Install a thermal barrier where the minimum space separation cannot be provided. • If the BESS must be located indoors, install in a 2-hour fire rated cut-off room, which is accessible directly outdoors for manual firefighting. • Restrict the access to competent employees or sub-contractors. • Ensure enclosures are non-combustible.

Initial Design Recommendations:
3. Material, equipment and design • Paulputs South should consider a 'Testing Method' for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems. A possible international standard to consider would be UL 9540A. This standard evaluates thermal runaway, gas composition, flaming, fire spread, re-ignition and the effectiveness of fire protection systems. Data generated can be used to determine the fire and explosion protection requirements for a BESS. • Place capacitor, transformer, and switch gear in separate rooms according to best engineering practices.
4. Ventilation and temperature control • Install adequate ventilation or an air conditioning system to control the temperature. Maintaining temperature control is vital to the battery's longevity and proper operation as they degrade exponentially at elevated temperatures. • Ensure ventilation is provided in accordance with the manufacturer's recommendations. • Install and maintain the ventilation during all stages of a fire. Ventilation is important since batteries will continue to generate flammable gas as long as they are hot. Also, carbon monoxide will be generated until the batteries are completely cooled through to their core.
5. Gas detection and smoke detection • Install a very early warning fire detection system, such as aspirating smoke detection. • Install carbon monoxide (CO) detection within the container or BESS room.
6. Fire protection and water supply • Investigate the possibility of installing a sprinkler protection system within the BESS containers. The sprinkler system should be designed to provide (at a minimum) 12.2 l/min/m² over 232 m². Water has been proven to be the best agent to fight a fire involving lithium-Ion batteries. It is important to note that other extinguishing agents, such as aerosols or gaseous extinguishing systems, will extinguish the fire, but they do not provide cooling like water. Insufficient cooling allows a hot and deep-seated core to remain. The heat will rapidly spread back through the battery and reignite remaining active sections. • Implement a procedure for battery submersion in the Tactical Fire Reponses Plan, as well as the WEF Emergency Response Plan to be performed by the fire department. Submerging batteries in water (preferably outdoors) after they burn has proven to be effective at cooling the batteries and neutralizing the thermal threat. They will continue to release gases, mostly carbon monoxide, but also flammable gas such as hydrogen. Therefore, it is not recommended to submerge several batteries in a confined space without adequate ventilation. • Ensure that sufficient water is available for manual firefighting. The ability of the fire department to control a fire involving a BESS depends on the presence of an adequate water supply and their knowledge of the hazards. The following should be considered: – An external fire hydrant should be located within 100 of the BESS room or containers. – The water supply should be able to extinguish the fire with an appropriate amount if water being administered in the first 2 hours.

Initial Design Recommendations:
1. Maintenance • Follow original equipment manufacturer recommendations for the inspection, testing and maintenance of the BESS. In addition, ensure that the following (at a minimum) is completed: – Measure the internal resistance of the battery cells. Replace the cells when a dramatic drop is detected. This will provide a good gauge of predictable battery life. – Perform infrared scanning at least once per year. – Check for fluid leakage. – Implement electric terminal torqueing procedures to maintain connection integrity.

11 SPECIALIST IMPACT STATEMENT

The impact statement summary below aims to provide the Competent Authority and I&APs with details relating to the findings and recommendations of specialist studies undertaken as part of this basic assessment process:

Table 11-1: Impact Statement Summary

Study	Overall Sensitivity Rating after mitigation	Statement
Aquatic	**Low**	The aforementioned OHPL, Substation and BESS has little bearing on the aquatic environment as the footprint would not result in any changes to the impacts previous assessed. Therefore the significance of the impact would remain low after mitigation during the construction, operation and decommissioning phases of the project as the with the exception of road crossings all the delineated systems with a High Sensitivity as is required by the Biodiversity Assessment Protocols – Aquatic Theme will be avoided.
Soil, Land Use and Agricultural Potential	**Low**	Because of the low sensitivity of the site and the negligible agricultural impact of grid infrastructure in this agricultural environment, the proposed development does not have an unacceptable negative impact on the agricultural production capability of the site. For the same reasons, micro-siting will have no influence on agricultural impacts in this environment and it is therefore confirmed that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities. The BESS would have two potential negative agricultural impacts, these include the loss of agricultural land use and land degradation, but neither is of high significance.
Terrestrial Ecology	**Low**	Very Low sensitivity areas include transformed areas and Low sensitivity areas include natural Bushmanland Arid Grassland. Several specific communities within the broader Grassland matrix have been identified, and due to various sensitivities have been designated a moderate or high sensitivity with additional mitigation and/or avoidance measures recommended. No Very High sensitivity areas were identified. No specific No-go areas have been designated. Watercourses, Alluvial washes, Rocky Hills and Dunes should be avoided as far as possible.
Avifauna	**Medium - Low**	Activity and abundance of priority species and red data species were found to be very low to low on the proposed development site. The proposed project is unlikely to generate significant negative impacts on avifauna post-mitigation and overall impact are of a low to medium-low significance. No highly significant negative impacts were observed.
Noise	**Low**	Minor construction noise is associated with the construction phase of the project and considering the remote location of the project in relation to sensitive receptoors, impacts are expected to be low for the OHPL and Substation. It is the opinion of the noise specialist that there is no risk of a potential noise impact from the BESS.
Heritage, Archaeology and Palaeontology	**Medium - Low**	The power line routes were not physically examined but some sites may be associated with hills or watercourses along the various options. There is still a small chance that isolated water holes with associated archaeological sites can be located in open areas but these could only be identified once the final facility layout is surveyed before construction. Given that the project has been studied in its entirety, no new impacts are envisaged aside from a very minor potential increase in cumulative impacts. In light of the already authorised electrical projects in the

		area, including some that are already in operation, the intensity of this increase is deemed to be negligible. The site and its surrounds have already had an electrical layer added to the cultural landscape and the change proposed by the proposed OHPL, Substation and BESS will be negligible. As such, all assessment ratings provided in the original impact assessment continue to apply.
Visual	**Low**	Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. The level of contrast will however be reduced by the presence of the KaXu, !Xina and Konkoonies SEFs, the Paulputs substation and the existing high voltage power lines in close proximity to the Paulputs WEF application site. The area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. The OHPL, Substation and BESS will not give rise to additional visual impacts or exacerbate the impacts previously identified in the VIA for the Paulputs WEF OHPL. Given the low level of human habitation and the absence of sensitive receptors in the area, the project is deemed acceptable from a visual perspective.
Social	**Low**	The findings of this Social Impact Assessment (SIA) conducted for the proposed Paulputs WEF indicated that during the construction and the operational phase of the proposed development project (which included the OHPL and Substation assessed herein), various employment opportunities, with different levels of skills will be created. In addition this will also create local business opportunities benefitting the socioeconomic development of the local communities of Pofadder and Kakamas. The local communities will however benefit from the establishment of a Community Trust if it is managed effectively. The challenges posed by climate change and global warming will be addressed by the investment in renewable energy facilities like the proposed Paulputs WEF. The report concluded that the only impact as a result of the OHPL and Substation would be The potential visual impact and impact on sense of place. This was rated as Low after mitigation. The proposed OHPL, Substation and BESS will not result in any additional impacts, cumulative impacts or residual impact, nor will it change the significance of these impacts. Paulputs South must ensure compliance with the recommendations of Section 4 of the approved SIA for the Paulputs WEF and OHPL, Substation and BESS.
Traffic	**Low**	The traffic specialist concluded that proposed development will not generate significant traffic volumes on the road network. Where the grid is crossing the N14, this will require a wayleave approval and road closure, assisted by Traffic Law Enforcement to enhance road safety. There is a possibility that the Paulputs South WEF and grid construction work-zone activities could overlap on-site, which increases risk of vehicles crashing into workers. This could be mitigated by proper planning/project management, that should be dealt with in the Traffic Management Plan. Lastly, the specialist concluded that The cumulative traffic is not significant considering the road network capacity in the vicinity of the site

12 CONDITIONS TO BE INCLUDED IN THE ENVIRONMENTAL AUTHORISATION

12.1 Aquatic

As the proposed activities have the potential to create erosion the following recommendations provided:

- Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment, and suitable dust and erosion control mitigation measures should be included in the EMP to mitigate.
- All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination / leaks. Washing and cleaning of equipment should also be done in berms or bunds, to trap any cement / hazardous substances and prevent excessive soil erosion. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. It is therefore suggested that all construction camps, lay down areas, batching plants or areas and any stores should be located more than 50 m from any demarcated watercourses.
- It is also advised that an Environmental Control Officer (ECO), with a good understanding of the local flora be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas along aquatic features, using selected species.
- All alien plant re-growth must be monitored, and should these alien plants reoccur these plants should be re-eradicated. The scale of the operation does however not warrant the use of a Landscape Architect and / or Landscape Contractor.
- No transmission line towers, substations, BESS infrustructure and construction camps will be placed within the delineated watercourses as well as their respective buffers without obtaining the required approvals from the relevant competent authority.
- It is further recommended that a comprehensive rehabilitation plan be implemented from the project onset within watercourse areas (including of buffers) to ensure a net benefit to the aquatic environment. This should from part of the suggested walk down as part of the final EMP preparation.

12.2 Flora and Terrestrial Fauna

Specific mitigation should be implemented during construction and operation to reduce the risk of poaching or harvesting on the local population of flora species of conservation concern (particularly species 144), including implementation of a long-term population monitoring programme within the site for this species. This plan must be submitted to Directorate and Department of Environment and Nature Conservation for review

The following recommendations should be included in the EA:

- The specialised habitats, which may serve as local refuges, that are designated as having an elevated sensitivity should be avoided as far as is technically possible.
- A final walkdown to microsite the pylon and other infrastructure footprints should be undertaken in final planning and design and before construction commencement.
- A flora and fauna search and rescue should be undertaken before construction.
- Management Plans contained in the Terrestrial Biodiversity Report (Pote, 2021) must be implemented, over and above the generic plans listed in the Generic EMPrs.

12.3 Avifauna

Develop and implement a carcass search programme for birds during the first two years of operation, in line with the South African monitoring guidelines (Jenkins et al. 2015). This

program must include monitoring of any overhead power lines, including the new OHPL line.

12.4 Heritage

- A pre-construction archaeological survey must be carried out within the authorised footprint in order to identify any residual issues and recommend mitigation as may be required.
- A report detailing the results of the recommended walkdowns of the final layouts of the powerline must be compiled by a qualified archaeologist and submitted to SAHRA for comment once completed.
- Identified sensitive sites must be treated as no-go areas throughout the lifetime of the project;
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.
- The final layout of the facility should be walked by an archaeologist at least six months prior to construction in order to determine whether any further archaeological sites may be present within the footprint. Recommendations for mitigation may need to be made at that time and such work would need to be carried out prior to construction.
- The only monitoring required as part of the Environmental Management Program (EMPr) is to ensure that the identified no-go areas are not transgressed during the construction, operation and, if applicable, decommissioning of the facility.

12.5 BESS Specific Conditions

Over and above the mitigation measures suggested in the high-level risk assessment, the following conditions of authorisation are proposed:

- Birds must be dissuaded from nesting within the substation and BESS facility through the use of bird spikes or other suitable deterrents on a case-by-case basis.
- The applicant must compile and implement the following additional programs to be submitted to the Competent Authority prior to the commencement of installation of the BESS:
    - Lifecycle Battery Recycling programme / End-of-Life plan should be in place for the handling, repurposing or disposal of dysfunctional, severely damaged batteries, module and containers;
    - An Emergency Response Plan should be in place that would be applicable for the full route from the source to the site. This plan would include details of the most appropriate emergency response to fires both while the units are in transit and once they are installed and operating; and
    - First Responder Training manual.
- The applicant must compile and implement the following additional programs to be submitted to the Competent Authority prior to the operation of the BESS:
    - Thermal management and monitoring programme; and
    - BESS operations and maintenance programme.

13 CONCLUSION AND RECOMMENDATIONS

The proposed development of a OHPL, Battery Energy Storage System and on-site Substation is required for the authorised Paulputs South WEF to provide much needed renewable energy to the country's grid. The use of renewable energy to provide power to

South Africa is supported at international, national, provincial and local level. Given South Africa's need for additional electricity generation and the need to decrease the country's dependency on coal-based power, renewable energy has been identified as a national priority, with wind energy identified as one of the readily available, technically viable and commercially cost-effective sources of renewable energy.

The impacts of the proposed development need to be viewed in the context of the country's energy mix and the negative externalities associated with the current dominant energy source of coal, often in areas of high potential soils, such as the Eastern Highveld, and the pollution that this form of energy generates. With this comparison in mind the impact of a wind energy facility is minimal compared to the damaging impacts of coal mining and coal-fired power generation. Indeed, wind energy is associated with positive externalities in the form of Economic Development benefits and the cheaper tariff at which it is bought. Therefore, in perspective, the impacts of the proposed development and the authorised Paulputs WEF (Arcus, 2019) can be motivated as necessary in decreasing the impacts in areas where agricultural potential plays a more significant role and in the role of externalities associated with power production.

Operational monitoring being conducted for the Paulputs South WEF must include the transmission line and substation yard, as per the mitigation measures stated in the Avifaunal Impact tables of Section 9.

The project will have no significant impact in terms of loss of agricultural productivity. The Final Mitigated Layout avoids all sensitive areas identified by the specialists' investigations (Figure 12.1). Should the mitigation measures identified by specialists and the recommendations of the EMPr be effectively implemented the negative impacts associated with the proposed project will be significantly reduced.

The study has concluded that there are no negative high residual impacts, including potential cumulative impacts associated with the proposed development. The creation of local employment and business opportunities, skills development and training which can be associated with cumulative impacts, was rated as high positive. With mitigation all potential negative cumulative impacts are reduced to medium or low significance. Potential cumulative negative impacts that remain medium significance after mitigation were identified by the bird and visual specialists while a potential cumulative positive impact of high significance after enhancement was identified by the social specialist. The negative impacts associated with the proposed development are considered acceptable by the specialists.

Table 12.1 below provides recommended time periods for inclusion in the Environmental Authorisation (EA).

Table 13-1: **Periods Recommended for Inclusion in the Environmental Authorisation**

EA Aspect	Recommended EA Period
The period within which commencement must occur;	The proposed activity must occur within ten years of environmental authorisation.
The period for which the environmental authorisation should be granted and the date by which the activity must have been concluded, where the environmental authorisation does not include operational aspects;	The construction aspects of the development should be authorised for a period of ten years, by which time construction should be complete. This development will include operational aspects.
The period that should be granted for the non-operational aspects of the environmental authorisation; and	The environmental authorisation is valid for a period of ten years, by which time the proposed developments should be constructed.

The period that should be granted for the operational aspects of the environmental authorisation.	Operational aspects that require environmental authorisation should be authorised for the maximum amount of time allowed to facilitate the time required to construct and operate a wind energy facility. This is typically 20 - 30 years.

It is the opinion of the Independent EAP that the proposed project will not cause any negative impact, where the significance of these impacts causes irreversible and permanent losses for an infinite period of time. There are no fatal flaws identified for the proposed project, and impacts remain unchanged from what was assessed during the Paulputs WEF EIA (Arcus, 2019).

BESS will need to be assessed holistically and in context of the application for which it is being included. The WEF is reliant on BESS to diminish grid instability effects during operation. The BESS has been assessed in a high-level desktop assessment and the outcomes of this assessment indicate that the BESS will not cause any negative impact, where the significance of these impacts causes irreversible and permanent losses for an infinite period of time.

It is the professional opinion of the independent EAP that **proposed development can be authorised subject to adherence with all mitigation measures proposed**.

APPENDIX A: EAP DECLARATION OF INDEPENDENCE AND CV

APPENDIX B: GENERIC EMPR FOR GRID INFRASTRUCTURE

APPENDIX C: PUBLIC PARTICIPATION PROCESS

APPENDIX D: MAPING