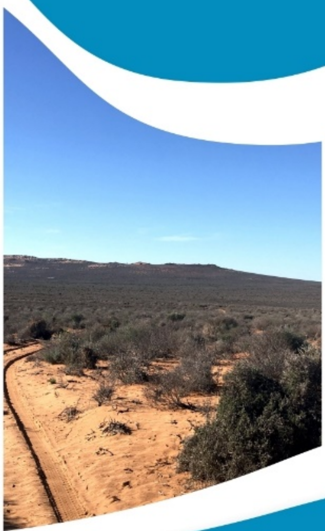
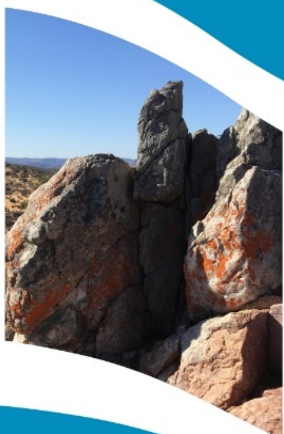
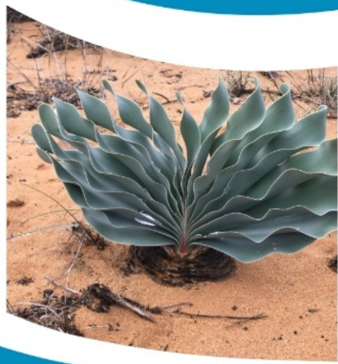
DRAFT BASIC ASSESSMENT REPORT

THE BASIC ASSESSMENT FOR THE PROPOSED KOMAS WIND ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR KLEINSEE IN THE NORTHERN CAPE PROVINCE.

APRIL 2021







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genesis eco-energy DEVELOPMENTS

ENERTRAG

CSIR
Touching lives through innovation

BASIC ASSESSMENT PROCESS

for the

Proposed development of the Komas Wind Energy Facility and associated infrastructure, near Kleinsee in the Northern Cape Province

DRAFT BASIC ASSESSMENT REPORT

April 2021

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Mapping:
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Formatting and Desktop Publishing:
Magdel van der Merwe (DTP Solutions)

REPORT DETAILS

Title:	Basic Assessment for the proposed development of the Komas Wind Energy Facility and associated infrastructure near Kleinsee in the Northern Cape Province: **DRAFT BASIC ASSESSMENT REPORT**
Purpose of this report:	The purpose of this Draft Basic Assessment (BA) Report is to: ▪ Present the details of and the need for the proposed project; ▪ Describe the affected environment at a sufficient level of detail to facilitate informed decision-making; ▪ Provide an overview of the BA process being followed, including public consultation; ▪ Assess the potential positive and negative impacts of the proposed project on the environment; ▪ Provide recommendations to avoid or mitigate negative impacts and to enhance the positive benefits of the project; and ▪ Provide an Environmental Management Programme (EMPr) for the proposed project. The Draft BA Report is currently being made available to all Interested and Affected Parties (I&APs), Organs of State and stakeholders for a 30-day review period. All comments submitted during the 30-day review period will be incorporated and addressed, as applicable and where relevant, into the Final BA Report. The Final BA Report will then be submitted to the National Department of Environment, Forestry and Fisheries (DEFF), as the competent authority, for decision-making.
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Competent Authority	Department of Environment, Forestry and Fisheries (DEFF) *Note from the CSIR:* A press release was issued on 31 March 2021 stating that the name of the DEFF will change on 1 April 2021. The DEFF will in future be known as the Department of Forestry, Fisheries and the Environment (DFFE). However, it must be noted that the Draft BA Report, including the specialist reports, were drafted prior to the

	name change of the Department. Therefore, where the Draft BA Report mentions the DEFF for example, kindly note that this refers to the DFFE.The Final BA Report will be updated to reflect the new department name i.e. DFFE.
Mapping:	Luanita Snyman-van der Walt and Abulele Adams (CSIR)
Date:	April 2021
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ABBREVIATIONS

AAA	Astronomy Advantage Area
AC	Alternating Current
AGA	Astronomy Geographic Advantage Act (Act 21 of 2007)
AGIS	Agricultural Geo-Referenced Information System
AIA	Archaeological Impact Assessment
ATNS	Air Traffic and Navigation Services SOC Limited
BA	Basic Assessment
BESS	Battery Energy Storage System
BGIS	Biodiversity Geographic Information System
BLSA	BirdLife South Africa
BSA	Blade Swept Area
BW	Bidding Window
CA	Competent Authority
CAA	Civil Aviation Act (Act 13 of 2009)
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)

CBA	Critical Biodiversity Area
CEMP	Construction Environmental Management Plan
CEPF	Critical Ecosystem Partnership Fund
CITES	Convention on the International Trade in Endangered Species of Wild Fauna and Flora
CPS	Collision-Prone Species
CPV	Concentrated Photovoltaic
CSIR	Council for Scientific and Industrial Research
CSP	Concentrated Solar Power
DAEARDLR	Department of Agriculture, Environmental Affairs, Rural Development and Land Reform
DAFF	Department of Agriculture, Forestry and Fisheries
DALRRD	Department of Agriculture, Land Reform and Rural Development
DC	Direct Current
DEA	National Department of Environmental Affairs
DEAT	Department of Environment and Tourism
DEA&DP	Western Cape Department of Environmental Affairs and Development Planning
DEFF	Department of Environment, Forestry and Fisheries
DENC	Department of Environment and Nature Conservation
DHSWS	Department of Human Settlements, Water and Sanitation
DM	District Municipality
DMR	Department of Minerals Resources
DMRE	Department of Mineral Resources and Energy
DNI	Direct Normal Irradiance
DoE	Department of Energy
DOT	National Department of Transport
DWS	National Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EC	Electrical Current
ECO	Environmental Control Officer
EGI	Electrical Grid Infrastructure
EIA	Environmental Impact Assessment
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMS	Environmental Management Services
EMPr	Environmental Management Programme
EPC	Engineering, Procurement and Construction
EPs	Equator Principles
EPFIs	Equator Principles Financial Institutions
ESA	Ecological Support Area
FDI	Foreign Direct Investment
GA	General Authorization
GDP	Gross Domestic Product
GG	Government Gazette
GHI	Global Horizontal Irradiation
GIS	Geographical Information Systems
GN	Government Notice
GNR	Government Notice Regulation
GPS	Global Positioning System

HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IFC	International Financial Corporation
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
IRP	Integrated Resource Plan
KCAAA	Karoo Central Astronomy Advantage Area
LED	Local Economic Development
LM	Local Municipality
MF	Monitoring Forum
MPDRA	Mineral Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MTS	Main Transmission Substation
MW	megawatt
NBF	National Biodiversity Framework
NC	Northern Cape
NCPAES	Northern Cape Protected Area Expansion Strategy
NDM	Namakwa District Municipality
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998), as amended
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act (Act 57 of 2003)
NERSA	National Energy Regulator of South Africa
NGI	National Geospatial Information
NHRA	National Heritage Resources Act, 1999 (Act 25 of 1999)
NIA	Noise Impact Assessment
NKLM	Nama Khoi Local Municipality
NSD	Noise Sensitive Development
NWA	National Water Act, 1998 (Act No. 36 of 1998)
O&M	Operation and Maintenance
PIA	Palaeontology Impact Assessment
PPA	Power Purchasing Agreement
PPP	Public Participation Process
PPE	Personal Protective Equipment
PSDF	Provincial Spatial Development Framework
PV	Photovoltaic
QGIS	Quantum Geographic Information System
REDZ	Renewable Energy Development Zone
REEA	Renewable Energy EIA Application
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFB	Redox Flow Battery
RFI	Radio Frequency Interference
RfP	Request for Proposal
RMIPPPP	Risk Mitigation Independent Power Producer Procurement Programme
SABAP2	South African Bird Atlas Project
SACAA	South African Civil Aviation Authority (SACAA)
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SALA	Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970)
SALT	South African Large Telescope

SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SARERD	South African Renewable Energy Resource Database
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SED	Socio-Economic Development
S&EIR	Scoping and Environmental Impact Reporting
SIP	Strategic Infrastructure Plan
SKA	Square Kilometre Array
SKEP	Succulent Karoo Ecosystem Programme
SMME	Small, Medium and Micro Enterprise
SS	Substation
STDs	Sexually Transmitted Diseases
TIA	Transport Impact Assessment
ToR	Terms of Reference
VIA	Visual Impact Assessment
WASA	Wind Atlas of South Africa
WEF	Wind Energy Facility
WMA	Water Management Area
WTG	Wind Turbine Generator
WULA	Water Use Licence Application

EXECUTIVE SUMMARY

INTRODUCTION

The Project Applicant, Genesis ENERTRAG Komas (Pty) Ltd (hereafter referred to as the "Project Applicant"), is proposing to design, construct and operate the Komas Wind Energy Facility (WEF) and associated infrastructure near Kleinsee in the Northern Cape Province. The proposed project is located approximately 35 km southeast of Kleinsee and 53 km southwest of Springbok. The locality of the proposed project is depicted in Figure S.1. The proposed project is located within the Nama Khoi Local Municipality, which falls within the Namakwa District Municipality. The proposed Komas WEF will have a capacity of up to 300 MW and will comprise of up to 50 Wind Turbine Generators (WTGs).

The associated infrastructure includes a solid state lithium-ion Battery Energy Storage System (BESS) and various structures, buildings and electrical grid infrastructure (EGI) such as, but not limited to an on-site 33/132 kV Substation (SS). Two site alternatives for the BESS and on-site SS (known as the BESS and SS complex) (i.e. Option 1 and Option 2) have been identified for assessment as part of the BA process (Figure A.1). A construction laydown area was also identified and includes the Operation and Maintenance (O&M) buildings.

The proposed Komas WEF project will be developed on the following farm portions as indicated in Table S.1. The approximate coordinates of the boundary points of the proposed Komas WEF project as well as the centre points for the preferred BESS and SS complex are included in Appendix A.3 of this BA report.

Table S.1. Affected Farm Portion Details

Farm Name	21 Digit Code	Parcel Number
Portion 1 of the Farm Zonnekwa No.326	C05300000000032600001	326
Portion 2 of the Farm Zonnekwa No.328	C05300000000032800002	328
Portion 3 of the Farm Zonnekwa No.328	C05300000000032800003	328
Portion 4 of the Farm Zonnekwa No.328	C05300000000032800004	328
Portion 4 of the Farm Kap Vley No.315	C05300000000031500004	315

The Project Applicant is also proposing to develop a 132 kV power line, a 33/132 kV Eskom Switching SS and a Collector SS (if required) to feed the electricity generated by the proposed Komas WEF into the national grid at the Gromis Main Transmission Substation (MTS) (Figure S.1). These electrical infrastructure components will be assessed as part of a **separate application and BA process to be undertaken by the Project Applicant.**

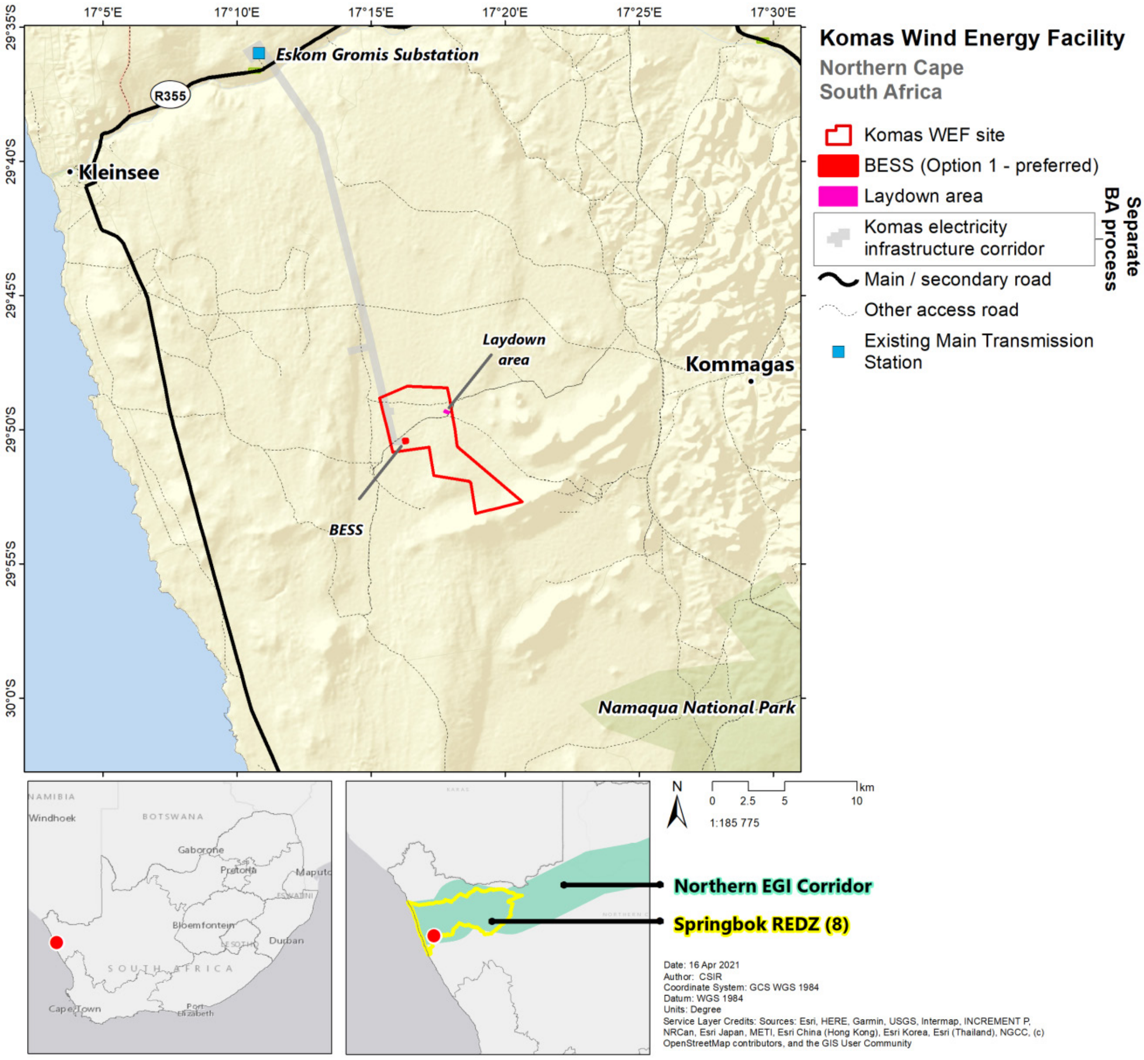


Figure S.1. Locality of the proposed Komas WEF and associated infrastructure

The proposed project is located entirely within the Springbok Renewable Energy Development Zone (REDZ 8), one of the eleven REDZs formally gazetted in South Africa for the purpose of developing solar and wind energy generation facilities (Government Gazette (GG) 41445, Government Notice (GN) 114; 16 February 2018 (Phase 1 with eight REDZs) and GG 44191, GN 144; 26 February 2021 (Phase 2 with three REDZs)). Refer to Figure A.2 for the locality of the proposed project in relation to the REDZs. In line with the gazetted process for a project located within a REDZ, the proposed project will be subject to a Basic Assessment (BA) process instead of a full Scoping and Environmental Impact Assessment (EIA) process and a reduced decision-making period of 57 days, in terms of the National Environmental Management Act, 1998 (Act 107 of 1998), as amended (NEMA) and the NEMA EIA Regulations, 2014, as amended, promulgated in GG 40772; in GN R326, R327, R325 and R324 on 7 April 2017. A BA process in terms of Appendix 1 of the NEMA EIA Regulations, 2014, as amended, has therefore been undertaken for the proposed project. The Competent Authority for the proposed project is the national Department of Environment, Forestry and Fisheries (DEFF), previously operating as the national Department of Environmental Affairs (DEA).

The proposed Komas WEF is located within the Springbok REDZ (i.e. REDZ 8) and is therefore aligned with national initiatives for the placement of WEFs in South Africa. The proposed project also falls within the Northern EGI Corridor, one of the five EGI Corridors gazetted in February 2018. While Listed Activity 9 of Listing Notice 2 of the NEMA EIA Regulations, 2014, as amended, is not triggered by the proposed project, the fact that the proposed project falls within the Northern EGI Corridor is still important as it indicates that the proposed project aligns with the strategic objectives of the country in terms of infrastructure placement.

This Draft BA Report is currently being released to all Interested and Affected Parties (I&APs), Organs of State and stakeholders for a 30-day review period. All comments submitted during the 30-day review will be incorporated and addressed, as applicable and where relevant, into the Final BA Report. The Final BA Report will then be submitted to the DEFF, in accordance with Regulation 19 (1) of the NEMA EIA Regulations, 2014, as amended, for decision-making in terms of Regulation 20, however with a reduced 57-day timeframe (as the proposed project falls within the REDZ 8, as explained above).

PROJECT BASIC ASSESSMENT TEAM

In accordance with Regulation 12 (1) of the NEMA EIA Regulations, 2014, as amended, the Applicant has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the required BA process in order to determine the biophysical, social and economic impacts associated with undertaking the proposed development. The project team, including the relevant specialists, is indicated in Table S.2 below.

Table S.2: Project Team for the Komas WEF BA process

Name	Organisation	Role/ Specialist Study
CSIR Project Team		
Minnelise Levendal (*Pr.Sci.Nat.*)	CSIR	Environmental Assessment Practitioner (EAP) and Project Leader
Rohaida Abed (*Pr.Sci.Nat.*)	CSIR	Project Team member
Dhiveshni Moodley (*Cand.Sci.Nat.*)	CSIR	Project Officer
Luanita Snyman-van der Walt (*Pr.Sci.Nat.*)	CSIR	Project Mapping
Abulele Adams *(Pr.Sci.Nat.)*	CSIR	Project Mapping
Specialists		
Simon Todd	3Foxes Biodiversity Solutions	Terrestrial Biodiversity Impact Assessment
Louise Zdanow and Joshua Gericke	Enviroswift (Pty) Ltd	Aquatic BiodiversityCompliance Statement
Dr. Rob Simmons	Birds and Bats Unlimited	Avifauna Impact Assessment (including 12 months pre-construction monitoring)
Stephanie Dippenaar	Stephanie Dippenaar Consulting	Bat Impact Assessment (including 12 months pre-construction

Name	Organisation	Role/ Specialist Study
		monitoring)
Kerry Schwartz	SiVEST SA (Pty) Ltd	Visual (including Flicker) Impact Assessment
Dr. Jayson Orton	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology, Cultural Landscape)
John Pether	Private	Palaeontology Impact Assessment
Johann Lanz	Private	Agriculture Compliance Statement
Tony Barbour and Schalk van der Merwe	Tony Barbour Environmental Consulting	Socio-Economic Impact Assessment
Morné de Jager	ENVIRO-ACOUSTIC RESEARCH cc (EAR)	Noise Assessment
Adrian Johnson	JG AFRIKA (Pty) Ltd	Transport Impact Assessment
Dr. Robert Leyland	WSP Environmental (Pty) Ltd	Geotechnical Impact Assessment
Minnelise Levendal (*Pr.Sci.Nat.*), Abulele Adams (*Pr.Sci.Nat.*) and Rohaida Abed (*Pr.Sci.Nat.*)	CSIR	Civil Aviation Site Sensitivity Verification
Minnelise Levendal (*Pr.Sci.Nat.*), Abulele Adams (*Pr.Sci.Nat.*), and Rohaida Abed (*Pr.Sci.Nat.*)	CSIR	Defence Site Sensitivity Verification
Technical Input		
Simon Todd	3Foxes Biodiversity Solutions	Initial Biodiversity Offset Analysis
Mark Botha	Conservation Strategy Tactics and Insight	Additional Biodiversity Offset Report (including proposed implementation)
Kennett Sinclair	DNV GL South Africa (Pty) Ltd	Wake Effects Assessment
Dr. Robert Leyland	WSP	Geology Assessment

It is important to note at the outset that the above technical inputs are purely technical and serve to inform the layout, mitigation and management requirements of the proposed WEF (as required), and do not constitute specialist studies in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended.

PROJECT DESCRIPTION

It is important to point out at the outset that the exact specifications of the proposed project components will be determined during the detailed engineering phase (subsequent to the issuing of EA should it be granted for the proposed project).

The footprint of the proposed Komas WEF with a capacity of up to 300 MW will cover an approximate area of 90 hectares (ha). This excludes access roads leading to the site. Several specialists assessed larger areas on the affected farm portions in order to avoid environmental constraints and sensitivities (highlighted by the specialists), during the siting and final design of the facilities and associated infrastructure.

The proposed Komas WEF will comprise of up to 50 WTGs. Each WTG will have a hardstand area of approximately 1 500 m^2, a turbine hub height of up to 200 m and a turbine rotor diameter of up to 200 m. Associated infrastructure includes a construction laydown area (which includes the O&M buildings), a solid state lithium-ion BESS comprising of batteries within shipping containers or a suitable housing structure on a concrete foundation and, an on-site SS. The BESS and on-site SS will be located within a complex of 4 ha in size to allow for micro-siting of the BESS components and to accommodate internal roads (as required), a temporary construction laydown area and a firebreak around the BESS footprint.

Once a Power Purchase Agreement (PPA) is awarded, the proposed Komas WEF will generate electricity for a minimum period of 20 years. The construction phase for the proposed project is expected to extend approximately 24 months.

The proposed Komas WEF and associated infrastructure include the main components and associated specifications as tabulated in Table S.3.

Table S.3: The key project and component details and associated specifications

Component	Description / Dimensions
Site coordinates (centre point)	Lat -29.843279°; Long 17.296014°
Affected farm portion/s	• Portion 1 of the Farm Zonnekwa No. 326 • Portion 2 of the Farm Zonnekwa No. 328 • Portion 3 of the Farm Zonnekwa No. 328 • Portion 4 of the Farm Zonnekwa No. 328 • Portion 4 of the Farm Kap Vley No. 315
SG code/s	• C05300000000032600001 • C05300000000032800002 • C05300000000032800003 • C05300000000032800004 • C05300000000031500004
Total project footprint	Approximately 90 ha
Proposed technology	WTGs and associated infrastructure, including a solid state lithium-ion BESS
Komas WEF site area	Approximately 2 725 ha
Total WEF capacity	Up to 300 MW
BESS capacity	Up to 300 MW/1 200 MWh
Number of turbines	Up to 50 turbines
Turbine hub height from ground	Up to 200 m
Turbine rotor diameter	Up to 200 m
Turbine blade length	Up to 100 m
On-site SS and BESS complex area	Approximately 4 ha (200 m x 200 m)
Height of BESS array	Approximately 5 – 10 m
Height of on-site SS	Approximately 7 – 10 m Up to 22 m (including lighting).
Construction laydown area	A temporary construction laydown/staging area of approximately 4.5 ha (which will also accommodate the O&M buildings)

Component	Description / Dimensions
Permanent laydown area	To be determined based on final layout
O&M building area	Part of the construction laydown area
Turbine hardstand area	Approximately 1 500 m² per turbine
Width of internal access roads	Up to 10 m, including turning circle/bypass areas of up to 20 m at some sections during the construction phase. As such, the roads and cables will be positioned within a 20m wide corridor. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.
Length of internal access roads	To be determined based on final layout
Site access	Unnamed public gravel road off the R355
Grid connection and proximity (This will be subject to a separate Environmental Assessment process)	Gromis MTS Approximately 30 km
Height of SS, BESS and O&M area fencing	Approximately 2 m to 3 m high
Type of fencing	Galvanised steel
Fencing around the WEF Perimeter	Type: Galvanized steel Height: 1 m to 3 m

As noted above, the proposed EGI, including an Eskom Switching SS, 132 kV power line and Collector SS (if required), will be assessed as part of a separate BA process to be undertaken by the Applicant.

NEED FOR THE BA

As noted above, in terms of the NEMA EIA Regulations, 2014, as amended, published in GN R326, R327, R325 and R324, as well as GN 114 for procedures within a REDZ, a BA process is required for the proposed project. The need for the BA is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

- *“The development of facility or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facility or infrastructure is for photovoltaic installations and occurs (a) within an urban area; or (b) on existing infrastructure”.*

Section A of this Draft BA Report contains the detailed list of activities contained in GN R327, R325 and R324 which are triggered by the various project components and thus form part of this BA process.

The purpose of the BA is to identify, assess and report on any potential impacts the proposed project, if implemented, may have on the receiving environment. The BA therefore needs to show the Competent Authority, the DEFF; and the Project Applicant, what the consequences of their choices will be in terms of impacts on the biophysical and socio-economic environment and how such impacts can be, as far as possible, enhanced or mitigated and managed as the case may be.

IMPACT ASSESSMENT

Table S.2 provides a list of specialist studies that were undertaken as part of the BA process. The full specialist studies are provided in Appendix C.1 – C.11 of this Draft BA Report. In addition, two site sensitivity verification assessments were undertaken for Civil Aviation and Defence (Appendix C.12 and Appendix C.13 respectively). Section B of this report provides a summary of the affected environment associated with these studies. Section D provides a summary of the impact assessments conducted by the specialists.

In addition to the specialist studies and site sensitivity verification assessments, technical inputs/studies on Geology (Appendix J.1) and Wake Effect (Appendix J.2) were also conducted.

A separate Terrestrial Biodiversity Offset Analysis was also commissioned by the Project Applicant and was undertaken by the Terrestrial Biodiversity Specialist on the project, Mr. Simon Fox of *3Foxes Biodiversity Solutions* (Appendix J.3 (2) of this BA Report). This study was undertaken to ascertain the need to determine and implement a Biodiversity offset to mitigate the potential negative impacts on terrestrial biodiversity. This is due to the fact that the project site is partly located within a Critical Biodiversity Area (CBA) Tier 2, the Northern Cape Protected Area Expansion Strategy (NC-PAES) Focus Area, the National Protected Area Expansion *Strategy* (PAES) Focus Area, the Namaqua National Park (NNP) expansion area, and the NNP buffer zone. The proposed development of the Komas WEF raises a concern regarding the possible impact of the development on CBAs, the NC and National PAES Focus Area, the NNP expansion footprint area, and the NNP buffer zone. It also raises concerns about achieving the long-term conservation targets of the affected area (see the pre-application comments from SANParks dated 15 February 2021 included in Appendix D of the BA Report).

The outcome of the Terrestrial Biodiversity Offset Analysis (Todd, 2021(b)) is that the proposed Komas WEF site is not unique and does not have any features present that would be impacted by the proposed development that are of a high conservation value. Although the southern section of the Komas site falls within a CBA 2 and NC -PAES Focus Area, the analysis suggests that impacts on these features would be acceptable and that there are no high or moderate impacts following mitigation on terrestrial biodiversity associated with the proposed Komas WEF development that would warrant an offset. The study therefore concluded that a Biodiversity Offset is not considered necessary for development of the site and recommended that on-site mitigation and avoidance measures (i.e. a 50% reduction of the grazing capacity on the proposed Komas WEF site) are considered sufficient to reduce the impacts of the development on the CBA and NC-PAES Focus Area to an acceptable level.

However, these on-site mitigation and avoidance measures were not deemed acceptable to DEFF and SANParks following the pre-application meetings we had with them. Therefore, based on these objections and following official comments received from SANParks dated 15 February 2021 (see Appendix D of the BA Report) the Project Applicant commissioned an additional Biodiversity Offset Study (including proposed implementation) which was undertaken by Mr. Mark Botha *of Conservation Strategy, Tactics and Insight* (dated February 2021). This study is included in Appendix J.3(1) of this BA Report (together with the initial Biodiversity Offset Analysis which was undertaken by Mr. Simon Todd). **It should be noted that the recommendations of the additional Biodiversity Offset Report (including proposed implementation) (Botha, 2021) replace those in the initial Biodiversity Offset Analysis (Todd, 2021(b)) which was undertaken prior to the comments raised by DEFF and SANParks during the pre-application phase.**

The Biodiversity Offset Report (including proposed implementation) (Botha, 2021) recommends that an offset of 810 ha, of Namaqualand Strandveld or an alternative mix of related vegetation types of greater conservation value, in the Expansion Footprint of the NNP and be within at least a CBA 2. The optimal location for this from a biodiversity perspective is likely the southern part of Portion 1 of the Farm Platvley 314, which is also owned by one of the owners of the proposed Komas WEF site. This site has also been assessed for the development of a WEF (known as the Gromis WEF). This area includes the most conservation-worthy and sensitive habitats on the properties assessed and is designated as largely CBA1. It could easily be secured through a Lease agreement or purchase, and declared as a Protected Area. More details on the proposed Biodiversity Offset and the calculation thereof is included in Section B of this BA Report. It is important to note that the findings and recommendations of the Biodiversity Offset Implementation study (i.e. the implementation of a biodiversity offset) are acceptable and supported by the EAP and the Project Applicant.

The Biodiversity Offset Implementation study concluded that although the proposed Komas WEF impacts marginally on the NNP Expansion Footprint, and thus the PAES focus area, as well as a CBA2 in terms of the applicable provincial plan, these impacts are not deemed sufficiently high to suggest that the development should not proceed. The impacts on intrinsic biodiversity features appear manageable. As the project is located within a REDZ and there are several offset options in the immediate vicinity, all with high likelihood of success, the specialist (Botha, 2021) notes that he has no objections to the development proceeding.

A summary of the specialist assessments included in Appendices C.1 – C.11 is outlined below.

Terrestrial Biodiversity Impact Assessment

The Terrestrial Biodiversity Impact Assessment was undertaken by Simon Todd of 3Foxes Biodiversity Solutions to inform the outcome of this BA from a terrestrial biodiversity perspective. The Terrestrial Biodiversity Impact Assessment was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended. The complete Terrestrial Biodiversity Impact Assessment is included in Appendix C.1 of this report. A summary of the Terrestrial Biodiversity Impact Assessment is provided below.

<u>Important Note:</u> The Terrestrial Biodiversity Impact Assessment (Appendix C.1) was undertaken and commissioned in September 2018. It was therefore commissioned a substantial period prior to the Assessment Protocol published in GN 320 on 20 March 2020 came into effect. This study was also undertaken and commissioned prior to the Species Protocol published in GN 1150 dated 30 October 2020 (as discussed in Section A.10) came into effect. Therefore, the Terrestrial Biodiversity Impact Assessment was undertaken in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended and not in accordance with the latest Protocols indicated above. Proof of the date of appointment of the biodiversity specialist, Simon Todd of 3Foxes Biodiversity Solutions, is provided in Appendix F.2.

<u>Summary of affected environment</u>

The vegetation of the Komas site consists of relatively homogenous Namaqualand Strandveld. The low-lying area in the west of the site, consisting of short strandveld on calcareous soils is considered to represent the most sensitive part of the site from an ecological perspective and is not considered suitable for development. There are also some areas of mobile dunes and rocky outcrops which should also be avoided as far as possible. The abundance of Species of Conservation Concern (SCC) across the site is however relatively low and a significant impact on features or SCC is unlikely. In terms of fauna, there are relatively few SCC that are likely to be present at the site. This is in part at least due to the low range of habitats present at the site, most notably the general lack of rocky outcrops. The major impact on fauna would be direct habitat loss of approximately 90 ha as well as some low-level operation phase disturbance resulting from maintenance activities and turbine noise. There are no local populations of fauna within the site that are likely to be compromised by the development as the total footprint is relatively low in proportion to the overall extent of the site and there are still extensive areas within and adjacent to the site that would not be affected.

The southern half of the site falls within a Critical Biodiversity Area (CBA 2) as well as a Northern Cape Protected Area Expansion Strategy (NC-PAES) Focus Area and the Namaqua National Park's Expansion Footprint, which raises some concern regarding the potential impact of the development on ecological processes and options for future conservation expansion in the area.

The field assessment suggests that the site is not likely to be of high significance for broad-scale ecological processes and as the site is already almost surrounded by other approved WEFs, it is not likely to be viewed as a current priority for formal conservation expansion. In addition, it has few features or SCC, its irreplaceability value is likely to be low. Given that the overall footprint of the wind farm represents less than 2-5% of the landscape, the development is considered to be broadly compatible with the aims of Ecological Support Areas (ESAs) provided that impacts such as erosion can be properly mitigated. The development footprint within the CBA 2 is 31 ha which represents less than 2% of the area of CBA within the Komas study area only and significantly less of the whole affected CBA. The parts of the site that fall within the NC-PAES Focus Area do not contain any species or habitats that are not widely available in adjacent areas. A separate offset study indicates that an offset is not considered necessary for development of the site and the on-site mitigation and avoidance measures that have been recommended are considered sufficient to reduce the impacts of the development on the CBA and NC-PAES Focus Area to an acceptable level.

Cumulative impacts

There are several other approved developments proposed in the area around the proposed Komas WEF site. This includes the 300 MW Kap Vley project east of the site, the 140 MW Namas WEF west of the site and the 140 MW Zonnequa WEF northwest of the site and the 300MW Eskom Kleinzee WEF towards the coast and the Project Blue WEF around Kleinsee. Those projects further afield are generally in a different environment and ecological context from the Komas site and as such are of less relevance when considering the cumulative impacts of the Komas development and the surrounding projects. The footprint of these different facilities would be approximately 700 ha and the Komas development would add an additional 11% to this, assuming that all these different developments go ahead, which is unlikely. However, this is a simplistic analysis and the real concern would be around the disruption of ecological processes and removal of important biodiversity features from possible future conservation expansion. The long-term potential impact of wind energy development should also be placed in context of other development impacts in the area, especially mining. The extent of habitat loss due to mining in the area around Kleinsee alone is more than 4 000 ha and similar extents have been lost further afield both to the north and south of Kleinsee. The total extent of habitat loss from wind energy development would thus be less than 10% of that caused my mining. The primary ecological process that would potentially be affected is likely to be landscape connectivity for fauna.

Not all species would be equally affected and species that may be particularly vulnerable to wind farm impacts include golden moles and Bat-eared Foxes, which may be sensitive to the noise turbines generate, while subterannean reptiles may experience fragmentation due to roads and noise. Bat-eared Foxes are however fairly mobile and would easily be able to move through wind farm areas if required. This would however not be the case for golden moles and subterranean reptiles, with the result that these groups can be idenitified as being most vulnerable to cumulative impact in the area. There is however currently no available information or research on this topic and long-term monitoring would be required to identify which species are impacted and the degree of impact. As such, the degree and nature of cumulative impacts on fauna in the area must be considered with a high degree of uncertainty.

Although the concentration of wind energy development in the area is a potential concern, the area is a REDZ, which has the purpose of encouraging renewable energy development within these areas, with the result that high cumulative impacts are to be expected in these areas. In the broader Namaqualand Coastal-Plain context, the concentration of wind energy projects in this restricted area can be viewed as positive as it discourages the development of wind farms in other more important areas. In addition, the total remaining extent of Namaqualand Strandveld is more than 250 000 ha and the loss of less than 0.5% of this area to wind farm development would not constitute significant cumulative loss, especially given that large tracts of this vegetation type are protected within the Namakwa National Park. The contribution of the Komas WEF to cumulative impacts is this seen as being relatively low. Overall, it does not appear that cumulative impacts on fauna and flora resulting from the Komas wind farm development would warrant an offset as these are considered relatively low after mitigation.

The additional Biodiversity Offset Report (including the proposed implementation) (Botha, 2021) notes that assessment of cumulative impacts is notoriously difficult, especially in a landscape where several development applications have been approved, but are not yet constructed, and several of which may never be constructed (for financial, regulatory, commercial or other unrelated reasons). Further, the proposed WEF is located in the REDZ which was designed (through a strategic assessment) to deliberately cluster impacts from renewable energy facilities.

It is further stated that it is very unlikely that the proposed Komas WEF, or indeed the cumulative impact of all the WEFs in this part of the REDZ, will impact on any foundational ecological processes. Either way, the offset design should endeavour to secure spatial representation to cater for persistence of these processes (Botha, 2021).

Summary of Impact Assessment

The potential impacts identified in the Terrestrial Biodiversity Impact Assessment, including direct and cumulative impacts during the construction, operational and decommissioning phases are listed below.

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Impact on vegetation and plant SCC.	• No development of turbines, roads or other infrastructure within No-Go areas. • Preconstruction walk-through of the development footprint to further refine the layout and reduce impacts on SCC through micro-siting of the turbines and access roads. • Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna.	**Moderate**	**Low**
Faunal impacts.	• Avoidance of identified areas of high faunal importance at the design stage. • Ensure that lay-down and other temporary infrastructure is within medium- or low-sensitivity areas, preferably previously transformed areas if possible. • Search and rescue for reptiles and other vulnerable species during construction, before areas are cleared. • During construction any fauna directly threatened by the construction activities should be removed to a safe location by the Environmental Control Officer (ECO) or other suitably qualified person. • 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. • All construction vehicles should adhere to a low speed limit (40 km/h for cars and 30 km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits should apply within the facility as well as on the public gravel access roads to the site. • If any parts of site such as construction camps must be lit at night, this should be done with low Ultra Violet (UV) type lights (such as most LEDs)	**Moderate**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	as far as practically possible, which do not attract insects and which should be directed downwards.		
Impact on CBAs	• Minimise the development footprint as far as possible, which includes locating temporary-use areas such as construction camps and lay-down areas in previously disturbed areas.	**Moderate**	**Low**
OPERATIONAL PHASE: DIRECT IMPACTS			
Increased soil erosion.	• Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan. • All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. • Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. • All cleared areas should be revegetated with indigenous perennial species from the local area. • Avoid areas of high wind erosion vulnerability as much as possible. • Use net barriers, geotextiles, active rehabilitation and other measures during and after construction to minimise sand movement at the site.	**Moderate**	**Low**
Increased alien plant invasion.	• Alien management plan to be implemented during the operational phase of the development, which makes provision for regular alien clearing and monitoring. • Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. • Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be	**Moderate**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	a long-term problem at the site and a long-term control plan will need to be implemented. Problem woody species such as *Acacia cyclops* are already present in the area and are likely to increase rapidly if not controlled. • Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems. • Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.		
Impacts on fauna.	• An Open space management plan must be developed for the development, which makes provision for favourable management of the facility and the surrounding area for fauna. • Limiting access to the site to staff and contractors only. • 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 20 cm of the ground as tortoises become stuck against such fences and are electrocuted to death. • If 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 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 (40 km/h max) to avoid collisions with susceptible species such as snakes and tortoises.	**Moderate**	**Low**
Impacts on CBAs.	• Minimise the development footprint as far as possible, which includes locating temporary-use areas such as construction camps and lay-down	**Moderate**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	areas in previously disturbed areas. • Avoid impact to restricted and specialised habitats such as pans or active dune fields. • Implement a management plan for the site which takes cognisance of the ecological value of the area and is favourable for the maintenance of fauna and flora in the area.		
DECOMMISSIONING PHASE: DIRECT IMPACTS			
Increased soil erosion.	• All hard infrastructure should be removed and the footprint areas rehabilitated with locally-sourced perennial species. • The use of net barriers, geotextiles, active rehabilitation and other measures after decommissioning to minimise sand movement and enhance revegetation at the site. • Monitoring of rehabilitation success at the site for at least 3 years after decommissioning or until the rehabilitation benchmarks and criteria have been met. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.	**High**	**Low**
Increased alien plant invasion.	• Alien management plan to be implemented during the decommissioning phase of the development, which makes provision for regular alien clearing and monitoring for at least 3 years after decommissioning. • Active rehabilitation and revegetation of previously disturbed areas with indigenous species selected from the local environment. • Wherever excavation is necessary for decommissioning, topsoil should be set aside and replaced after decommissioning activities are complete to encourage natural regeneration of the local indigenous species. • Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. • Regular monitoring for alien plants within the disturbed areas for at least three years after	**High**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	decommissioning or until alien invasives are no longer a problem at the site. • Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.		
CUMULATIVE IMPACTS			
Cumulative habitat loss and impact on broad scale ecological processes.	• Minimise the development footprint as far as possible. • The facility should be managed in a biodiversity-conscious manner in accordance with an open-space management plan for the facility. • Ensure that on-site impacts on plant SCC are maintained at acceptable levels through avoidance of significant populations of these species.	**Moderate**	**Low**
Impaired ability to meet conservation targets.	• Engage with the provincial and national conservation authorities on the implications of the current development for future conservation expansion in the area. Note: An initial Biodiversity Offset Analysis has been conducted and is included in Appendix J.3(2) of this BA Report). In addition, comment on the Terrestrial Biodiversity Impact Assessment and the Biodiversity Offset Analysis including the recommendations held there-in, has been received from SANParks and the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR) (previously operating as the Northern Cape Department of Environment and Nature Conservation (DENC) • Develop an ecological offset study to evaluate the potential need for an offset to mitigate the impacts of the development on CBAs and the NC-PAES Focus Area. (Note: An initial Biodiversity Offset Analysis has been completed and is included in Appendix J.3(2) of this BA Report).	**Moderate**	**Low**

In response to SANParks comments received during the pre-application phase, below is the impact assessment provided by Mr. Mark Botha in his Additional Biodiversity Offset Report (including proposed implementation) (Appendix J.3(1) of this BA Report) which comprises an amended table of impact significance ratings to clarify the requirement[1] for a biodiversity offset. This includes highly summarised impact ratings for Birds and Bats.

Phase/Impact	Before Mitigation	After Mitigation but prior to offset	Considerations
Construction Phase			
Impact on plant SCC	Moderate	Low	
Impact on Fauna	Moderate	Low	
Operational Phase			
Increased Soil Erosion	Moderate	Low	
Increased Alien Plant Invasion	Moderate	Low	
Terrestrial Faunal Impact	Moderate	Low	
Avifauna Impact (Simmons & Martins 2021; Dippenaar 2021)	Moderate - High	Moderate	Mitigation dependent. Acknowledged to be likely over-estimate
CBA2	Moderate	Moderate	Low if offset included
National & NC-PAES Focus Area	Moderate	Moderate	Low if offset included
SANParks' Expansion footprint, buffer zone	Moderate	Moderate	Low if offset included
Decommissioning Phase			
Increased Soil Erosion	High	Low	
Increased Alien Plant Invasion	High	Low	
Cumulative Impacts			
Broad-Scale Ecological Processes	Moderate	Low	
Ability to Meet Conservation Targets	Low	Low	Low if offset included
Reduction of Offset Receiving Area	Low	Low	Very low. Receiving area only likely next to NNP; REDZ and electricity infrastructure more important.

Comparative assessment of alternatives

Two alternatives were provided by the Project Applicant for assessment for the BESS and on-site SS complex area (Option 1 and Option 2). There is not a strong preference between these alternatives from a Terrestrial Biodiversity perspective, but Option 2 is favoured as it closer to the proposed Collector SS (which will be assessed as part of a separate BA process). However, Option 1 is also feasible and is acceptable from a Terrestrial Biodiversity impact perspective.

Concluding statement from the initial Biodiversity Offset Analysis(Todd, 2021(a))

The proposed Komas WEF site is considered to represent a broadly suitable environment for wind farm development. There are no specific long-term impacts likely to be associated with the wind farm that cannot be reduced to an acceptable level through mitigation and avoidance. Although the development will impact on areas classified as ESAs, CBAs and the NC-PAES Focus Area, the conservation value of the site is not considered exceptional and the location and context of the site,

[1] The draft Offset Guideline (DEA 2017) suggests offsets are appropriate for residual negative moderate to high impacts

suggest that these impacts are likely to be acceptable and would not significantly restrict future conservation expansion in the greater Namaqualand area. As there are no high residual impacts or fatal flaws associated with the development, it can be supported from a Terrestrial Biodiversity perspective. **It is therefore the reasoned opinion of the specialist that the proposed Komas WEF and associated infrastructure should be authorised, subject to the implementation of the recommended mitigation measures.**

Concluding statement from the additional Biodiversity Offset Report (including proposed implementation) (Botha, 2021)

Although the proposed Komas WEF impacts marginally on the NNP Expansion Footprint, and thus the PAES focus area, and thus a CBA2 in terms of the applicable provincial plan, these impacts are not deemed sufficiently high to suggest that the development should not proceed. The impacts on intrinsic biodiversity features appear manageable. As the project is located in a REDZ and there are several offset options in the immediate vicinity, all with high likelihood of success, I have no objections to the development proceeding. An offset of 810 ha, in Namaqualand Strandveld or an adjacent, related vegetation type in the PAES focus area is prudent, and the optimal location for this from a biodiversity perspective is likely a portion of the Gromis property.

Aquatic Biodiversity Compliance Statement

The Aquatic BiodiversityAssessment was undertaken by Joshua Gericke and Louise Zdanow from Enviroswift (Pty) Ltd to inform the outcome of this BA from an aquatic biodiversity perspective. An Aquatic Biodiversity Compliance Statement was undertaken in accordance with the requirements of the Aquatic Biodiversity Protocol as per Government Notice 320 published in GG No. 43110 on 20 March 2020. The web-based national Screening Tool indicates that a full Aquatic Biodiversity Specialist Assessment is required. However, the aquatic specialist identified no watercourses on site. Therefore, the proposed development will not have an impact on any aquatic features and a full Aquatic Biodiversity Specialist Assessment is therefore not required. A Compliance Statement has been prepared instead as indicated above. It is the opinion of the Aquatic Biodiversity specialist that this Compliance Statement is sufficient as the aquatic sensitivity of the site was rated as very low. The complete Aquatic Biodiversity Compliance Statement is included in Appendix C.2 of this report. A summary of the Compliance Statement is provided below.

Comparative assessment of alternatives

Two alternatives were provided by the Project Applicant for assessment for the BESS and on-site SS complex area (Option 1 and Option 2). Both alternatives are acceptable from an aquatic perspective as there are no watercourses on the proposed Komas WEF site.

Summary of affected environment

According to the National Wetland Map 5 (CSIR, 2018), a large depression wetland is located within the western portion of the study area (Figure B.23). This depression has been indicated as an area of very high sensitivity in terms of Aquatic Biodiversity by the National Environmental Screening Tool (Figure B.24). However, upon investigation of this area during the field survey undertaken in January 2020 it was found that the area indicated as wetland habitat is in fact an extensive dune field. This dune field is a flat area located between two ridge lines and is characterised by fresh, wind-blown sand and dry terrestrial vegetation (Figure B.25). There is no indication that water accumulates within this area, and no wetland indicators as defined by the delineation guidelines (DWAF 2005, updated 2008) were encountered e.g. hydromorphic soils, wetland vegetation, signs of salt accumulation or hardened / cracked surface layers. Therefore, the site sensitivity verification disputes the rating of very high sensitivity assigned to this area in the National Web-Based Screening Tool in terms of Aquatic Biodiversity.

The low regional rainfall, semi-desert conditions and dominance of well drained, sandy soils within the study area is not conducive to the formation of wetland habitat. Furthermore, the relatively flat topography, the absence of ridges, and the lack of concentrated flow paths is not conducive to the formation of drainage lines. **No watercourses as defined by the National Water Act, 1998 (Act 36 of 1998) (NWA) were therefore encountered within the study area, and no additional watercourses have been indicated within 500 m of the study area by desktop resources.**

Concluding statement

No watercourses were encountered within the study area. It is therefore the opinion of the specialist that the study area is not considered to be important in terms of Aquatic Biodiversity and would fall within the low sensitivity category as defined by the National Web-Based Environmental Screening Tool. The proposed development will not have an impact on any aquatic features and a full Aquatic Biodiversity Specialist Assessment is therefore not required. A Compliance Statement has been prepared instead in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Gazette 43110/ Government Notice 320, dated 20 March 2020). It is the opinion of the Aquatic Biodiversity specialist that this Compliance Statement is sufficient as the aquatic sensitivity of the site was rated as very low and therefore the rating of very high significance as identified by the National Web-Based Environmental Screening Tool is disputed based on the evidence collected during the site visit and as motivated in this report.

It is the opinion of the specialist that the proposed development of the Komas WEF and associated infrastructure does not pose an unacceptable risk and can therefore be approved from an Aquatic Biodiversity perspective.

Avifauna Assessment

The Avifauna Impact Assessment was undertaken by Dr. Rob Simmons of Birds and Bats Unlimited to inform the outcome of this BA from an Avifaunal perspective. The Avifauna Impact Assessment was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended. The complete Avifauna Impact Assessment is included in Appendix C.3 of this report. A summary of the Avifauna Impact Assessment is provided below.

Important Note:* *The Avifauna Impact Assessment (Appendix C.3) was commissioned in February 2019. It was therefore commissioned a substantial period prior to the Assessment Protocol for Avifauna Specialist Assessment published in GN 320 on 20 March 2020 came into effect. Therefore, the Avifauna Assessment was undertaken in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended. Proof of the date of appointment of the avifauna specialist, Dr. Rob Simmons of Birds and Bats Unlimited, is provided in Appendix F.2.

Summary of affected environment

Priority avifauna were monitored and recorded at the proposed 300 MW Komas WEF site over 12 months as required by the Best Practice Guidelines for assessing and monitoring the impacts of wind energy facilities in southern Africa, produced by BirdLife South Africa and the Endangered Wildlife Trust (Jenkins et al. 2015).

Kleinsee lies in the Succulent Karoo Biome of the Northern Cape and this report details the number of priority species (i.e. all threatened and collision-prone birds) and their Passage Rates through the 27-km^2 area proposed for the proposed Komas WEF development from March 2019 (autumn) to December 2019 (summer). We quantify and predict possible threats, and map high-risk and medium-risk areas to reduce future potential impacts to avifauna at the proposed Komas WEF site.

The impact zone of the proposed Komas WEF site lies within the coastal area of the Succulent Karoo biome. Dry and uniform grazed habitats within this undulating area allows a small suite of arid-adapted and nomadic species to exist. Up to date bird atlas data from the Southern African Bird Atlas Project 2 (SABAP2) of the broader region indicates that the area proposed for the development supports a low diversity of 48 bird species.

- The records of the avifauna specialist which focussed on the proposed Komas WEF site in a particularly dry period, found 58 species in 12 months of monitoring.
- More species (43 and 49 species) were present in spring and summer, following rains, and this brought in more priority (6 and 8 species) and more Red Data species (3 and 3 species) respectively.
- Eight priority collision-prone species occurred over the year of which three were red-listed: Verreaux's Eagle *Aquila verreauxii* (ranked 2nd in top 100 collision-prone species); Ludwig's Bustard *Neotis ludwigii* (ranked 10th); and Southern Black Korhaan *Afrotis afra* (ranked 35th).

South African turbines kill 4.1-4.6 birds per turbine annually of which raptors comprise 36% (Perold et al. 2020). As such they may impact the five species of raptor that frequent the site.

- Both the annual passage rate of all collision-prone species on the proposed Komas WEF site (0.39 birds per hour), and the three Red Data species alone (0.15 birds per hour) were medium-high, increasing the probability of impacts especially for any turbines proposed in frequently used areas by raptors.
- Risk is also increased by the proportion of time priority species spent in the blade swept area (from 100 m to 300 m, for 200 m Hub Height turbines with 100 m blades).
- Priority species flew at these heights 78% of the time (Verreaux's Eagle); 40% of the time (Black-chested Snake Eagle); 56% of the time (Booted Eagle) and 0% of the time (Ludwig's Bustards), thereby increasing risk to the raptors.
- Based on frequent flights of Red Data species or where two or more priority species overlapped, **no areas of high-risk were identified.**
- However, **five areas of medium-risk were found on the proposed Komas WEF site**. These were located through-out the proposed Komas WEF site where the Snake Eagles and Booted Eagles were particularly active (Figure B.35).

Important note: The current updated turbine layout avoids the areas identified as medium-risk in the Avifauna Impact Assessment (Appendix C.3).

The specialist recommends that if turbines are positioned within the medium-risk areas and they are found to kill any Red Data birds a single blade should be painted black (or with signal red paint) for those select turbines to reduce impacts for eagles and other raptors (Stokke et al. 2017).

Cumulative impacts

The cumulative impacts of nine other proposed WEFs within 50 km of the proposed Komas WEF were assessed, and a minimum of 2 334 bird fatalities are estimated annually from these proposed facilities. Approximately 168 of these are estimated to be priority Red Data raptors per year.

Summary of Impact Assessment

The potential direct impacts to avifauna during the construction, operational and decommissioning phases of the facility are indicated below. Cumulative impacts are also identified.

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Direct disturbance and loss of foraging habitat around the proposed Komas WEF site for the priority bird groups identified on site (Verreaux's Eagle, Jackal Buzzard Ludwig Bustard, Booted Eagle and Black-chested Snake Eagle).	• If an active nest of Verreaux's Eagle is found a buffer of 3.2 km would be required during the breeding season. • Dust suppression techniques must be implemented on all access roads. • Implement construction-phase monitoring to monitor the effect of the construction itself on priority birds.	**Moderate**	**Moderate**
OPERATIONAL PHASE: DIRECT IMPACTS			
Fatalities caused by avifauna colliding with wind turbines, disturbance and loss of foraging habitat around the proposed Komas WEF site for the Red-listed and priority bird groups identified as at risk. Outside the wind farm birds may be electrocuted or hit by the internal 33 kV overhead power lines, or with double fences, may be entrapped between them.	• If turbines are positioned within the medium-risk areas and they are found to result in mortalities of any Red Data birds then either the turbines must be erected with an automatic shut-down on demand system (DT-bird or similar) or a single blade should be painted black (or with signal red paint) for those select turbines to reduce impacts for eagles and other raptors (May et al. 2020). For turbines outside the medium-risk area (as presently likely) these mitigations are not necessary unless > 1 red data bird is found to be killed per year during the post-construction surveys. • 12-24 months post construction monitoring to be undertaken to assess the mortality of birds in the Komas WEF area, through systematic and direct observation and carcass searches.	**Moderate-High**	**Moderate**
DECOMMISSIONING PHASE: DIRECT IMPACTS			
Direct disturbance and loss of foraging habitat around the proposed Komas WEF site for the Red-listed bird groups identified as at risk (as noted above).	• Reduce degree of disturbance and length of disturbance to a minimum during sensitive breeding seasons, but only if breeding red data species are found within 3-5 km radius from the proposed Komas WEF site. • Habitat can be rehabilitated to its former attractiveness (from a prey	**Moderate-High**	**Moderate**

Impact	**Mitigation measure**	**Significance before mitigation**	**Significance after mitigation**
	point of view) for the raptors. • The developer to implement decommissioning phase monitoring to assess the effects of rehabilitating the WEF, through direct observation.		
CUMULATIVE IMPACT (Construction, Operational and Decommissioning Phases)			
Fatalities caused by collisions with the wind turbines, entrapment in the perimeter fences, collision with the internal 33 kV power lines or electrocution. Disturbance and loss of foraging habitat around the WEF site for the Red-listed bird groups due to the construction, operation and decommissioning of the WEF and associated infrastructure.	• Although not enforceable on the applicant, all wind farms that are killing red data raptors (at > 1 red data individual per year) should be required to implement shut down on demand or black (red) blade mitigation.	**Moderate-High**	**Moderate**

Comparative assessment of alternatives

The applicant provided two BESS and on-site SS complex site alternatives to be assessed (i.e. Option 1 and Option 2). Option 2 is the preferred avian option since it is (i) closer to the incoming power line and (ii) there are slightly fewer priority bird flights in this area than at Option 1. However, Option 1 is not fatally flawed and can be implemented.

Concluding statement

The anticipated impacts of the proposed Komas WEF and associated infrastructure were overall rated to be negative and of Moderate significance pre- and post-mitigation. It is therefore recommended that the proposed Komas WEF be authorised, on condition that the proposed mitigation measures as detailed in the Avifauna Impact Assessment (Appendix C.3) and in the EMPrs (Appendix G of this BA Report) are strictly adhered to.

Bat Impact Assessment

The Bat Impact Assessment was undertaken by Stephanie Dippenaar of Stephanie Dippenaar Consulting to inform the outcome of this BA from a bat perspective. The Bat Impact Assessment was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended, as there is no relevant protocol on the National Web-based Screening Tool. The complete Bat Impact Assessment is included in Appendix C.4 of this report. A summary of the Bat Impact Assessment is provided below.

Summary of affected environment

Four static bat monitoring systems were deployed at the proposed Komas WEF site, two at the Met mast and two at temporary 10 m masts. Data was collected between 10 August 2019 and 23 September 2020, representing the four seasons of the year. Seven of the 12 species that have distribution ranges overlapping with the development site and nearby surrounding area were confirmed through bat recording devices. *Tadarida aegyptiaca* (Egyptian free-tailed bat) is the most dominant species on site, with nearly all the calls at the high monitoring system, situated within the rotor swept area, being part of the *Molossidae* family. These are high risk bats as they are adapted to forage at high altitudes. A limited number of one red data species, namely *Miniopterus natalensis (*Natal long-fingered bat), was recorded.

The farm buildings, rocky outcrops, relative denser vegetation, limited trees and livestock water points could be potential sources for bat roosting and foraging at the study area. According to SANBI's Database (2012) the main vegetation type at the study area is Namaqualand Strandveld. Namaqualand Klipkoppe Shrubland is situated at the south-eastern border of the site. This vegetation type is characterised by rocky outcrops and large boulders which are ideal for bat roosts. However, the updated project layout excludes this area for the placement of turbines or any associated infrastructure.

The most important aspect of the project that would affect bats adversely is the wind turbines themselves, and in particular, direct collisions and barotrauma as a result of operational turning blades. Loss of foraging habitat, loss of existing and potential roosts and attracting bats by artificially creating new bat conducive areas amongst the turbines, further summarise the main potential negative impacts to bats due to wind farm developments.

Low bat activity was recorded during winter and summer transects, but high activity occurred during the transect conducted in spring 2020. It is speculated that the relative increased rainfall in 2020 in the Kleinsee area, could have been the cause of occasional insect emergence, which resulted in sporadic high bat activity. This should be closely monitored during the operational phase.

According to the recorded data, bats at the proposed Komas WEF site are more active during late summer and autumn, between February and May, with a peak in activity around March. High bat activity is also observed in September, during spring. The highest bat activity was recorded in the southern section of the farm. In general, bats seem to be active from about two hours after sunset, with activity starting to decline around four to five hours before sunrise, around 1:00 a.m.

During the monitoring period, the hourly mean bat activity for the proposed Komas WEF site was higher than the highest threshold figures for the Succulent Karoo biome. This indicates that bat populations might be severely negatively impacted upon by the wind energy development should the development progresses without mitigation measures. The monitoring system stationed at high altitude was used to plot bat activity and weather conditions to describe the relationship between weather conditions and bat activity, in particular activity within the rotor swept area of the turbine blades. This information was then used to develop a mitigation scheme for the wind farm.

The following mitigation is suggested for the proposed Komas WEF:

1. Turbine positions

The first step in mitigating the potential negative impacts of a proposed WEF on bats is to site turbines outside of sensitive areas. The applicant has already updated the initial turbine layout to exclude turbines or turbine components from the high bat sensitivity zones (see Figure D.1 of this BA Report).
ail

2. Curtailment at specific turbines

A. **Curtailment** is the act of limiting the supply of electricity to the grid during conditions when it would normally be supplied. This is usually accomplished by feathering the turbine blades with the aim to raise the cut-in speed. Curtailment should be implemented immediately from the onset of the turbines situated within the medium to high sensitivity zone, thus the moment the turbines start to turn:

CURTAILMENT FOR TURBINES NUMBERED WTG23, WTG24, WTG37, WTG38 AND WTG50			
Months	**Time periods**	**Temperature (°C)**	**Wind speed (m/s)**
February	19:00 – 02:00	Between 14 and 19 °C	Between 2.5 and 9 m/s
March	19:00 – 02:00	Between 14 and 19 °C	Between 2.5 and 9 m/s
April	19:00 – 02:00	Between 14 and 19 °C	Between 2.5 and 9 m/s

If the developer decides to reduce the number of turbines, the first option, after the wind regime is taken into account, should be to reduce the turbines in the medium to high sensitivity zone. If a substantial number of turbines in the medium sensitivity zone is reduced, it will be at the discretion of the operational bat specialist as to whether some of the curtailment at the medium to high zone could be relieved. Operational monitoring and carcass searches will have to inform this, and mortality will have to be below the threshold.

B. Additional Curtailment to be implemented, under the advice and supervision of the operational bat specialist, when medium and high estimated true bat mortality is experienced.

MITIGATION FOR TURBINE NUMBERS WTG23, WTG24, WTG37, WTG38 and WTG50, or as advised by the bat specialist			
Months	**Time periods**	**Temperature (°C)**	**Wind speed (m/s)**
September	19:00 – 02:00	Between 14 and 22 °C	Between 2.5 and 9 m/s
December	19:00 – 02:00	Between 14 and 22 °C	Between 2.5 and 9 m/s
January	19:00 – 02:00	Between 14 and 22 °C	Between 2.5 and 9 m/s

3. Feathering and freewheeling of turbine blades

Normally operating turbine blades are at right angles to the wind. To avoid bat fatality at areas highly sensitive to bat activity, feathering as a mitigation measure is applied and the angle of the blades is pitched parallel with the wind direction andso that the blades only spin at very low rotation and minimal movement (not complete standstill) to prevent. The turbines will not come to a complete standstill, but the movement of the turbines shouldwould be minimal so thatto prevent bat fatalities are prevented during conditions when power is not generated.

The cut-in speed is the lowest wind speed at which turbines generate power. Free-wheeling occurs when turbine blades are allowed to rotate below the cut-in speed and thereby increase the risk of collision at areas already highly sensitive to bat activity. Freewheeling should be prevented as much as possible immediately after installation for the duration of the project to prevent bat mortality.

4. Bat deterrents

Bat deterrents is a developing technology that works on the principle of emitting ultrasonic noise that prevents bats from echolocating and therefore cause bats to avoid the area. Not enough research is done in South Africa to establish the success of bat deterrents yet, but this mitigation measure could be used together with curtailment, or even as an alternative, depending on research and the consequent opinion of the operational bat specialist and the South African Bat Assessment Association (SABAA). During post construction, turbines with high mortality could be specifically targeted for bat deterrents.

All turbine components should be excluded from No-Go areas as indicated on the bat sensitivity map (Figure 30 of the Bat Impact Assessment). Mitigation is recommended, as per Section 9 of the Bat Impact Assessment and summarised above, for the turbines situated within the medium to high zones. The rest of the proposed Komas WEF site is classified as of medium sensitivity. Operational monitoring should inform the extent of mitigation required, but due to the bat activity being above threshold, there is a possibility that more stringent mitigation would be required and would need to be implemented by the Project Developer. Therefore, the Project Developer needs to include this in the financial cost structure from the start of the project. If bat mortality is lower than expected, thus below the threshold, it will be up to the discretion of the operational bat specialist as to whether curtailment could be reduced.

The turbine layout of the development option of the proposed wind farm, as provided, is the preferred option to accommodate the bat sensitivity map by avoiding highly sensitive areas. Additional to mitigation by turbine positioning to avoid sensitive areas, other options may be utilised when necessary such as feathering of blades parallel to the wind to reduce blade rotation to a bare minimum and curtailment of blade movement when turbines are not generating power.

Cumulative impacts

For the cumulative effect, the total output of approximately 1 063.7 MW for wind developments within a 50 km radius of the proposed Komas WEF site, was considered. With Komas WEF added to this, the output will be 1 363.7 MW. Although not all the bat studies undertaken as part of a BA/EIA of proposed wind farms within 50 km radius were available, the bat monitoring reports of the wind farms directly adjacent to the proposed Komas WEF, were obtained. The collective Bat Index, thus the mean number of bats per hour per year, using the Kap Vley, Namas, Kleinzee, Zonnequa and Komas WEFs, is calculated at 0,18. According to the threshold levels of the Bat Guidelines (Sowler *et al*. 2017), this is classified as high. This is excarbated if one considers that most bats are high risk species. If mitigation is diligently conducted at all wind farms, this impact could be reduced.

Summary of Impact assessment

The following potential direct, indirect and cumulative impacts for the construction, operational and decommissioning phases were identified.

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Active roost destruction and potential roost destruction.	• Keep construction activities out of high sensitive areas for bats. • Avoid destruction of rock formations along southern ridge lines. • Avoid destruction of trees. • Take care before destroying dense bushes to avoid unnecessary roost destruction. • All aardvark holes, derelict holes or excavations should be carefully investigated for bat roosts before destruction.	**Moderate**	**Low**
Creating new habitat amongst the turbines which might attract bats. This include buildings with roofs that could serve as roosting space or open water sources from quarries or excavation where water could accumulate.	• Completely seal off roofs of new buildings (e.g. SS and site buildings). Note a small bat species could enter a hole the size of one- by- one centimetres. • Roofs need to be regularly inspected during the lifetime of the wind farm and any new holes need to be sealed. • Excavation areas or artificial depressions should be filled and rehabilitated to avoid creating areas of open water sources which could attract bats during rainy spells.	**Moderate**	**Very Low**
Construction noise, especially during night-time.	• Nightly construction activities should be avoided, or if necessary, minimised to the shortest period possible. • With the exception of compulsory civil aviation lighting, artificial lighting during construction should be minimised, especially bright lights or spotlights. • Lights should avoid skyward illumination. Turbine tower lights should be switched off when not in operation, where possible.	**Moderate**	**Low**
OPERATIONAL PHASE: DIRECT IMPACT			
Fatality of resident bats through direct collision or barotrauma.	• Maintain a register of action taken regarding bat mortality/injury as well as queries or complaints.	**High**	**Moderate**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	• Mitigation as proposed in Section A above in section D 2.4.4 of this BA Report as well as in Section 9.2 (Table 7) of the Bat Impact Assessment (Appendix C.4) should be applied from the start of operation of the turbines for the site as a whole. Mitigation measures must be adapted by a bat specialist as data is collected during the operational phase. • Mitigation as proposed for Medium to High sensitivity zones indicated in Section B above and in Section 9.2 (Table 8), of the Bat Impact Assessment (Appendix C.4), must be adhered to as from the start of operation of the turbines. If the developer decides to reduce the number of turbines, the first option, after the wind regime is taken into account, should be to reduce the turbines in the medium to high sensitivity zone. If a substantial number of turbines in the medium sensitivity zone is reduced, it will be at the discretion of the operational bat specialist as to whether some of the dfsfr at the medium to high zone could be relieved. Operational monitoring and carcass searches will have to inform this decision. • A suitably qualified bat specialist must be appointed at the start of the operational phase. Careful observation should take place during post-construction and mitigation should be discussed between the bat specialist and Project Developer. Mitigation should be adapted and implemented without delay. Where high bat mortality occurs, those turbines should be mitigated, using Section B above in section D 2.4.4 of this BA Report and Section 9.2 (Table 8) of the Bat Impact Assessment (Appendix C.4), as a starting point for discussions. • With the exception of compulsory civil aviation lighting, artificial lighting should be minimised, especially bright lights. Lights should		

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible. • At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South African Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et. al., 2020) or later versions valid at the time of monitoring, as well as other relevant South African guidelines as applicable during the monitoring period. • It is understood that static monitoring equipment for bats on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines, but having more refined static data from sampling points at height, would aid in interpreting future fatality records of the wind farm; therefore, the installation of more than one monitoring system at height, will be recommended. • Ultrasound should be investigated for use at turbines displaying high mortality.		
Bat fatality of migratory species through direct collision or barotrauma.	• Mitigation Lighting of WEF should be kept to a minimum and directed downwards. • Post-construction bat monitoring to determine the most effective cut-in speed for turbines on site. Implement curtailment and feathering mitigation measures and select the cut-in speed that demonstrates a significant reduction in bat mortality as the default cut-in speed during periods of peak bat activity on site. • Care should be taken during post construction monitoring to verify the numbers of M. natalensis, especially within the rotor swept area of the turbine blades.	**Low**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	• Mitigation measures as described above for the impact regarding the fatality of resident bats through direct collision or barotrauma (as contained in Section 11.2.1 of the Bat Impact Assessment (Appendix C.4)).		
Loss of bats of conservation value.	• Bat fatalities should be monitored by fatality searches and a record kept of date, time, location, gender, cause of death. Carcasses should be photographed to be used for searcher efficiency and carcass removal trails. • Mitigation measures as described above for the impact regarding the fatality of resident bats through direct collision or barotrauma (as contained in Section 11.2.1 of the Bat Impact Assessment (Appendix C.4)). Proven mitigation measures, such as curtailment, should be applied if high numbers of bat passes concerned with bats of conservation value is recorded during post-construction.	**Low**	**Low**
Bat fatality due to the attraction of bats to turbine blades.	• Develop an adaptive mitigation plan based on results from post-construction monitoring to modify the cut-in speed and hours of curtailment of selected turbines. • Investigate ultrasonic deterrents and implement at turbines with high fatality.	**Low**	**Low**
Loss of habitat and foraging space during operation of the wind turbines.	• Buffer sensitive habitat and foraging areas and where possible minimise lighting on turbines that could attract insects and bats. • Mitigation measures as described above for the impact regarding the fatality of resident bats through direct collision or barotrauma (as contained in Section 11.2.1 of the Bat Impact Assessment (Appendix C.4)).	**High**	**Moderate**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
OPERATIONAL PHASE: INDIRECT IMPACT			
Reduction in size, genetic diversity, resilience, and persistence of bat populations.	• Mitigation measures as described above for the impact regarding the fatality of resident bats through direct collision or barotrauma (as contained in Section 11.2.1 of the Bat Impact Assessment (Appendix C.4)). Care should be taken during post construction monitoring to verify the numbers of this species, especially within the RSA of the turbine blades.	**High**	**Moderate**
DECOMMISSIONING PHASE: DIRECT IMPACT			
Bat disturbance due to decommissioning activities and noise, especially during night-time.	• Nightly decommissioning activities should be avoided, or if necessary, minimised to the shortest period possible. • Except for compulsory lighting required in terms of civil aviation, artificial lighting during construction should be minimised, especially bright lights or spotlights. • Lights should avoid skyward illumination.	**Low**	**Very Low**
CUMULATIVE IMPACTS			
CONSTRUCTION PHASE			
Cumulative effect of construction activities of several WEFs within 50 km from the proposed Komas WEF site. Cumulative effect of destruction of active roosts due to several WEFs as well as features that could serve as potential roosts.	• Although not enforceable on the Project Applicant, the project specific mitigation should be adhered to, especially adhering to buffer zones and sensitivity areas and recommended mitigation, for each renewable energy project.	**Moderate**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CUMULATIVE IMPACTS			
OPERATIONAL PHASE: DIRECT IMPACTS			
Cumulative bat mortality of **resident bats** due to direct blade impact or barotrauma during foraging of migrating bats on several wind farms.	• Although not enforceable on the Project Applicant it is recommended that the project specific mitigation should be adhered to and each wind farm should apply specific mitigation measures as recommended. • Although not enforceable on the Project Applicant it is recommended that the buffer zones and sensitivity areas should be adhered to and recommended mitigation, for each renewable energy project. Post construction monitoring as per the relevant bat guidelines in South Africa. • Post construction monitoring as per the relevant bat guidelines in South Africa.	**High**	**High**
Cumulative bat mortality of **migrating bats** due to direct blade impact or barotrauma during foraging of migrating bats on several wind farms.	• Although not enforceable on the Project Applicant it is recommended that the project specific mitigation should be adhered to and each wind farm should apply specific mitigation measures as recommended. • Although not enforceable on the Project Applicant it is recommended that the buffer zones and sensitivity areas should be adhered to and recommended mitigation, for each renewable energy project. • Post construction monitoring as per the relevant guidelines in South Africa.	**Moderate**	**Low**
Habitat loss over several wind farms.	• Although not enforceable on the Project Applicant it is recommended that the project specific mitigation should be adhered to, especially adhering to buffer zones and sensitivity areas and recommended mitigation, for each WEF. • Post construction monitoring as per the relevant guidelines in South	**Moderate**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	Africa.		
CUMULATIVE IMPACTS			
OPERATIONAL PHASE: INDIRECT IMPACTS			
Cumulative reduction in the size, genetic diversity, resilience and persistence of bat populations	• Although not enforceable on the Project Applicant it is recommended that the project specific mitigation should be adhered to and each wind farm should apply specific mitigation measures as recommended. • Although not enforceable on the Project Applicant it is recommended that the buffer zones and sensitivity areas should be adhered to and recommended mitigation, for each renewable energy project. • Post construction monitoring as per the relevant bat guidelines in South Africa.	**High**	**Low**

Comparative assessment of alternatives

No turbine layout alternatives were provided; however, the initial turbine layout was re-designed after specialist input to avoid environmental sensitive areas on site. Alternatives were provided for the BESS and on-site SS complex area (Option 1 and Option 2). Apart from habitat destruction, the negative impact of an onsite SS on insectivorous bats should be low. There is no preferred option from a bat perspective and both options are acceptable.

Concluding statement

The turbine layout was updated following bat specialist input to avoid environmentally sensitive areas. If the Project Applicant adheres to the proposed mitigation measures, the potential impact on bats from the proposed Komas WEF is predicted to be Negative and of Moderate significance. **It is therefore the opinion of the bat specialist, based on the one-year pre-construction monitoring undertaken at the proposed Komas WEF site, that Environmental Authorisation (EA) may be granted to the proposed project.**

Visual (including Flicker) Impact Assessment

The Visual (including Flicker) Impact Assessment (VIA) was undertaken by Kerry Schwartz of SiVEST SA (Pty) Ltd to inform the outcome of this BA from a visual perspective. The VIA was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended as there is no relevant protocol on the Screening Tool. The complete VIA is included in Appendix C.5 of the BA Report. A summary of the VIA is provided below.

Summary of affected environment

Although the study area has a largely natural, untransformed visual character with some elements of rural / pastoral infrastructure, it is not typically valued or utilised for its tourism significance. The study area has however seen very limited transformation or disturbance and is considered largely natural. As such the proposed Komas WEF development is expected to alter the visual character of the area and contrast significantly with the typical land use and / or pattern and form of human elements present.

A broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low to moderate visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

No formal protected areas, leisure-based tourism activities or sensitive receptor locations were identified and there are no recognised tourism or scenic routes in the study area. In addition, there is limited human habitation resulting in relatively few potentially sensitive receptors in the area.

The VIA identified thirteen potentially sensitive receptors in the study area, all of which are farmsteads. These farmsteads are regarded as potentially sensitive visual receptors as they are located within a mostly natural setting and the proposed Komas WEF development will likely alter natural vistas experienced from these dwellings. The VIA determined that the proposed development will have a high level of impact on three (3) of these receptors. Most of these four receptors are farmsteads located in relatively close proximity to the proposed Komas WEF development area and this factor, in conjunction with the relatively flat terrain in the area and the lack of screening vegetation, gives rise to a high impact rating. None of these receptors are tourism-related facilities however, and as such they are not considered to be Sensitive Receptors. In addition, it should be noted that three of these receptors, namely R12, R14 and R15, are located on the application site for the proposed Kap Vley WEF and as such it is possible that residents at these locations may not perceive the proposed Komas WEF in a negative light.

Seven (7) of the remaining receptor locations would be subjected to moderate levels of visual impact as a result of the proposed development and the remaining three (3) receptors would only experience negligible levels of visual impact.

The significance of the overall impact rating revealed that the proposed Komas WEF is expected to have a **negative low visual impact rating during construction and a negative moderate visual impact rating during operation**, with relatively few mitigation measures available.

Cumulative impacts

Several renewable energy developments are being proposed within a 50 km radius of the proposed Komas WEF application site. These renewable energy developments have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other, could significantly alter the sense of place and visual character in the broader region. It was however determined, that only five of these would have any significant impact on the landscape within the study area, these being; the proposed Gromis WEF which is subject to another BA process which is currently being undertaken, the proposed Kleinzee WEF and the proposed Kap Vley, Namas and Zonnequa WEFs which have received EAs on 25 October 2018, 18 February 2019 and 25 February 2019 respectively. All of these projects are in close proximity to one another and to the proposed Komas WEF development area and it is anticipated that this concentration of facilities will alter the inherent sense of place and introduce an increasingly industrial character into a largely rural area. This will result in significant cumulative impacts, rated as having negative impacts of moderate significance during both construction and operation phases of the project. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists.

It should be noted that the study area is located within the REDZ 8 known as Springbok, and thus the relevant authorities support the concentration of renewable energy developments in this area. In addition, it is possible that the three WEFs in close proximity to each other could be seen as one large WEF rather than three separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

Summary of Impact assessment

The potential visual impacts resulting from the proposed Komas WEF on landscape features and receptors are listed below for each of the project phases, including cumulative impacts. The impacts identified are direct and cumulative impacts. No indirect impacts have been identified.

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			

Visual intrusion, visual effect of construction laydown areas and material stockpiles, visual pollution resulting from littering on the construction site, landscape scarring and dust emissions.	• Carefully plan to minimise the construction period and avoid construction delays.
	• Position laydown areas and related storage / stockpile areas in unobtrusive positions in the landscape, where possible.
	• Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
	• Vegetation clearing should take place in a phased manner.
	• 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.
	• Ensure that dust suppression techniques are implemented:
	  ○ on all access roads;
	  ○ in all areas where vegetation clearing has taken place; and
	  ○ on all soil stockpiles.
	• Maintain a neat construction site.
		Moderate	**Low**

OPERATIONAL PHASE: DIRECT IMPACTS			
Alteration of visual character of the area, visual intrusion resulting from wind turbines dominating the skyline in a largely natural / rural area, Kap Vley, Namas and Zonnequa WEFs visual clutter caused by the SS and other associated infrastructure on-site, dust emissions, visual effect on surrounding farmsteads, and light pollution and glare (i.e. alteration of the night-time visual environment as a result of operational	Design Phase: • In areas of 'Very High' and 'High Sensitivity', the number of turbines should be limited, where possible. • No turbines should be placed within 500 m of the dwellings or farmsteads which are situated within the proposed Komas WEF development area (i.e. 500 m exclusion buffers – see Figures D.9 and D.12 of this BA Report). • Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. • Turbine colours should adhere to the South African Civil Aviation Authority (SACAA) requirements.	**Moderate**	**Moderate**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
and security lighting as well as navigational lighting on top of the wind turbines).	Operational Phase: • If possible, turbines should be painted plain white, as this is a less industrial colour. Bright colours and logos on the turbines should be kept to a minimum. • Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). • If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale. Repeating elements of the same height, scale and form can give the impression of unity which will lessen the visual impact that would typically be experienced in a chaotic landscapes made up of diverse colours, textures and patterns (Vissering, 2011). • Light fittings for security at night should reflect the light toward the ground and prevent light spill. • Where practically possible, the O&M buildings should not be illuminated at night. • Cables should be buried underground where feasible. • The O&M buildings should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible. • Unless there are water shortages, dust suppression techniques must be implemented on all access roads.		

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
DECOMMISSIONING PHASE: DIRECT IMPACTS			
Visual intrusion and dust emissions.	• Carefully plan to reduce the decommissioning period. • Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. • Maintain a neat decommissioning site by removing rubble and waste materials regularly. • Make use of existing gravel access roads where possible. • Dust suppression techniques must be implemented on all gravel access roads.	**Moderate**	**Low**
CUMULATIVE IMPACTS			
CONSTRUCTION ACTIVITIES			

Visual intrusion and dust emissions.
Combined visual impacts from several renewable energy facilities in the broader area during the construction phase could potentially alter the sense of place and visual character of the area.
Combined visual impacts from several renewable energy facilities in the broader area during construction phase could potentially exacerbate visual impacts on visual receptors.
	• Carefully plan to minimise the construction period and avoid construction delays.
	• Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.
	• Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
	• Vegetation clearing should take place in a phased manner.
	• Access roads must be kept as narrow as possible and existing gravel access roads must be used where possible.
	• Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible.
	• Ensure that dust suppression techniques are implemented:
	    ○ on all access roads;
	    ○ in all areas where vegetation clearing has taken place; and
	    ○ on all soil stockpiles.
	• Maintain a neat construction site by removing litter, rubble and waste materials regularly.
	• Formulation and adherence to an EMPr, monitored by an ECO.
		Moderate	**Moderate**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	• In areas of 'Very High' and 'High Sensitivity', the number of turbines should be limited, where possible. • Steep slopes (>1:5 gradient) should be avoided.		
CUMULATIVE IMPACTS - OPERATIONAL ACTIVITIES			
Visual intrusion, dust emission and light pollution and glare. Combined visual impacts from several renewable energy facilities in the broader area during operation phase could potentially alter the sense of place and visual character of the area. Combined visual impacts from several renewable energy facilities in the broader area during the operations phase could potentially exacerbate visual impacts on visual receptors.	• Development on steep slopes (>1:5 gradient) should be avoided. • No turbines should be placed within 500 m of the dwellings or farmsteads which are situated within the proposed application (i.e. 500 m exclusion buffers – see Section 1.6.2 of the VIA and Figures D.9 and D.12) • Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. • Turbine colours should adhere to SACAA requirements. • Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. • If possible, turbines should be painted plain white, as this is a less industrial colour. Bright colours and logos on the turbines should be kept to a minimum. • Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). • If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale. Repeating elements of the same height, scale and form can give the impression of unity which will lessen the visual impact that would typically be experienced in a chaotic landscapes made up of diverse colours, textures and patterns (Vissering, 2011). • Light fittings for security at night should reflect the light toward the ground and prevent light spill. • Where practically possible, the O&M buildings should not be illuminated at night.	**Moderate**	**Moderate**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	• Cables should be buried underground where feasible. • The O&M buildings should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible. • Unless there are water shortages, dust suppression techniques must be implemented on all access roads.		

Comparative assessment of alternatives

A comparative assessment of alternatives (Option 1 and Option 2) for the proposed BESS and on-site SS complex area was undertaken in order to determine which of the alternatives would be preferred from a visual perspective. No fatal flaws were identified for either of the alternatives. Option 2 was found to be favourable. Option 1 was identified as the preferred alternative as Option 2 is closer to the nearest receptor.

Concluding statement

From a visual perspective therefore, the project is deemed acceptable and an EA should be granted. SiVEST is of the opinion that the potential impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

Heritage Impact Assessment (Archaeology and Cultural Landscape)

The Heritage Impact Assessment (HIA) was undertaken by Dr. Jayson Orton of ASHA Consulting to inform the outcome of this BA from an archaeology and cultural landscape perspective. The HIA was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended as there is no relevant Protocol on the Screening Tool. An integrated HIA, containing Archaeology, Cultural Landscape and Palaeontology, has been undertaken for the project. However, for ease of reference, this section only deals with the Archaeology and Cultural Landscape. The complete HIA is included in Appendix C.6 of the BA Report. A summary of the HIA is provided below.

Summary of affected environment

The study area is an undulating, sandy coastal plain with a light vegetation covering. Dune ridges occur with deflation hollows generally located along the crests of these ridges. Infrastructure is absent aside from a few gravel roads through the area, occasional power lines and some farmsteads.

Summary of affected environment

The vast majority of impacts would occur during construction. Palaeontological resources are likely to consist of isolated bones and their locations cannot be predicted. Any fossils present could be of high significance and, if found and reported, impacts are expected to be of **low positive** significance after mitigation. This is because of the difficulty of finding fossils outside of the development context – their recovery would be a benefit to science. The region is well-known for its very high density of archaeological sites but their number and significance often decreases away from the coast. The survey revealed many small Later Stone Age archaeological sites with occasional historical artefacts also present. None of these was of high cultural significance and the WEF has avoided all known sites. Although it is possible that some sites were missed during the survey, these are likely to be less important ones and would be easily recorded during a pre-construction survey. Because of the ease with which mitigation can be effected, the impacts are expected to be of **very low negative** significance after mitigation. Although culturally important, graves are very unlikely to be impacted and their locations generally cannot be predicted. The impact significance is therefore expected to be **very**

low negative. Impacts to the cultural landscape cannot be mitigated because of the size of the turbines but the expected impacts would be of **moderate negative** significance.

Cumulative impacts

Cumulative impacts are similar to the ones listed above, except that cumulative impacts to archaeology are considered to be of **moderate negative** significance after mitigation, because there is the possibility that a large number of sites could be lost with extensive development of the area.

Summary of Impact assessment

The potential impacts identified in the HIA include direct and cumulative impacts during the construction, operational and decommissioning phases. No indirect impacts are anticipated. The impacts identified are listed below.

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Loss of palaeontological resources.	• Monitoring, inspection, sampling, curation as required.	Low	Low (+)
Loss of archaeological resources on site.	• Conduct a pre-construction survey, sampling and curation as required.	Low	Very Low
Loss of graves.	• Protect and report graves found during construction so they can be rescued.	Very Low	Very Low
Impacts to the cultural landscape.	• Minimise the amount of land that gets disturbed and scarred.	Moderate	Moderate
OPERATIONAL PHASE: DIRECT IMPACT			
Impacts to the cultural landscape.	• None.	Low	Low
DECOMMISSIONING PHASE: DIRECT IMPACT			
Impacts to cultural landscape.	• Minimise the amount of land that gets disturbed and scarred.	Moderate	Moderate
CUMULATIVE IMPACTS			
Loss of palaeontological resources.	• Monitoring, inspection, sampling, curation as required.	Low	Low (+)
Loss of archaeological resources.	• Conduct a pre-construction survey, sampling and curation as required.	Moderate	Very Low
Loss of graves.	• Protect and report graves found during construction so they can be rescued.	Very Low	Very Low
Impacts to the cultural landscape.	• Minimise the amount of land that gets disturbed and scarred.	Moderate	Moderate

Comparative assessment of alternatives

No heritage impacts are anticipated at either BESS and on-site SS complex area Option 1 or Option 2 alternative and the assessment undertaken thus apply equally to either alternative. There is no preference between Option 1 and Option 2, and therefore both alternatives are acceptable from a heritage perspective.

Concluding statement

There are no fatal flaws associated with the proposed development of the Komas WEF.

It is recommended that the proposed Komas WEF should be authorised, but subject to the following conditions which should be incorporated into the EA:

- A chance fossil finds procedure needs to be incorporated into the EMPr;
- A pre-construction survey should be commissioned to check for any remaining archaeological sites that might have been missed during the original survey. Mitigation would then be suggested if required;
- Landscape scarring must be kept to an absolute minimum; and
- 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 authority, i.e. the South African Heritage Resources Agency (SAHRA), 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.

Heritage Impact Assessment (Palaeontology)

The Palaeontology Impact Assessment (PIA) was undertaken by John Pether, a Geological and Palaeontological Consultant, to inform the outcome of this BA from a palaeontological perspective. The PIA was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended as there is no relevant Protocol on the Screening Tool. The full Palaeontology Impact Assessment is included as Appendix 4 to the HIA, which is included in Appendix C.6 of the BA Report. A summary of the HIA is provided below.

Summary of affected environment

The primary palaeontological concern is the fossil bones that are sparsely distributed in these aeolian deposits. In the Hardevlei and Koekenaap formations the fossil bone and marine shell material that may occur is likely to be in an archaeological context. Both artefacts and fossil bones are most often found on the compact palaeosurface of the Dorbank Formation. beneath the surficial sands. The fossil bone material would be of late Quaternary age and comprised mainly of extant species (modern fauna), but could include species that did not historically occur in the region.

The fossil bone finds in the Dorbank Formation are generally the scattered, disarticulated and sometimes fragmented larger limb bones of antelopes and zebra. Pans and vleis/seep deposits, with greater fossil potential, may occur along buried drainage lines within the Dorbank Formation. Most finds have been at lower elevations in diamond-mine pits and little is known of this formation and its fossils at higher elevations and in this region of the coastal plain. Fossil finds could prove to be a scientifically significant addition to the poorly-known later mid-Quaternary fossil fauna of Namaqualand.

The calcrete-floored Zonnekwa Valley has very likely hosted pans during wetter climate spells in the past. It is possible that some pan deposits may remain, or fossils that have been eroded from them by wind deflation. The calcrete is assumed to have formed within the upper part of an older aeolianite formation. As the capping calcrete has formed along a persistent palaeosurface, fossil bones are more prevalent within it and are expected to be of earlier Quaternary age.

Due to the overall sparse distribution of fossil bones in the affected formations the palaeontological sensitivity and intensity of impact is considered to be LOW before and after mitigation for all excavations involved in the construction of the proposed Komas WEF and associated infrastructure. However, when fossils are found in such poorly fossiliferous formations, they provide very significant advances in the geological understanding of the stratigraphy of a region.

There will be a considerable number of excavations for turbine foundations (i.e. 50) distributed over and "sampling" a wide area during the construction phase. Therefore, in spite of the overall low fossil potential, there is a distinct possibility that buried palaeosurfaces bearing fossil bones and archaeological material may be exposed in some of the excavations. The excavations for cabling and other infrastructure such as the SS are relatively shallow and mainly affect the coversands, but the cabling trenches will traverse considerable lengths across the proposed WEFs development areas and intersect the locally-fossiliferous top of the Dorbank Unit in places.

Cumulative impacts

Several other WEFs have been proposed in the area. Although this may mean that more impacts to palaeontology are anticipated, there is also the likelihood that there will be a gain in terms of the state of knowledge of these disciplines if mitigation measures are successfully applied. The significance of impacts is expected to be the same as that for the construction phase with a low negative and low positive impact to palaeontology.

Summary of Impact Assessment

The impacts identified only apply to the construction phase of the proposed development since further significant impacts on fossil heritage during the planning, operational and decommissioning phases of the facility is not anticipated. Cumulative impacts are also identified, as indicated below.

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Direct destruction of fossil resources.	• Monitoring of all construction-phase excavations by project staff and ECO. • Significant fossil chance finds should be safeguarded and reported at the earliest opportunity to SAHRA for recording and sampling by a professional palaeontologist. A protocol for Chance Fossil Finds is appended as Appendix 4 of the Palaeontology Impact Assessment (in Appendix C.6 of this report). These recommendations must be included within the EMPr for the Komas WEF development. • Inspection, sampling and recording of selected exposures in the event of fossil finds. • Fossil finds and the compiled contextual report deposited in a curatorial scientific institution.	**Low**	**Low (+)**
CUMULATIVE IMPACTS			
Disturbance, damage or destruction of significant fraction of fossil heritage within the lower Abrahamskraal Formation (Karoo Supergroup).	• Monitoring of all construction-phase excavations by project staff and ECO. • Significant fossil chance finds should be safeguarded and reported at the earliest opportunity to SAHRA for recording and sampling by a professional palaeontologist. A protocol for Chance Fossil Finds is appended as Appendix 4 of the PIA (in Appendix C.6 of this report). These recommendations must be included within the EMPr for the Komas WEF development. • Inspection, sampling and recording of selected exposures in the event of fossil finds. • Fossil finds and the compiled contextual report deposited in a curatorial scientific institution.	**Low**	**Low (+)**

Comparative assessment of alternatives

Due to the low palaeontological sensitivity of the site, there is no material difference between the palaeontological impact of the BESS and on-site SS complex area alternatives (Option 1 or Option 2) and therefore both these alternatives are considered acceptable.

Concluding statement

The significance of potential impacts to palaeontological resources was assessed to be **low negative before and low positive after mitigation** during the construction phase of the proposed Komas WEF and associated infrastructure. It is therefore the opinion of the specialist that development of the proposed Komas WEF and associated infrastructure is considered acceptable from a palaeontological perspective and can be authorised, subject to the implementation of the recommended mitigation measures.

Potential adjustments to the layout of the turbines and infrastructure do not affect this assessment.
Both BESS and on-site SS complex area alternatives (Option 1 and Option 2) are acceptable from a palaeontological perspective and either alternative may be developed.

If the recommended mitigation measures are applied to the proposed Komas WEF, it is possible that the WEF development will to some extent alleviate the negative cumulative impact on paleontological resources in the region.

The history of these vast tracts of sands, gravels and pedocretes of the Northern Cape Province is very poorly known, with very few fossils to rely on. Therefore, although of low probability; any find will be of considerable importance and could add to the scientific knowledge of the area in a positive manner.

Agriculture

An Agriculture Compliance Statement was undertaken by Johann Lanz to inform the outcome of this BA from an agricultural and soils perspective. The Compliance Statement was undertaken in accordance with the requirements of the Agricultural Protocol for Onshore Wind Energy Generation Facilities where the Electricity Output is 20 MW or more (GG 43110 / GNR 320, 20 March 2020). A Compliance Statement was undertaken, instead of an Assessment as the site was assessed to be of low agricultural sensitivity.

Summary of affected environment

The key findings of this study are:

- Soils of these land type are predominantly deep to moderately deep, very sandy soils on underlying hardpan carbonate and sometimes clay.
- The major limitations to agriculture are the severely limited climatic moisture availability and the sandy soils with low water holding capacity.
- As a result of these limitations, **the agricultural use of the study area is limited to low intensity grazing only.**
- The project site is classified with a predominant **land capability evaluation value of 5 (low)**, although it varies from 4 to 6 across the site (Land Capability Classification for South Africa, 2017).

- The significance of all potential agricultural impacts associated with the development of the proposed Komas WEF is rated as **low** because the proposed site is on land of extremely limited agricultural potential and the footprint of disturbance of the wind farm is limited to a very small proportion of the surface area.
- There are no agriculturally sensitive areas on the site and no parts of the site need to be avoided by the development of the proposed Komas WEF and associated infrastructure.
- Three potential negative impacts of the proposed development on agricultural resources and productivity were identified as:
  - Loss of agricultural land use - Agricultural grazing land directly occupied by the development infrastructure, which includes all associated infrastructure, will become unavailable for agricultural use. This impact is relevant only in the construction phase. No further loss of agricultural land use occurs in subsequent phases.

  - Soil degradation - Soil can be degraded by impacts in three different ways: erosion; topsoil loss; and contamination. 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 excavations. Hydrocarbon spillages from construction activities can contaminate soil. Soil degradation will reduce the ability of the soil to support vegetation growth. This impact is relevant only during the construction and decommissioning phases.

  - Cumulative, regional loss of agricultural land use.
- One potential positive impact of the development on agricultural resources and productivity was identified as:
  - Increased financial security for farming operations from land rental to energy facility.
- All potential impacts (positive and negative) associated with the proposed development were assessed as having **low or very low significance after mitigation.**
- The overall significance of the potential impact on agricultural resources for the construction, operation and decommissioning phases is assessed **as low to very low** (with mitigation actions applied effectively).
- The outcome of the site sensitivity verification and assessment therefore confirm the current use of the land as Agriculture and environmental sensitivity **as low** as identified by the National Web-Based Environmental Screening Tool. Therefore, a Compliance Statement was undertaken in accordance with the requirements of the Agricultural Protocol for Onshore Wind and/or Solar PV Energy Generation Facilities where the Electricity Output is 20 MW or more (GG 43110 / GNR 320, 20 March 2020).
- Recommended mitigation measures include implementation of an effective system of storm water run-off control; the maintenance of vegetation cover to mitigate erosion; and topsoil stripping, stockpiling and re-spreading to mitigate loss of topsoil on disturbed areas.

Cumulative impacts

In quantifying the cumulative impact, the area of land taken out of grazing as a result of all thirteen developments plus the 300 MW of this development (total generation capacity of 1,993 MW) will amount to a total of approximately 964 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the DEA Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 50 km radius (approximately 785,300 ha), this amounts to 0.12% of the surface area. That is well within an acceptable limit in terms of loss of low potential agricultural land, of which there is no scarcity in the country.

Due to all of the considerations discussed above, the potential cumulative impact of loss of agricultural land use is assessed as having **low significance before and after mitigation**. **In terms of cumulative impact, therefore, it is recommended that the development be approved.**

Impact assessment

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Loss of agricultural land use.	• None	Low	Low
Soil degradation.	• Storm water run-off control; • Maintain vegetation cover; and • Strip, stockpile and re-spread topsoil.	Low	Low
OPERATIONAL PHASE: DIRECT IMPACTS			
Increased financial security for farming operations.	• None	Low (+)	Low (+)
DECOMMISSIONING PHASE: DIRECT IMPACTS			
Soil degradation.	• Storm water run-off control; • Maintain vegetation cover; and • Strip, stockpile and re-spread topsoil.	Low	Low
CUMULATIVE IMPACT			
Regional loss of agricultural land use.	• None	Very low	Very low

Comparative assessment of alternatives

Because of the agricultural uniformity and low potential, there is no material difference between the agricultural impact of the BESS and on-site SS complex area alternatives, i.e. Option 1 or Option 2, and therefore both these alternatives are considered acceptable.

Concluding statement

- The conclusion of this assessment is that the proposed development of the Komas WEF and associated infrastructure **will not have an unacceptable negative impact on the agricultural production capability of the site**. This is substantiated by the facts that the amount of agricultural land loss is within the allowable development limits, and that the proposed development poses a low risk in terms of causing soil degradation.
- **The proposed development is therefore acceptable and it is recommended that from an agricultural impact point of view, it can be approved.**

Socio-Economic Assessment

The Socio-Economic Impact Assessment was undertaken by Tony Barbour and Schalk van der Merwe of Tony Barbour Environmental Consulting to inform the outcome of this BA from a socio-economic perspective. The Socio-Economic Impact Assessment was undertaken in accordance with

Appendix 6 of the NEMA EIA Regulations, 2014, as amended, as there is no relevant Protocol or Theme on the Screening Tool. The complete Socio-Economic Assessment is included in Appendix C.8 of this report. A summary of the assessment is provided below.

Summary of benefits of the proposed Komas WEF project

The findings of the Socio-Economic Impact Assessment indicate that the development of the proposed Komas WEF will create employment and business opportunities for locals during both the construction and operational phase of the project. The establishment of a Community Trust will also benefit the local community. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated with a coal based energy economy and the challenges created by climate change, represents a significant positive social benefit for society as a whole. The findings of the Socio-Economic Impact Assessment also indicate that the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) has resulted in significant socio-economic benefits, both at a national level and a local, community level. These benefits are linked to Foreign Direct Investment (FDI), local employment and procurement and investment in local community initiatives. The establishment of Community Trusts associated with renewable energy projects also have the potential to create significant benefits for local rural communities. These benefits should be viewed within the context of the limited economic opportunities in the area and the impact of the decline in the mining sector on the local economy. The proposed Komas WEF site is also located within the Springbok REDZ (REDZ 8). The area has therefore been identified as suitable for the establishment of Renewable Energy Facilities (REFs).

Summary of benefits of the proposed Komas WEF project

- **Impacts associated with the presence of construction workers on local communities**

Experience has shown that the presence of construction workers can pose a potential risk to family structures and social networks. These risks however tend to be more pronounced in isolated rural areas. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. The risks are linked to:

- An increase in alcohol and drug use;
- An increase in crime levels;
- The loss of girlfriends and/or wives to construction workers;
- An increase in teenage and unwanted pregnancies;
- An increase in prostitution; and
- An increase in sexually transmitted diseases (STDs), including HIV.

However, while the risk does exist, the majority of the low skilled (136) and semi-skilled (76) work opportunities associated with the construction phase are likely to benefit members from the local community. If these opportunities are taken up by local residents the potential impact on the local family and social network will be low as these workers come from local community. As indicated in the Overview of the IPPPP (March 2019), in terms of benefits for local communities, significantly more people from local communities were employed during construction than was initially planned. The expectation for local community participation was 13 058 job years. To date 18 253 job years have been realised (i.e. 140% more than initially planned), with 26 projects still in construction. The likelihood of local community members being employed during the construction phase is therefore high. Employing local residents to will also reduce the need to provide accommodation for construction workers in Kleinsee and or Springbok.

Employing members from the local community to fill the low-skilled job categories will reduce the risk and mitigate the potential impact on the local communities. The use of local residents to fill the low skilled job categories will also reduce the need to provide accommodation for construction workers in local towns in the area, such as Komaggas, Buffelsrivier, Kleinsee and Springbok. The non-local skilled workers (38) are likely to be accommodated in local guest facilities in the area, such as Die Houthoop Guest Farm. The presence of an additional 38 or so worker's over a period of 24 months is unlikely to have a significant impact on local family networks and structures in the area.

In terms of potential threat to the families of local farm workers in the vicinity of the site, the risk is likely to be low. This is due to the low number of permanent and temporary farm workers on local farms in the area. The potential risk is therefore likely to be limited. The risks can also be effectively mitigated by ensuring that the movement of construction workers on and off the site is carefully controlled and managed. However, given the nature of construction projects it is not possible to totally avoid these potential impacts at an individual or family level.

While the risks associated with construction workers at a community level will be low, at an individual and family level they may be significant, especially in the case of contracting a sexually transmitted disease or an unplanned pregnancy. However, it will not be possible to avoid this. This potential risk should also be viewed within the context of the socio-economic benefits associated with the creation of employment opportunities for locals.

- **Impacts related to the potential influx of job-seekers**

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become "economically stranded" in the area or decide to stay on irrespective of finding a job or not. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the manner in which they conduct themselves can impact on the local community.

Experience from other projects has also shown that the families of job seekers may accompany individual job seekers or follow them at a later date. In many cases the families of the job seekers that become "economically stranded" and the construction workers that decided to stay in the area, subsequently moved to the area. The influx of job seekers to the area and their families can also place pressure on the existing services in the area, specifically low-income housing. In addition to the pressure on local services the influx of construction workers and job seekers can also result in competition for scarce employment opportunities. Further secondary impacts included increase in crime levels, especially property crime, as a result of the increased number of unemployed people. These impacts can result in increased tensions and conflicts between local residents and job seekers from outside the area.

These issues are similar to the concerns associated with the presence of construction workers and are discussed above. However, in some instances the potential impact on the community may be greater given that they are unlikely to have accommodation and may decide to stay on in the area. In addition, they will not have a reliable source of income. The risk of crime associated with the influx of job seekers may therefore be greater.

However, the potential for economically motivated in-migration and subsequent labour stranding in the area linked to the proposed project is likely to be low. This is due to the location of the site, the relatively small size of the project (300 MW), the limited employment opportunities (~250) and short duration of the construction phase (approximately 24 months). There are limited economic opportunities in area, specifically Komaggas, Buffelsrivier, Kleinsee and Springbok. The risks associated with job seekers being attracted to and staying on in the area will therefore be low.

More potential negative socio-economic impacts to occur during the construction phase are listed in Section D (D.2.9.3) of this BA report.

Cumulative impacts

Cumulative impact on sense of place

Based on the findings of the Socio-Economic Assessment the potential visual impact on the areas sense of place and rural character was not raised as a concern by local landowners and tourism representatives interviewed. The site is also located within the Springbok REDZ 8. The area has therefore been identified as suitable for the establishment of REFs, including WEFs. The significance of the potential cumulative impact on the areas character and sense of place is therefore regarded as **Low Negative**.

The findings of the VIA rate the significance of the cumulative impact on the areas sense of place as **Moderate Negative**. The VIA notes however that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists.

However, the potential impact of WEFs on the landscape is an issue that does need to be considered, specifically given South African’s strong attachment to the land and the growing number of WEF applications. The Environmental Authorities should therefore be aware of the potential cumulative impacts when evaluating applications and the potential implications for other land uses, specifically game farming and associated tourist activities.

Cumulative impact on services

The establishment of the proposed Komas WEF and the other REFs in the NKLM and NDM may place pressure on local services, specifically medical, education and accommodation. This pressure will be associated with the potential influx of workers to the area associated with the construction and operational phases of renewable energy projects proposed in the area, including the proposed Komas WEF. The potential impact on local services can be mitigated by employing local community members. With effective mitigation the significance of the impact is rated as **Low Negative.**

In addition, as indicated below, this impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of renewable energy as an economic driver in the area.

Cumulative impact on local economies

In addition to the potential negative impacts, the establishment of the proposed Komas WEF and other REFs in the area also has the potential to create a number of socio-economic opportunities for the NKLM and NDM, which, in turn, will result in a positive social benefit. The positive cumulative impacts include creation of employment, skills development and training opportunities, creation of downstream business opportunities. The Community Trusts associated with each project will also create significant socio-economic benefits. These benefits should also be viewed within the context of the limited economic opportunities in the area and the impact of the decline in the mining sector in recent years. This significance of this benefit is rated as **High Positive** with enhancement.

Summary of Impact Assessment

A summary of the potential direct and cumulative impacts for the construction, operational and decommissioning phases are identified below. The full assessment is included in the Socio-Economic Impact Assessment (Appendix D.8 of this BA Report).

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Creation of employment and business opportunities, and opportunity for skills development and on-site training.	**Employment** • Where reasonable and practical the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories; Due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. • Where feasible, efforts should be made to employ local contactors that are compliant with B-BBEE criteria. • Before the construction phase commences the proponent should meet with representatives from the NKLM and NDM to establish the existence of a skills database for the area. If such a database exists, it should be made available to the contractors appointed for the construction phase. • The local authorities, relevant community representatives and local farmers should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project. • Where feasible a training and skills development programmes for local workers should be initiated prior to the initiation of the construction phase. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.	**Moderate (+)**	**Moderate (+)**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	Business • The proponent should liaise with the NKLM and NDM with regards the establishment of a database of local companies, specifically B-BBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work; • Where possible, the proponent should assist local B-BBEE companies to complete and submit the required tender forms and associated information; and • The NKLM and NDM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project. Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.		
Impacts associated with the presence of construction workers on local communities (including an increase in alcohol and drug use; an increase in crime levels; and increase in teenage and unwanted pregnancies and an increase in prostitution and STDs, including	• Where possible the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories. • The proponent should consider the need for establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
HIV).	include key stakeholders, including representatives from the NKLM, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community and farm workers associated with construction workers. • The proponent and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation. • The proponent and contractor (s) should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. • The contractor should provide transport to and from the site on a daily basis for low and semi-skilled construction workers. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site. • Where necessary, the contractors should make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks. • It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.		
Impacts related to the potential influx of job-seekers on local	It is not possible to prevent job seekers from coming to the area in search of a job. However, due to the location of the site the potential influx of job seekers	**Low**	**Low**

Impact	**Mitigation measures**	**Significance before mitigation**	**Significance after mitigation**
communities. Potential impact on family structures, social networks and community services.	to the area as a result of the proposed Komas WEF will be low. In addition: • The proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities.		
Increased risks to safety, livestock and farming infrastructure and operations associated with the construction related activities and presence of construction workers on the site.	• The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase proven to be associated with the construction activities for the WEF will be compensated for. The agreement should be signed before the construction phase commences. • Contractors appointed by the proponent should provide daily transport for workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties. • The proponent should consider the option of establishing a MF that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site. • The proponent should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below). • The EMPrs should outline procedures for managing and storing waste on	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	site, specifically plastic waste that poses a threat to livestock if ingested. • Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms. • Contractors appointed by the proponent must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation. • The housing of construction workers on the site should be limited to security personnel.		
Increased risk of grass fires associated with construction related activities.	• The proponent should enter into an agreement with the local farmers in the area whereby losses associated with fires that can be proven to be associated with the construction activities for the WEF will be compensated for. The agreement should be signed before the construction phase commences. • Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. • No smoking should be permitted on site, except in designated areas. • Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	of fires is greater. In this regard special care should be taken during the higher-risk dry, windy summer months. • Contractor to provide adequate fire-fighting equipment on-site. • Contractor to provide fire-fighting training to selected construction staff. • No construction staff, with the exception of security staff, to be accommodated on site overnight. • As per the conditions of the Code of Conduct, in the event of a fire proven to be caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.		
Noise, dust, waste and safety impacts of construction related activities and vehicles.	• As far as possible, the transport of components to the site along the N7 should be planned to avoid weekends and holiday periods. • The contractor should inform local farmers and representatives from the NLM and NDM Tourism of dates and times when abnormal loads will be undertaken. • The contractor must ensure that damage caused by construction related traffic to the gravel public roads and local, internal farm roads is repaired on a regular basis throughout the construction phase. The costs associated with the repair must be borne by the contractor. • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis, adhering to speed limits and ensuring that vehicles used to transport sand and building materials are	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	fitted with tarpaulins or covers. • All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. • The Contractor should ensure that workers are informed that no waste can be thrown out of the windows while being transported to and from the site. Workers who throw waste out windows should be fined. • The Contractor should be required to collect waste along access roads on a weekly basis. • Waste generated during the construction phase should be transported to the local permitted landfill site. • EMPr measures (and penalties) should be implemented to ensure farm gates are closed at all times. • EMPr measures (and penalties) should be implemented to ensure speed limits are adhered to at all times.		
Impacts on productive farmland due to construction activities.	• The location of wind turbines, access roads, laydown areas etc. should be informed by the findings of the Agriculture and Terrestrial Biodiversity (flora) specialist studies. In this regard areas of sensitive vegetation and soils of high agriculture potential should be avoided. • The footprint areas for the establishment of individual wind turbines should be clearly demarcated prior to commencement of construction activities. All construction related activities should be confined to the demarcated area and minimised where possible. • An ECO should be appointed to monitor the establishment phase of the	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	construction phase. • All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase. The rehabilitation plan should be informed by input from the soil scientist and discussed with the local farmer. • The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. • The implementation of the Rehabilitation Programme should be monitored by the ECO. • All workers should receive training/ briefing on the reasons for and importance of not driving in undesignated areas. • EMPr measures (and penalties) should be implemented to strictly limit all vehicle traffic to designated roads and construction areas. Under no circumstances should vehicles be allowed to drive into the veld. • Disturbance footprints should be reduced to the minimum. • Compensation should be paid by the Project Developer to farmers that suffer a permanent loss of land due to the establishment of the WEF. Compensation should be based on accepted land values for the area.		
OPERATIONAL PHASE: DIRECT IMPACTS			
Establishment of clean renewable energy infrastructure.	Should the project be approved the proponent should: • Implement a skills development and training program aimed at maximizing	**High (+)**	**High (+)**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	the number of employment opportunities for local community members. • Maximise opportunities for local content, procurement and community shareholding. • Consider establishing a visitor centre.		
Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training.	The enhancement measures listed above, i.e. to enhance local employment and business opportunities during the construction phase, also apply to the operational phase. In addition: • The proponent should implement a training and skills development programme for locals during the first five years of the operational phase. The aim of the programme should be to maximise the number of South Africans and locals employed during the operational phase of the project. • The proponent, in consultation with the NKLM and NDM, should investigate the options for the establishment of a Community Development Trust (see below).	**Low (+)**	**Moderate (+)**
Benefits associated with the establishment of a Community Trust.	• The NKLM and NDM should be consulted as to the structure and identification of potential trustees to sit on the Trust. The key departments in the NKLM and NDM that should be consulted including the Municipal Managers Office, IDP Manager and LED Manager. • Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community. • Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from	**Moderate (+)**	**High (+)**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	the WEF.		
Benefits for affected landowners through the generation of income.	• Implement agreements with affected landowners.	**Moderate (+)**	**Low (+)**
The visual impacts and associated impact on sense of place and rural character of the landscape.	• The recommendations contained in the VIA should be implemented. • It is recommended that the Project Applicant meets with the affected landowners to discuss the possibility of relocating wind turbines that have the highest potential visual impact.	**Moderate**	**Low**
Impact on property values and operations.	• The recommendations contained in the VIA should be implemented. • It is recommended that the Project Applicant meets with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact.	**Low**	**Low**
Impact on tourism.	• The recommendations contained in the VIA should be implemented.	**Low (-) & (+)**	**Low (-) & (+)**
DECOMMISSIONING PHASE: DIRECT IMPACTS			
Social impacts associated with retrenchment including loss of jobs, and source of income.	• The proponent should ensure that retrenchment packages are provided for all staff retrenched when the WEF is decommissioned. • All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning. • The proponent should investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20-year operational life of the	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure. Alternatively, the funds from the sale of the WEF components as scrap metal should be allocated to the rehabilitation of the site.		
CUMULATIVE IMPACTS			
Visual impacts associated with the establishment of more than one WEF and the potential impact on the area's rural sense of place and character of the landscape.	• The recommendations contained in the VIA should be implemented.	**Moderate**	**Low**
Impact on local services and accommodation. The establishment of a number of renewable energy facilities in the NKLM will place pressure on local services, specifically medical, education and accommodation.	• The Northern Cape Provincial Government, in consultation with the NKLM and NDM and the proponents involved in the development renewable energy projects in the area should consider establishing a Development Forum to co-ordinate and manage the development and operation of REFs in the area, with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues should be addressed in the Integrated Development Planning process undertaken by the NKLM and NDM.	**Moderate**	**Low**
Impact on local economy. The establishment of a number of wind energy facilities in the NKLM will	• The proposed establishment of suitably sited REFs within the NKLM and NDM should be supported.	**Moderate (+)**	**High (+)**

Impact	**Mitigation measures**	**Significance before mitigation**	**Significance after mitigation**
create employment, skills development and training opportunities, creation of downstream business opportunities.			

Comparative assessment of alternatives

The BESS and SS complex area Option 1 and Option 2 alternatives have been assessed and both are found to be acceptable from a socio-economic perspective and may proceed as none are fatally flawed.

Concluding statement

The establishment of the proposed Komas WEF and associated infrastructure is strongly supported by the findings of the Socio-Economic Impact Assessment.

Noise Assessment

The Noise Assessment was undertaken by Morné De Jager of Enviro-Acoustic Research cc (EAR) inform the outcome of this BA from a noise perspective. The Noise Specialist Assessment was undertaken in terms of the requirements of the Noise Protocol as per GN 320 published on 20 March 2020 in GG No. 43110. The complete Noise Assessment is included in Appendix C.9 of this report. A summary of the Noise Assessment is provided below.

Summary of affected environment

The study area is very remote area with little infrastructure. The study area, and indeed entire farm portion, lacks any sign of development, although some recent/historical materials did betray a historical presence on the land.

The online screening tool identified a number of areas with a very high noise sensitivity as indicated below (Figure D.1 of the Noise Assessment):

- Noise Sensitive Development (NSD) K1 is located approximately 1,475 m to the west from the closest WTG, with two WTGs positioned within 2,000 m from this NSD. This dwelling is permanently used for residential purposes as confirmed during the Noise Assessments for the proposed Namas and Zonnequa WEFs;
- NSD K2 is located around 1,900 m to the east of one WTG (the only WTG within 2,000 m). The farmhouse is occasionally used by the land owner though the smaller dwelling is permanently occupied by the farm employee; and
- NSD K3 is located approximately 2,075 m to the west from the closest WTG, with no WTG positioned within 2,000 m from this NSD. This dwelling is permanently used for residential purposes as confirmed during the Noise Assessment for the Namas and Zonnequa WEFs.

The author agrees with the site sensitivity as highlighted by the online Screening Tool, i.e. areas of very high noise sensitivity were identified on the proposed Komas WEF site. While there are no WTGs located within this potential very high noise sensitive areas, a Noise Specialist Assessment was completed as there are WTGs within 2,000 m from NSDs (as per the requirements of SANS 10328:2008).

The potential noise impact associated with the construction, operation and decommissioning of the proposed Komas WEF was evaluated using a sound propagation model. Conceptual scenarios were developed for the construction and operational phases.

Cumulative impacts

Considering the contribution from the Komas WEF on total cumulative noises, if the Namas, Zonnequa, Kleinzee, Gromis, Project Blue and Kap Vley WEFs are to be developed, it is well less than 3 dBA. The potential significance of the cumulative noise impact from these WEFs operating simultaneously at night is assessed to be very low.

Summary of Impact assessment

The following potential direct, indirect and cumulative impacts for the construction, operational and decommissioning phases were identified.

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Increase in ambient sound levels due to construction activities during the day.	• None. Significance of noise impact is very low for the scenario as conceptualised.	**Very Low**	**Very Low**
Increase in ambient sound levels due to construction activities at night.	• The Project Developer should investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction activities are taking place; and • The Project Developer should minimise night-time construction traffic if the access road is closer than 150 m from any NSD, alternatively, the access road must be relocated further than 150 m from NSDs (night-time traffic passing occupied houses).	**Low**	**Low**
Increase in ambient sound levels due to construction of roads.	• The Project Developer should investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction activities are taking place; and • The Project Developer should minimise night-time construction traffic if the access road is closer than 150 m from any NSD, alternatively, the access road must be relocated further than 150 m from NSDs (night-time traffic passing occupied houses).	**Very Low**	**Very Low**
Increase in ambient sound levels due to day-time construction traffic.	• It is recommended that new roads not be constructed within 150 m from occupied dwellings used for residential purposes at night.	**Very Low**	**Very Low**
OPERATIONAL PHASE: DIRECT IMPACTS			

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
Increase in ambient sound levels due to air-borne noise from the wind turbines operating simultaneously during the day.	• No mitigation required or recommended for daytime operational activities.	**Very Low**	**Very Low**
Increase in ambient sound levels due to air-borne noise from the wind turbines operating simultaneously at night.	• The Project Developer should investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where operational activities are taking place.	**Low**	**Low**
DECOMMISSIONING PHASE: DIRECT IMPACT			
Increase in ambient sound levels due to air-borne noise from various decommissioning activities taking place simultaneously during the day.	• No mitigation required or recommended for decommissioning activities.	**Very Low**	**Very Low**
CUMULATIVE IMPACT			
OPERATIONAL PHASE: INDIRECT IMPACT			
Increase in ambient sound levels due to air-borne noise from the wind turbines from various WEFs operating at night.	• The Project Developer should investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where operational activities are taking place.	**Very Low**	**Very Low**

Comparative assessment of alternatives

There is no difference in the potential noise impact associated with the BESS and on-site SS complex area alternatives (Option 1 and Option 2). Therefore, both alternatives are acceptable from a noise perspective.

Concluding statement

Considering the low to very low significance of the potential noise impacts (with mitigation, inclusive of cumulative impacts) for the proposed Komas WEF and associated infrastructure, it is recommended that the proposed Komas WEF and associated infrastructure be authorised from a noise perspective.

Transport Impact Assessment

The Transport Impact Assessment (TIA) was undertaken by Adrian Johnson of JG AFRIKA (Pty) Ltd to inform the outcome of this BA from a transport perspective. The TIA was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended. The complete TIA is included in Appendix C.10 of this report. A summary of the TIA is provided below.

Summary of potential impacts

- The traffic generated during the construction phase, although significant, will be temporary and impacts are considered to be negative and of high significance before and of **moderate significance** after mitigation.
- During operational phase of the proposed Komas WEF, it is anticipated that staff and security personnel will visit the facility periodically. It is assumed that approximately less than ten (10) full-time employees will be stationed on site. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.
- The traffic generated during the decommissioning phase will be less than the traffic generated during the construction phase and the impact on the surrounding road network will also be negative and of high significance before and of **moderate significance** after mitigation.

Cumulative impacts

To assess the cumulative impact, it was assumed that all WEFs within 50 km currently proposed and authorised, would be constructed at the same time. This is the precautionary approach as in reality; these projects would be subject to a highly competitive bidding process and not all the projects may be selected to enter into a PPA with Eskom. There are currently nine approved WEFs and one approved solar Photovoltaic (PV) facility. A separate BA is currently being undertaken for the proposed Gromis WEF. The Klipdam and Nigramoep solar PV applications are in progress. Even if all the facilities are constructed and decommissioned at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.

The construction and decommissioning phases of a WEF are the only significant traffic generators. The duration of these phases is short term i.e. the potential impact of the traffic generated during the construction and decommissioning phases of the proposed Komas WEF traffic on the surrounding road network is temporary and WEFs, when operational, do not add any significant traffic to the road network. The cumulative impacts were assessed to be of high significance before mitigation and moderate significance after mitigation.

Summary of Impact assessment

The following potential direct and cumulative impacts for the construction and decommissioning phases were identified. The potential traffic impacts during the operational phase are minimal. The full assessment is included in the Transport Impact Assessment (Appendix C.9 of the BA Report).

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Traffic congestion and delays. Noise and dust pollution.	• Stagger turbine component delivery to site. • Reduce the construction period. • Stagger the construction of the turbines. • The use of mobile batch plants and quarries in close proximity to the site would decrease the impact on the surrounding road network. • Staff and general trips should occur outside of peak traffic periods. • Maintenance of haulage routes. • Design and maintenance of internal roads. • Dust suppression.	**High**	**Moderate**
OPERATIONAL PHASE			
The traffic generated during this phase will be minimal and will have a nominal impact on the surrounding road network.			
DECOMMISSIOING PHASE: DIRECT IMPACTS			
Traffic congestion and delays. Noise and dust pollution	• Stagger turbine component transportation. • Reduce the construction period. • Stagger the decomissioningof the turbines. • Staff and general trips should occur outside of peak traffic periods. • Maintenance of haulage routes and internal roads. • Dust suppression.	**High**	**Moderate**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CUMULATIVE IMPACTS			
Traffic congestion and delays. Noise and dust pollution.	• Stagger turbine component transportation. • Reduce the construction period. • Stagger the construction of the turbines. • Staff and general trips should occur outside of peak traffic periods. • Dust suppression.	**High**	**Moderate**

Comparative assessment of alternatives

It should be noted that there is no difference between the BESS and on-site SS complex area Option 1 and Option 2 alternatives from a transport perspective. Both alternatives are deemed acceptable and may proceed as none are fatally flawed.

Specialist	Option 1	Option 2
Transport	No Preference	No Preference
	There is no difference between the alternatives from a Transport perspective. Both alternatives are acceptable.	

Concluding statement

Based on the findings of this assessment, the potential increase in traffic and the associated noise and dust pollution impacts have been rated as high before mitigation during the construction and decommissioning phases of the proposed Komas WEF. However, the phases will be short-term and the traffic volumes are expected to be low. Therefore, the significance of the impacts can be reduced to moderate after mitigation. It is envisaged that most materials, water, plant, services and people will be procured within a 60 km radius from the proposed Komas WEF.

The potential impacts associated with proposed Komas WEF and associated infrastructure are acceptable from a transport perspective and it is therefore recommended that the proposed facility be authorised, provided that the proposed recommendations and mitigation measures are adhered to.

Geotechnical Assessment

The Geotechnical Impact Assessment was undertaken by Robert Leyland of WSP Environmental (Pty) Ltd to inform the outcome of this BA from a Geotechnical perspective. The Geotechnical Impact Assessment was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended. The complete Geotechnical Impact Assessment is included in Appendix C.11 of this report. A summary of the assessment is provided below.

Summary of affected environment

The most significant geotechnical condition that will affect the development is the expected hard excavation conditions. It is therefore recommended that shallow foundations that are anchored to the bedrock are considered. This will require a detailed study of the rock mass and pedocrete properties at the wind turbine locations. The excavation conditions will also affect the trench excavation costs negatively.

Minimal slope stability issues are expected as slope areas are minimal. No other problem soils or problem geotechnical conditions are expected on site. Access roads can be developed as gravel road with suitable wearing-course to protect the subgrade likely being obtained from local calcrete deposits.

The impacts of the development have been assessed and all geotechnical impacts are considered to have a very low significance before and after mitigation.

The following potential direct impacts for the construction and decommissioning phases were identified. The potential noise impacts during the operational phase are minimal.

Cumulative impacts

The cumulative impacts were assessed to be of very low significance before and after mitigation.

Summary of Impact Assessment

The following potential direct impacts for the construction and decommissioning phases were identified. The potential geotechnical impacts during the operational phase are minimal.

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Topsoil degradation.	Maintain vegetation cover as far as possible; strip, stockpile and re-spread topsoil. Proper construction management.	**Very Low**	**Very Low**
Disturbance of fauna and flora.	Foundation design to avoid blasting and deep excavation into sound rock.	**Very Low**	**Very Low**
Erosion and slope instability around structures.	Avoid steep slope areas, design any cuts slopes according to detailed geotechnical analysis.	**Very Low**	**Very Low**
Damage/destruction of the proposed development: Seismic activity.	Design according to expected peak ground acceleration.	**Very Low**	**Very Low**
OPERATIONAL PHASE			
No impacts have been identified during the operational phase.			
DECOMMISSIOING PHASE: DIRECT IMPACTS			
Topsoil degradation.	Maintain vegetation cover as far as possible; strip, stockpile and re-spread topsoil, Proper decommissioning management.	**Very Low**	**Very Low**
Disturbance of fauna and flora.	Foundation design to avoid blasting and deep excavation into sound rock.	**Very Low**	**Very Low**
Erosion and slope instability in areas where turbines are removed.	Fill any excavations or flatten any slopes that may form due to/during removing infrastructure.	**Very Low**	**Very Low**
CUMULATIVE IMPACTS			

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
Topsoil degradation	Maintain vegetation cover as far as possible; strip, stockpile and re-spread topsoil. Proper construction and decommissioning management.	**Very Low**	**Very Low**
Disturbance of fauna and flora	Foundation design to avoid blasting and deep excavation into sound rock in the construction and decommissioning phases.	**Very Low**	**Very Low**
Erosion and slope instability around existing and removed structures	Avoid steep slope areas, design any cuts slopes according to detailed geotechnical analysis during the construction phase.	**Very Low**	**Very Low**
Damage/destruction of the proposed development: Seismic activity.	Design according to expected peak ground acceleration during the construction phase.	**Very Low**	**Very Low**

<u>Comparative assessment of alternatives</u>

There is no preferred option between the BESS and SS complex area Option 1 or Option 2 alternatives with respect to the Geotechnical Impact Assessment. Both alternatives are favourable.

<u>Concluding statement</u>

The completed desktop assessment of the geotechnical conditions at the proposed development site of the Komas WEF has shown the site to be generally suitable for the proposed development. The **proposed development should, from a geotechnical impact perspective, be authorised.**

EAP'S RECOMMENDATION

No negative impacts have been identified within this BA that, in the opinion of the EAP who has conducted this BA process, should be considered "fatal flaws" from an environmental perspective, and thereby necessitate substantial re-design or termination of the project. This echoes the findings of the specialists as summarised above.

Section 24 of the Constitutional Act states that "everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development." Based on this, this BA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures, and monitoring requirements. These measures will be undertaken to promote conservation by avoiding the sensitive environmental features present on site and through appropriate monitoring and management plans (refer to the EMPrs included in Appendix G of this BA Report).

It is understood that the information contained in this BA Report and appendices is sufficient to make a decision in respect of the activity applied for.

Summary of Key Impact Assessment Findings

Based on the findings of the specialist studies, the proposed project is considered to have an overall low negative environmental impact and an overall low to moderate positive socio-economic impact (with the implementation of respective mitigation and enhancement measures). Table S.4 below provides a summary of the impact assessment for each phase of the proposed project **post mitigation for direct impacts**. Table S.5 provides the same information for the **cumulative impacts**.

As indicated in Table S.4, it is clear that the majority of the **direct negative impacts** were rated with a **low to very low post mitigation impact significance** for the **construction phase**, with only the Avifauna, Cultural Landscape and Transport impacts being rated with a **moderate significance**. In terms of the operational phase, the majority of the **direct negative impacts** were rated with a **low post mitigation impact significance**, with only the Avifauna, Bats and Visual impacts being rated with a **moderate significance**. The majority of the **direct negative impacts** for the decommissioning phase were rated with a **low post mitigation impact significance**, with only the Avifauna, Heritage (Archaeology and Cultural Landscape) and Transport impacts being rated with a **moderate significance.** In terms of **positive impacts**, the Socio-Economic impacts are rated as of **moderate significance** for the construction phase; and **moderate to high** for the operational phase.

Based on Table S.5, the majority of the **cumulative negative impacts** were rated with a **low post mitigation impact significance** for the **construction phase**, with only the Heritage (Cultural Landscape) and Transport impacts being rated with a **moderate significance**. The majority of the impacts for the **operational phase** are rated as **insignificant to low significance**, with visual and Heritage (Archaeology and Cultural Landscape) impacts being rated with a **moderate significance, and Avifauna and Bats** rated as **high significance**. During the decommissioning phase, cumulative impacts were not identified and/or were considered insignificant, however for those that were rated, it resulted in an overall **neutral and very low post mitigation impact significance**. In terms of **positive impacts**, the Socio-Economic impacts are rated with a **moderate significance** and Palaeontology impacts are rated with a low significance for the construction phase. For the operational phase, the Socio-Economic impacts are rated with a **moderate to high significance** and the Agriculture impacts are rated with a **low significance**.

Table S.4. Overall Impact Significance with the Implementation of Mitigation Measures for Direct Negative and Positive Impacts for the Komas WEF Project

Specialist Assessment	Construction Phase	Operational Phase	Decommissioning Phase
DIRECT NEGATIVE IMPACTS			
Terrestrial Biodiversity	**Low**	**Low**	**Low**
Aquatic Biodiversity	**Low**	**Low**	**Low**
Avifauna	**Moderate**	**Moderate**	**Moderate**
Bats	**Low**	**Moderate**	**Very Low**

Specialist Assessment	Construction Phase	Operational Phase	Decommissioning Phase
Visual	**Low**	**Moderate**	**Low**
Heritage (Archaeology and Cultural Landscape)	**Archaeology and graves: Very Low** **Cultural Landscape: Moderate**	**Low**	**Moderate**
Palaeontology	**Low**	**Insignificant and/or not identified and/or not applicable (N/A)**	**Insignificant and/or not identified and/or N/A**
Agriculture	**Low**	**N/A**	**Low**
Socio-Economic	**Low**	**Low**	**Low**
Noise	**Very Low**	**Very Low** **Low**	**Very Low**
Transport	**Moderate**	**Insignificant**	**Moderate**
Geotechnical	**Very Low**	**No impacts identified**	**Very Low**
DIRECT POSITIVE IMPACTS			
Agriculture	**Not applicable**	**Low (+)**	**Not applicable**
Palaeontology	**Low (+)**	**Insignificant and/or not identified and/or N/A**	**Insignificant and/or not identified and/or N/A**
Socio-Economic	**Moderate (+)**	**Moderate (+)** **High (+)**	**N/A**

Table S.5. Overall Impact Significance with the Implementation of Mitigation Measures for Cumulative Negative and Positive Impacts for the Komas WEF Project

Specialist Assessment	Construction Phase	Operational Phase	Decommissioning Phase
CUMULATIVE NEGATIVE IMPACTS			
Terrestrial Biodiversity	**Low**	**Low**	**Neutral**
Aquatic Biodiversity	**N/A**	**N/A**	**N/A**
Avifauna	**Insignificant and/or not identified and/or N/A**	**High**	**Insignificant and/or not identified and/or N/A**
Bats	**Low**	**Low** **High**	**Insignificant and/or not identified and/or N/A**
Visual	**Low**	**Moderate**	**Insignificant and/or not identified and/or N/A**
Heritage (Archaeology and	**Archaeology and**	**Moderate**	**Insignificant and/or**

Specialist Assessment	Construction Phase	Operational Phase	Decommissioning Phase
CUMULATIVE NEGATIVE IMPACTS			
Cultural Landscape)	**graves: Very Low** **Cultural Landscape: Moderate**		**not identified and/or N/A**
Palaeontology	**Low**	**Insignificant and/or not identified and/or N/A**	**Insignificant and/or not identified and/or N/A**
Agriculture	**Very Low**	**Insignificant and/or not identified and/or N/A**	**Insignificant and/or not identified and/or N/A**
Socio-Economic	**Low**	**Low**	**Insignificant and/or not identified and/or N/A**
Noise	**Insignificant and/or not identified and/or N/A**	**Very Low**	**Insignificant and/or not identified and/or N/A**
Transport	**Moderate**	**Insignificant**	**Insignificant**
Geotechnical	**Very Low**	**Very Low**	**Very Low**
CUMULATIVE POSITIVE IMPACTS			
Palaeontology	**Low (+)**	**Insignificant and/or not identified and/or N/A**	**Insignificant and/or not identified and/or N/A**
Agriculture	**N/A**	**Low (+)**	**N/A**
Socio-Economic	**Moderate (+)**	**Moderate (+)** **High (+)**	**Insignificant and/or not identified and/or N/A**

All of the specialists have recommended that the proposed project receives EA, if the recommended mitigation measures are implemented.

Overall Environmental Impact Statement

Taking into consideration the findings of the BA process, as well as the fact that the proposed **Komas WEF project** will be located within Springbok REDZ (REDZ 8), it is the opinion of the EAP, that the project benefits outweigh the costs and that the project will make a positive contribution to sustainable infrastructure development in the Kleinsee and Komaggas regions. Provided that the specified mitigation measures are applied effectively, it is recommended that the proposed project receives EA in terms of the NEMA EIA Regulations, 2014, as amended.

Cumulative Environmental Impact Statement

The cumulative impacts have been assessed by all the specialists on the project team. The cumulative assessment included approved renewable energy projects (i.e. wind and solar

Photovoltaic (PV)) within a 50 km radius of the proposed Komas WEF project site. No cumulative impacts have been identified that were considered to be fatal flaws. The specialists recommended that the project receives EA in terms of the NEMA EIA Regulations, 2014, as amended, including consideration of cumulative impacts. It is also important to note that the proposed project site is located within the Springbok REDZ (REDZ 8), which supports the development of large-scale wind and solar energy developments. The proposed project is therefore in line with the national planning vision for wind and solar development in South Africa.

Summary of where requirements of Appendix 1 of the NEMA EIA Regulations, 2014, as amended (GN R326) are provided in this BA Report

APPENDIX 1	YES / NO	SECTION IN BA REPORT
Objective of the basic assessment process 2) The objective of the basic assessment process is to, through a consultative process- a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context; b) identify the alternatives considered, including the activity, location, and technology alternatives; c) describe the need and desirability of the proposed alternatives; d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the site and locations within site and the risk of impact of the proposed activity and technology alternatives on these aspects to determine- (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and (ii) 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; and e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the site and location identified through the life of the activity to- (i) identify and motivate a preferred site, activity and technology alternative; (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and (iii) identify residual risks that need to be managed and monitored.	Yes	**Section A of the report includes the Introduction, legislative review, alternatives assessment and needs and desirability.** **Section D includes a summary of the specialist studies and associated impact assessments undertaken.**
Scope of assessment and content of basic assessment reports 3) (1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include: (a) details of: (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Yes	**Section A.2 and Appendix E**

APPENDIX 1	YES / NO	SECTION IN BA REPORT
(b) the location of the activity, including: (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	**Yes**	**Section A.1 and Appendix A**
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	**Yes**	**Section A.1 and Appendix A**
(d) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for; and a description of the activities to be undertaken including associated structures and infrastructure;	**Yes**	**Section A.5 and Section A.10**
(e) a description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	**Yes**	**Section A.3 and A.9**
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;	**Yes**	**Section A.13**
(g) a motivation for the preferred site, activity and technology alternative;	**Yes**	**Section A.12**
(h) A full description of the process followed to reach the proposed preferred alternative within the site, including - (i) details of all the alternatives considered;	**Yes**	**Section A.12**
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	**Yes**	**Section C**
(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;	**Yes**	**Section C**
(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	**Yes**	**Section A.12 and Section B**
(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	**Yes**	**Section A.12 and Section D**

APPENDIX 1	YES / NO	SECTION IN BA REPORT
irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;		
(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;	**Yes**	
(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;	**Yes**	
(viii) the possible mitigation measures that could be applied and level of residual risk;	**Yes**	
(ix) the outcome of the site selection matrix;	**Yes**	
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	**Yes**	
(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.	**Yes**	**Section A.12**
(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- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	**Yes**	**Executive Summary; Section D and Appendix C**
(j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	**Yes**	**Section D and Appendix C**
(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;	**Yes**	**Section D and Section E**
(l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the	**Yes**	**Executive Summary, Section D, Section E and Appendix A.5**

APPENDIX 1	YES / NO	SECTION IN BA REPORT
proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;		
(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	Yes	**Section D and Appendix C**
(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;	Yes	**Section E**
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Yes	**Please refer to each specialist study included in Appendix C**
(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;	Yes	**Section E**
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	X	**Not Applicable**
(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; (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 and affected parties; and	Yes	**Appendix E**
(s) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	X	**N/A**
(t) any specific information that may be required by the competent authority; and	Yes	**Appendix J**
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	X	**N/A**
2) Where a government notice *gazetted* by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply.	Yes	**Refer to Section A.9 for a breakdown of the relevant gazettes.**

SECTION A: INTRODUCTION, PROJECT DESCRIPTION; ALTERNATIVES; LEGISLATION AND SCREENING TOOL

A.1 Introduction

The Project Applicant, Genesis ENERTRAG Komas (Pty) Ltd (hereafter referred to as the "Project Applicant"), is proposing to design, construct and operate the Komas Wind Energy Facility (WEF) and associated infrastructure near Kleinsee in the Northern Cape Province. The proposed project is located approximately 35 km southeast of Kleinsee and 53 km southwest of Springbok. The locality of the proposed project is depicted in Figure F.1. The proposed project is located within the Nama Khoi Local Municipality, which falls within the Namakwa District Municipality. The proposed Komas WEF will have a capacity of up to 300 MW and will comprise of up to 50 Wind Turbine Generators (WTGs).

The associated infrastructure includes a solid state lithium-ion Battery Energy Storage System (BESS) and various structures, buildings and electrical grid infrastructure (EGI) such as, but not limited to an on-site 33/132 kV Substation (SS). Two site alternatives for the BESS and on-site SS (known as the BESS and SS complex) (i.e. Option 1 and Option 2) have been identified for assessment as part of the BA process (Figure A.1). A construction laydown area was also identified and includes the Operation and Maintenance (O&M) buildings.

The proposed Komas WEF project will be developed on the following farm portions as indicated in Table A.1. The approximate coordinates of the boundary points of the proposed Komas WEF project as well as the centre points for the preferred BESS and SS complex are included in Appendix A.3 of this BA report.

The proposed Komas WEF project will be developed on the following farm portions as indicated in Table A.1:

Table A.1. Affected Farm Portion Details

Farm Name	21 Digit Code	Parcel Number
Portion 1 of the Farm Zonnekwa No.326	C0530000000032600001	326
Portion 2 of the Farm Zonnekwa No.328	C0530000000032800002	328
Portion 3 of the Farm Zonnekwa No.328	C0530000000032800003	328
Portion 4 of the Farm Zonnekwa No.328	C0530000000032800004	328
Portion 4 of the Farm Kap Vley No.315	C0530000000031500004	315

The Project Applicant is also proposing to develop a 132 kV power line, a 33/132 kV Eskom Switching SS and a Collector SS (if required) to feed the electricity generated by the proposed Komas WEF into the national grid at the Gromis Main Transmission Substation (MTS) (Figure A.1). These electrical infrastructure components will be assessed as part of a **separate application and BA process to be undertaken by the Project Applicant.**

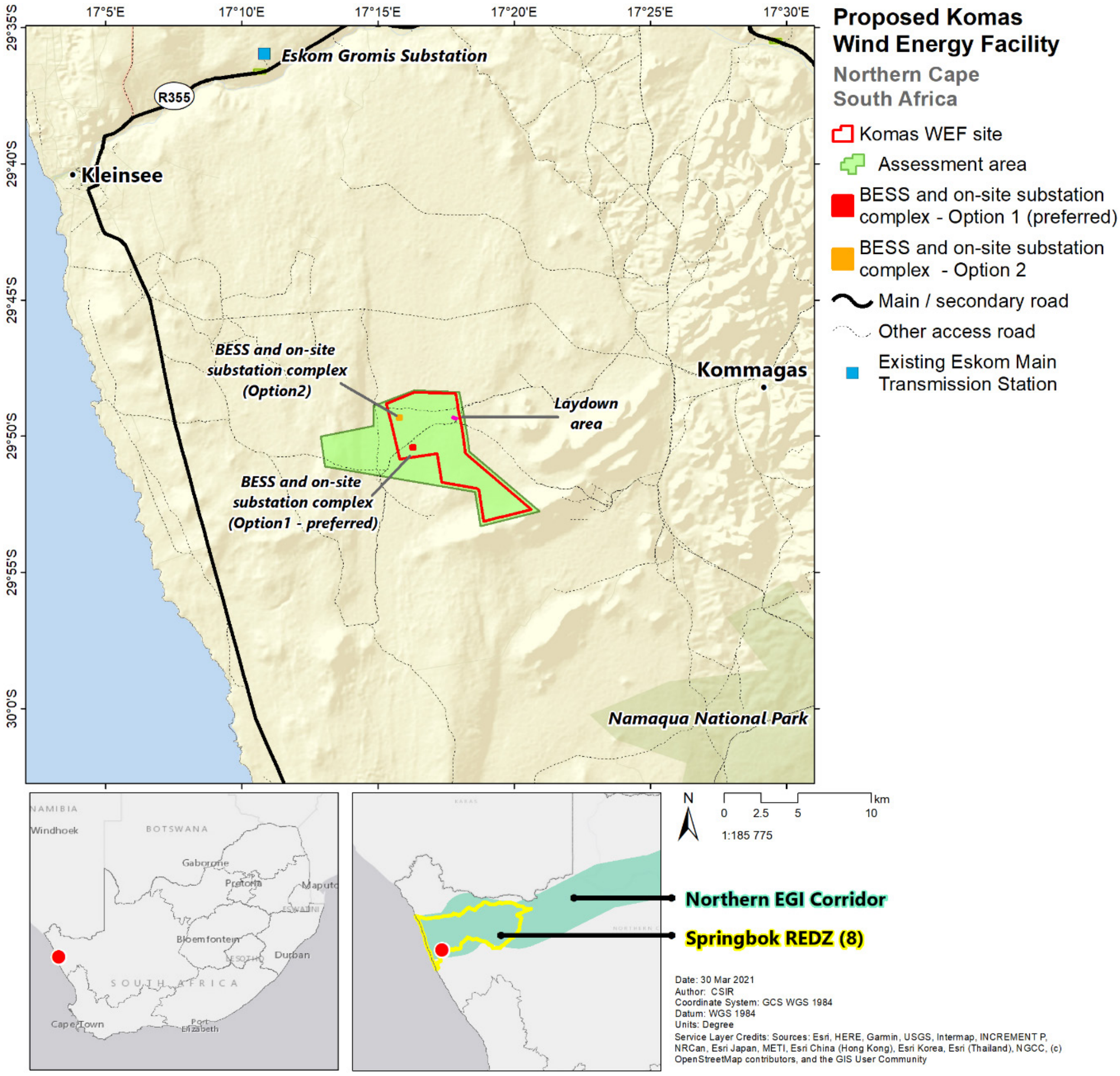


Figure A.1. Locality of the proposed Komas WEF and associated infrastructure

The proposed project is located entirely within the Springbok Renewable Energy Development Zone (REDZ 8), one of the eleven REDZs formally gazetted in South Africa for the purpose of developing solar and wind energy generation facilities (Government Gazette (GG) 41445, Government Notice (GN) 114; 16 February 2018 (Phase 1 with eight REDZs) and GG 44191, GN 144; 26 February 2021 (Phase 2 with three REDZs)). Refer to Figure A.2 for the locality of the proposed project in relation to the REDZs. In line with the gazetted process for project located within a REDZ, the proposed project will be subject to a Basic Assessment (BA) process instead of a full Scoping and Environmental Impact Assessment (EIA) process and a reduced decision making period of 57 days, in terms of the National Environmental Management Act, 1998 (Act 107 of 1998), as amended (NEMA) and the NEMA EIA Regulations, 2014, as amended, promulgated in GG 40772; in GN R326, R327, R325 and R324 on 7 April 2017. A BA process in terms of Appendix 1 of the NEMA EIA Regulations, 2014, as amended, has therefore been undertaken for the proposed project. The Competent Authority for the proposed project is the National Department of Environment, Forestry and Fisheries (DEFF) (previously operating as the Department of Environmental Affairs (DEA)).

Note from the CSIR: A press release was issued on 31 March 2021 stating that the name of the DEFF will change on 1 April 2021. The DEFF will in future be known as the Department of Forestry, Fisheries and the Environment (DFFE). However, it must be noted that the Draft BA Report, including the specialist reports, were drafted prior to the name change of the Department. Therefore, where the Draft BA Report mentions the DEFF for example, kindly note that this refers to the DFFE.

The Final BA Report will be updated to reflect the new department name i.e. DFFE.

In addition, five EGI Power Corridors were gazetted for implementation on 16 February 2018 in GG 41445, GN 113. The proposed project also falls within the Northern EGI Corridor, one of the five EGI Corridors gazetted in February 2018. While Listed Activity 9 of Listing Notice 2 of the NEMA EIA Regulations, 2014, as amended, is not triggered by the proposed project, the fact that the proposed project falls within the Northern EGI Corridor is still important as it indicates that the proposed project aligns with the strategic objectives of the country in terms of infrastructure placement.

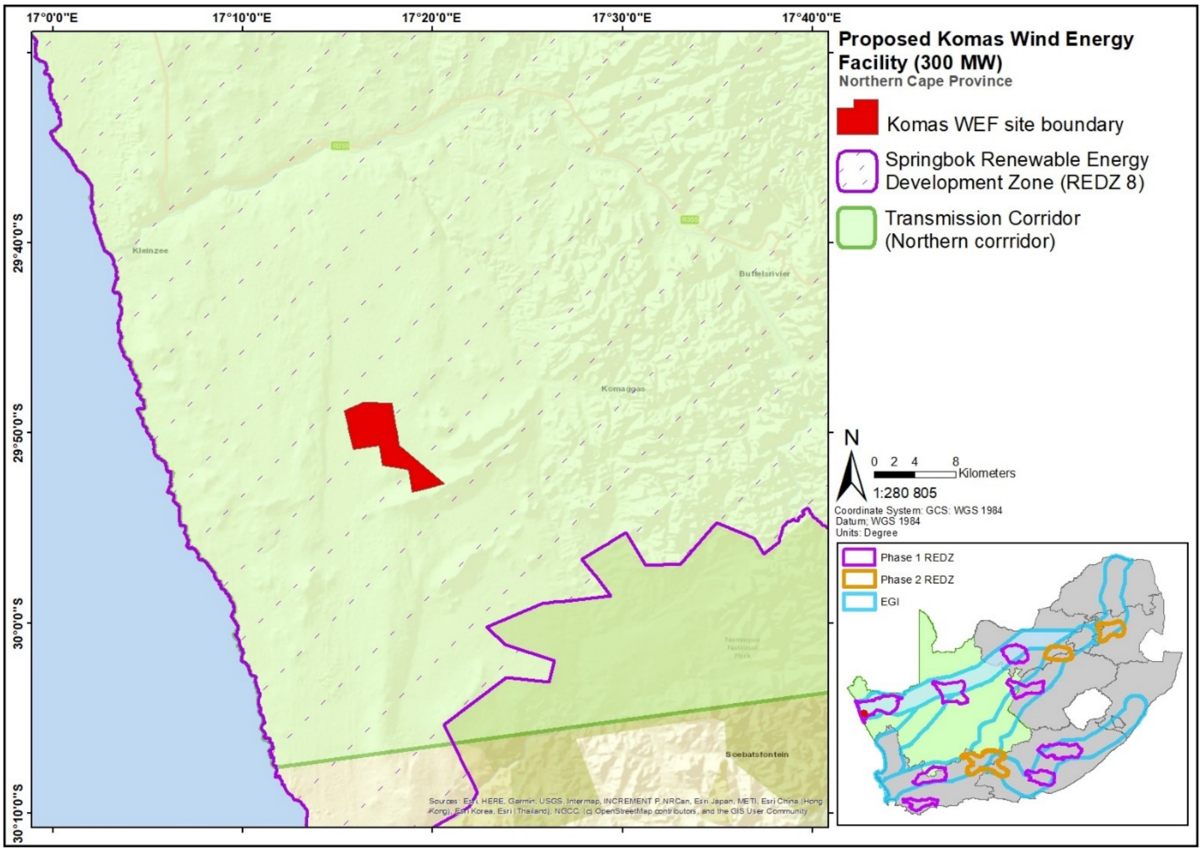


Figure A.2. Locality of the Proposed Komas WEF in the Springbok REDZ (REDZ 8) (Phase 1 REDZs) and within the Northern EGI Corridor.

(Note: The map shows the REDZs gazetted in Phase 1 in Government Notice (GN) 114; 16 February 2018) as well as three additional REDZs which have been subsequently gazetted in Phase 2 in Gazette 44191, GN 144 on 26 February 2021).

This Draft BA Report is currently being released to all I&APs, Organs of State and stakeholders for a 30-day review period. All comments submitted during the 30-day review will be incorporated and addressed, as applicable and where relevant, into the Final BA Report. The Final BA Report will then be submitted to the DEFF, in accordance with Regulation 19 (1) of the NEMA EIA Regulations, 2014, as amended, for decision-making in terms of Regulation 20, however with a reduced 57-day timeframe (as the proposed project falls within the Springbok REDZ, as explained above).

A.2 Project Team

In accordance with Regulation 12 (1) of the NEMA EIA Regulations, 2014, as amended, the Applicant has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the BA process in order to determine the biophysical, social and economic impacts associated with undertaking the proposed development.

The BA is being led by the Environmental Assessment Practitioner (EAP) and Project Leader, Minnelise Levendal. Professional Natural Scientist (Pr. Sci. Nat. Number 117078):

Minnelise is a Senior EAP in the Environmental Management Services (EMS) Group of the CSIR and holds a Masters degree in Botany from the Stellenbosch University. She obtained her BSc (Education) and BSc (Honours) degrees at the University of the Western Cape. She has 15 years of experience in Environmental Management (which includes nine years working as an EAP). Before joining the CSIR she was employed at the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) where she assessed EIAs, BAs and EMPs. Minnelise is currently managing various EIAs and BAs for wind and solar renewable energy projects in South Africa. Minnelise was the CSIR project manager for the 100 MW Ubuntu WEF near Jeffrey's Bay (EA granted in June 2012), as well as the 50 MW Banna Ba Pifhu WEF proposed by WKN Wind current near Humansdorp in the Eastern Cape (EA granted in July 2014). She was the project manager of ten BAs for wind monitoring masts in South Africa as part of the National Wind Atlas Project of the Department of Energy (DoE). EAs for all the ten masts were obtained from DEA in 2010. Minnelise was the Project Leader for seven solar PV facilities near Kenhardt for Mulilo in the Northern Cape in 2016. Four of these projects received EA in 2018, two were not deemed feasible due to environmental constraints and one was not pursued further by the applicant. Minnelise was also the Project Leader for the Kap Vley Wind Energy Project near Kleinsee in the Northern Cape. Authorisation for this project was received in November 2018. Minnelise managed the Special Needs and Skills Development Programme of DEA (from 2014 to 2018) which provided *pro bono* environmental assessments (BAs) to applicants with special needs, i.e. applicants who do not have the financial means to appoint an EAP to undertake a BA for their small-scale projects. Thirty BAs have been undertaken and received EAs under this Programme. Minnelise is currently managing four BAs for WEFs and associated EGI near Kleinsee in the Northern Cape Province. These include the Komas WEF (assessed in this BA), the Gromis WEF as well as the associated power lines and EGI to support these WEFs. Separate applications for each of the four projects will be submitted to the Competent Authority.

Minnelise is supported by Rohaida Abed (Project team member, CSIR) (Pr.Sci.Nat. Number 400247/14):

Rohaida Abed is an EAP in the EMS group of the CSIR. She has 10 years of experience in the Environmental Management field, and has been involved in various transport infrastructure related project as an ECO. She has also been involved in BAs and EIAs relating to renewable energy, port infrastructure and Bulk Liquid Storage facility in the capacity of Project Manager. She also worked on the SEA for Gas Pipeline and EGI, which was commissioned by the National Departments of Environmental Affairs, Energy and Public Enterprises. She is a registered Professional Natural Scientist (400247/14) with the South African Council for Natural Scientific Professions (SACNASP).

Project Officer: Dhiveshni Moodley (Cand.Sci.Nat. Number 1472997/19):

Dhiveshni Moodley is the Project Officer on the BA and is an EAP Intern in the EMS group of the CSIR. She holds a BSc, BSc Honours (*cum laude*), MSc *cum laude* degrees in Environmental Science from the University of KwaZulu-Natal and has experience in the research and consulting sectors. She has about two year's work experience in flood risk, hydropedological- and wetland functional assessment specialist studies, as well as conducting BAs and Scoping/EIAs in the Renewable Energy sector. Her key interest lies in using GIS analyses to apply the formation of accurate, feasible solutions to complex environmental challenges. She is registered as a Candidate Natural Scientist with the SACNASP (1472997/19).

Various specialists and additional members from the CSIR have contributed to this BA. The team which is involved in this BA process is listed in Table A.2 below.

Table A.2. Details of the BA Team

Name	Organisation	Role/ Specialist Study
CSIR Project Team		
Minnelise Levendal (*Pr.Sci.Nat.*)	CSIR	Environmental Assessment Practitioner (EAP) and Project Leader
Rohaida Abed (*Pr.Sci.Nat.*)	CSIR	Project Team member
Dhiveshni Moodley (*Cand.Sci.Nat.*)	CSIR	Project Officer
Luanita Snyman-van der Walt (*Pr.Sci.Nat.*)	CSIR	Project Mapping
Abulele Adams *(Pr.Sci.Nat.)*	CSIR	Project Mapping
Specialists		
Simon Todd	3Foxes Biodiversity Solutions	Terrestrial Biodiversity Impact Assessment
Louise Zdanow and Joshua Gericke	Enviroswift (Pty) Ltd	Aquatic Biodiversity Compliance Statement
Dr. Rob Simmons	Birds and Bats Unlimited	Avifauna Impact Assessment (including 12 months preconstruction monitoring)
Stephanie Dippenaar	Stephanie Dippenaar Consulting	Bat Impact Assessment (including 12 months preconstruction monitoring)
Kerry Schwartz	SiVEST SA (Pty) Ltd	Visual (including Flicker) Impact Assessment
Dr. Jayson Orton	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology, Cultural Landscape)
John Pether	Private	Palaeontology Impact Assessment
Johann Lanz	Private	Agriculture Compliance Statement
Tony Barbour and Schalk van der Merwe	Tony Barbour Environmental Consulting	Socio-Economic Impact Assessment
Morné de Jager	ENVIRO-ACOUSTIC RESEARCH cc (EAR)	Noise Assessment
Adrian Johnson	JG AFRIKA (Pty) Ltd	Transport Impact Assessment

Name	Organisation	Role/ Specialist Study
Dr. Robert Leyland	WSP Environmental (Pty) Ltd	Geotechnical Impact Assessment
Minnelise Levendal (*Pr.Sci.Nat.*), Abulele Adams (*Pr.Sci.Nat.*) and Rohaida Abed (*Pr.Sci.Nat.*)	CSIR	Civil Aviation Site Sensitivity Verification
Minnelise Levendal (*Pr.Sci.Nat.*), Abulele Adams (*Pr.Sci.Nat.*) and Rohaida Abed (*Pr.Sci.Nat.*)	CSIR	Defence Site Sensitivity Verification
Technical Input		
Simon Todd	3Foxes Biodiversity Solutions	Initial Biodiversity Offset Analysis
Mark Botha	Conservation Strategy Tactics and Insight	Additional Biodiversity Offset Report (including proposed implementation)
Kennett Sinclair	DNV GL South Africa (Pty) Ltd	Wake Effect Assessment
Dr. Robert Leyland	WSP	Geology Assessment

It is important to note at the outset that the above technical inputs are purely technical and serve to inform the layout, mitigation and management requirements of the proposed WEF (as required), and do not constitute specialist studies in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended.

The list of specialist studies was discussed and agreed to by DEFF at the pre-application meeting held on 18 August 2020 (Appendix H). The Wake Effect Assessment was requested by DEFF at the second pre-application meeting as discussed below.

Wake Effect Assessment

At the second pre-application meeting with DEFF on 7 October 2020 (Appendix H.3), DEFF requested that a Wake Effect assessment be conducted to determine the potential wake effect on the adjacent proposed WEFs, i.e. the Kap Vley (proposed by Kap Vley Wind Farm (Pty) Ltd), Namas (proposed by Genesis Namas Wind (Pty) Ltd) and Zonnequa (proposed by Genesis Zonnequa Wind (Pty) Ltd) and Gromis WEFs (proposed by Genesis ENERTRAG Gromis Wind (Pty) Ltd). A Wake Effect Assessment was therefore commissioned by the Project Applicant and has been undertaken by Mr. Kennett Sinclair of DNV GL South Africa (Pty) Ltd as part of the BA process. Please refer to Appendix J.2 for the Wake Effect Assessment. A summary of the Wake Effect Assessment is provided in Section D of this BA Report.

Terrestrial Biodiversity Offset Analysis

A Terrestrial Biodiversity Analysis was also commissioned by the Project Applicant and is included in Appendix J.3(2) of this BA report. This study was undertaken to ascertain the need to determine and implement a Biodiversity offset to mitigate the potential negative impacts on terrestrial biodiversity. This is due to the fact that the project site is partly located within a Critical Biodiversity Area (CBA), the national and Northern Cape Protected Area Expansion Strategy (NC-PAES) Focus Area and the Namaqua National Park's Expansion footprint. The proposed development of the Komas WEF raises a concern regarding the possible impact of the development on CBAs, the NC-PAES Focus Area and the long-term conservation value of the affected area.

The outcome of the study is that the proposed Komas WEF site is not unique and does not have any features present that would be impacted by the development that are of a high conservation value. Although the southern section of the Komas site falls within a CBA 2 and NC-PAES Focus Area, the analysis suggests that impacts on these features would be acceptable and that there are no high or moderate impacts following mitigation on terrestrial biodiversity associated with the proposed Komas WEF development that would warrant an offset. The study therefore concluded that a Biodiversity Offset is not required, but proposed that a reduction in livestock grazing on site would be a suitable mitigation measure to reduce the impact on the biodiversity on site.

However, these on-site mitigation and avoidance measures were not deemed acceptable to DEFF and SANParks following the pre-application meetings we had with them. Therefore, based on these objections and following official comments received from SANParks dated 15 February 2021 (see Appendix D of the BA Report), the Project Applicant commissioned an additional Biodiversity Offset Study (including proposed implementation) which was undertaken by Mr. Mark Botha of Conservation Strategy, Tactics and Insight (dated 24 February 2021). This study is included in Appendix J.3(1) of this BA Report (together with the initial Biodiversity Offset Analysis which was undertaken by Mr. Simon Todd). **It should be noted that the recommendations of the additional Biodiversity Offset Report (including proposed implementation) (Botha, 2021) replace those in the initial Biodiversity Offset Analysis (Todd, 2021(b)) which was undertaken prior to the comments raised by DEFF and SANParks during the pre-application phase.**

A.3 Project Overview in terms of Energy Planning

As noted above, the proposed project falls within the Springbok REDZ (REDZ 8) which was promulgated in GN 114 in February 2018. The REDZs represent areas where wind and solar PV development is being incentivised from resource, socio-economic and environmental perspectives. The Wind and Solar Phase 1 SEA identified REDZs in five provinces, namely the Eastern Cape, Western Cape, Northern Cape, Free State and North West. Projects which fall within a REDZ are subject to a BA process instead of a full Scoping and EIA Process and will be subjected to a reduced decision-making timeframe of 57 days (instead of the 107 days).

In addition, five EGI Power Corridors were gazetted for implementation on 16 February 2018 in Government Gazette 41445, GN 113. The Gazette documented notice, given by the Minister of Environmental Affairs, of alternative procedures to be followed when applying for EA for large scale electricity transmission and distribution development activities, identified in terms of section 24(2)(a) of the NEMA in the identified Strategic Transmission Corridors (i.e. areas declared as geographical areas of strategic importance). Developers proposing to submit applications for EA for large scale electricity transmission infrastructure within any of the five gazetted Strategic Transmission Corridors, that trigger Listed Activity 9 of Listing Notice 2 of the NEMA EIA Regulations, 2014, as amended, or any other listed and specified activities that are necessary for the realisation of such infrastructure and facility, would need to follow a BA process, as opposed to a full Scoping and EIA Process. The proposed project also falls within the Northern EGI Corridor, one of the five EGI Corridors gazetted in February 2018. While Listed Activity 9 of Listing Notice 2 of the NEMA EIA Regulations, 2014, as amended, is not triggered by the proposed project, the fact that the proposed project falls within the Northern EGI Corridor is still important as it indicates that the proposed project aligns with the strategic objectives of the country in terms of infrastructure placement.

Refer to Figure A.2 which shows the location of the proposed project in relation to the REDZ 8 and Northern EGI Corridor.

A.4 Project Co-ordinates

The proposed Komas WEF project will take place on the farm portions indicated in Table A.1.

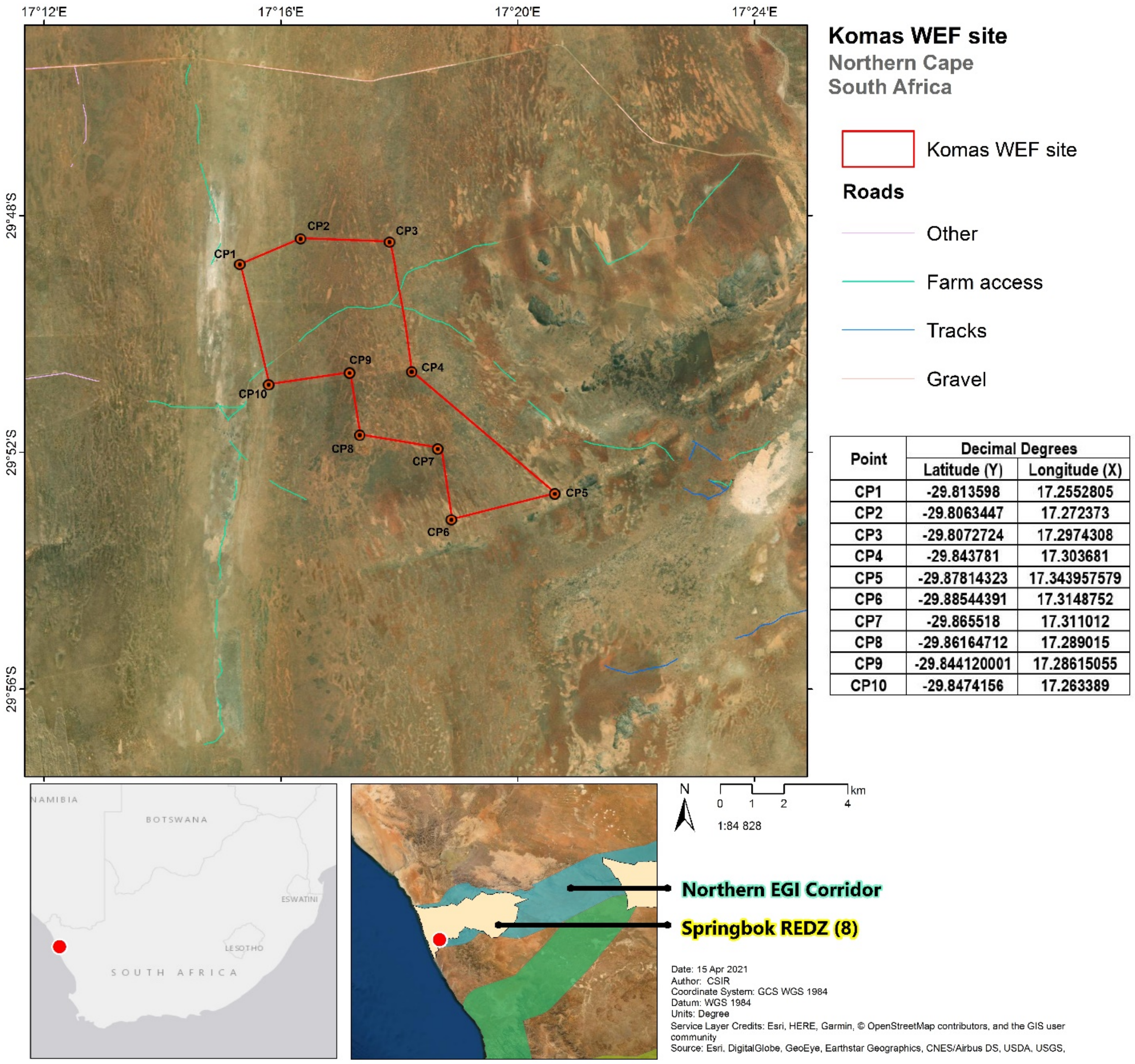
The approximate co-ordinates of the boundary points of the project site for the proposed Komas WEF are detailed in Table A.3a. A map corresponding to the co-ordinate points are indicated in Figure A.3. Coordinates of the mid-point of the development area as well as the mid-point of the preferred BESS and on-site SS site (Option 1) are also included in Table A.3b.

Table A.3a. Co-ordinate Points along the boundary of the proposed Komas WEF

Point	Decimal Degrees		Degrees, Minutes, Seconds	
	Latitude (Y)	Longitude (X)	Latitude (S)	Longitude (E)
CP1	-29.813598	17.2552805	29°48'48.95"S	17°15'19.01"E
CP2	-29.8063447	17.272373	29°48'22.86"S	17°16'20.56"E
CP3	-29.8072724	17.2974308	29°48'26.20"S	17°17'50.74"E
CP4	-29.843781	17.303681	29°50'37.63"S	17°18'13.22"E
CP5	-29.87814323	17.343957579	29°52'41.34"S	17°20'38.22"E
CP6	-29.88544391	17.3148752	29°53'7.62"S	17°18'53.56"E
CP7	-29.865518	17.311012	29°51'55.89"S	17°18'39.63"E
CP8	-29.86164712	17.289015	29°51'41.93"S	17°17'20.47"E
CP9	-29.844120001	17.28615055	29°50'38.85"S	17°17'10.14"E
CP10	-29.8474156	17.263389	29°50'50.70"S	17°15'48.22"E

Table A.3b. Co-ordinate Points of the mid-point of the proposed Komas WEF study area and mid-point of the preferred BESS and on-site Substation complex area (Option 1)

Point	Decimal Degrees		Degrees, Minutes, Seconds	
	Latitude (Y)	Longitude (X)	Latitude (S)	Longitude (E)
Mid-point of project area	-29.843279	17.296014	29° 50' 35.8044"	17°17' 45.6504"
Mid-point of preferred BESS and on-site SS (Option 1)	-29.840287	17.271397	29° 50' 25.0332''	17° 16' 17.0292''



Point	Decimal Degrees	
	Latitude (Y)	Longitude (X)
CP1	-29.813598	17.2552805
CP2	-29.8063447	17.272373
CP3	-29.8072724	17.2974308
CP4	-29.843781	17.303681
CP5	-29.87814323	17.343957579
CP6	-29.88544391	17.3148752
CP7	-29.865518	17.311012
CP8	-29.86164712	17.289015
CP9	-29.844120001	17.28615055
CP10	-29.8474156	17.263389

Figure A.3. Komas WEF Boundary Co-ordinate Point Map

A.5 Project Description

It is important to note at the outset that the above technical inputs are purely technical and serve to inform the layout, mitigation and management requirements of the proposed WEF (as required), and do not constitute specialist studies in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended.

The footprint of the proposed Komas WEF with a capacity of up to 300 MW will cover an approximate area of 90 hectares (ha). This excludes access roads leading to the site. Several specialists assessed larger areas on the affected farm portions in order to avoid environmental constraints and sensitivities (highlighted by the specialists), during the siting and final design of the facilities and associated infrastructure.

The proposed Komas WEF and associated infrastructure include the following components:

- Up to 50 WTGs with a maximum capacity of up to 300 MW.
- Turbines with a hub height of up to 200 m and a rotor diameter of up to 200 m.
- Hardstand areas of approximately 1 500m^2 per turbine.
- Temporary construction laydown and storage area of approximately 4 500m^2 per turbine.
- Medium voltage cabling connecting the turbines will be laid underground.
- A solid state Lithium-ion BESS comprising of several utility scale battery modules within shipping containers or an applicable housing structure on a concrete foundation.
- Internal roads with a width of up to 10 m providing access to each turbine, the BESS, on-site SS and laydown area. The roads will accommodate cable trenches and stormwater channels (as required) and will include turning circle/bypass areas of up to 20 m at some sections during the construction phase. As such, the roads and cables will be positioned within a 20 m wide corridor. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.
- A temporary construction laydown/staging area of approximately 4.5 ha which will also accommodate the O&M buildings.
- A 33/132kV on-site SS to feed electricity generated by the proposed Komas WEF into the national grid at the Gromis MTS.

The BESS and 33/132kV on-site SS will be located within a 4 ha BESS and SS complex to allow for micro-siting of the BESS components and to accommodate internal roads (as required), a temporary construction laydown area and a firebreak around the BESS footprint. Two site alternatives have been identified for assessment as part of the BA process (i.e. Option 1 and Option 2).

Once a Power Purchase Agreement (PPA) is awarded, the proposed Komas WEF will generate electricity for a minimum period of 20 years. The construction phase for the proposed project is expected to extend approximately 24 months.

The proposed Komas WEF and associated infrastructure include the main components and associated specifications as tabulated in Table A.4.

Table A.4 Description of the main project components and associated specifications for the proposed Komas WEF and associated infrastructure

Component	Description
WEF	
Proposed technology	WTGs and associated infrastructure, including a lithium-ion BESS
WEF capacity	Up to 300 MW
BESS capacity	Up to 300 MW/1200 MWh
Number of turbines	Up to 50 turbines
Turbine Hub Height (HH) from ground	Up to 200 m
Turbine Rotor Diameter	Up to 200 m
Turbine Blade Length	Up to 100 m
Voltage of on-site SS	33/132 kV
On-site SS and BESS complex area	Approximately 4 ha (200 m x 200 m)

Component	Description
Height of BESS	Approximately 5 – 10 m
Height of on-site SS	Approximately 7 – 10 m Up to 22 m (including lighting)
Construction laydown area	A temporary construction laydown/staging area of approximately 4.5 ha which will also accommodate the O&M buildings.
Permanent laydown area	To be determined based on the final layout
O&M building area	Part of the construction laydown area
Turbine hardstand area	Approximately 1 500 m² per turbine
Width of internal access roads	Approximately 10 m, including turning circle/bypass areas of up to 20 m at some sections during the construction phase. As such, the roads and cables will be positioned within a 20 m wide corridor. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.
Length of internal access roads	To be determined based on final layout
Site access	Unnamed public gravel road off the R355
Grid connection and proximity (This will be subject to a separate Environmental Assessment process)	Approximately 30 km to connect to the Gromis MTS
Height of SS, BESS and O&M area fencing	Approximately 2 m to 3 m high
Type of fencing	Galvanised steel
Fencing around the WEF Perimeter	Type: Galvanised steel Height: 1 m to 3 m
Site area	Approximately 5 070 ha (the assessed area is approximately 2 725 ha).
Total project footprint area (including internal roads, but excluding access roads leading to the site)	Approximately 90 ha

As noted above, the proposed EGI, listed below will be assessed as part of a separate BA process to be undertaken by the Applicant, which includes:

- 132 kV overhead single or double power line to connect the proposed Komas WEF to the national grid at the existing Gromis MTS;
- 33/132 kV Eskom Switching SS;
- 132 kV Collector SS (if required); and an
- Access road providing access along the power line servitude.

Power line corridors with a width of approximately 500 m are being assessed to allow flexibility when determining the final route alignment. The proposed gridline however only requires a 31 m wide servitude and as such, this servitude would be positioned within the corridor as required by Eskom. Further details on the EGI component will be included in the separate BA which will be submitted to the Competent Authority for decision-making.

Two separate draft Environmental Management Programmes (EMPrs) have been compiled and are provided in Appendix D of this BA Report:

- Draft EMPr for the **proposed Komas WEF and associated infrastructure**, excluding the 132 kV on-site SS. **<u>This Draft EMPr is in Appendix G.1 of this BA Report.</u>**
- Draft EMPr for the **proposed 33/132 kV on-site SS**. **It complies with the Generic EMPr published for SS development (Government Gazette 42323, GN 435, dated 22 March 2019). <u>This Draft EMPr is included in Appendix G.2 of this BA Report.</u>**

Two separate BA processes are currently being undertaken, i.e. one for the proposed Komas WEF and one for the associated power line and EGI. The approach to conduct two separate BA processes (one for the proposed Komas WEF and 132 kV on-site SS) and one for the 132 kV power line and Eskom Switching SS has been structured to meet the requirements of the REIPPPP and to allow for the associated power line and EGI to be handed over to Eskom for operation and maintenance. This approach was also confirmed with DEFF at the pre-application meeting held on 18 August 2020 (see presentation in Appendix H.3 and approval of the pre-application meeting notes in Appendix H.4).

A.5.1 General description of a wind turbine and wind turbine technology

Wind turbines generate electricity by converting movement or kinetic energy produced by the wind into electricity. Different turbine technologies achieve this through slightly different means. A typical horizontal-axis wind turbine consists of a number of components, which work together to generate electricity as depicted in Figure A.4 below. When the rotor spins the shaft, the shaft spins the assembly of magnets, which generate voltage in the coil of wire. This voltage provides alternating electrical current which can then be distributed through power lines. The wind turbine tower supports the rotor and nacelle and provides the height for the rotor blades to clear the ground safely, and to capitalise on atmospheric wind resources which occur approximately 80 - 200 m above the earth's surface. It is anticipated that the individual wind turbines and rotor blades will have a maximum height of 200 m and a maximum rotor diameter of 200 m.

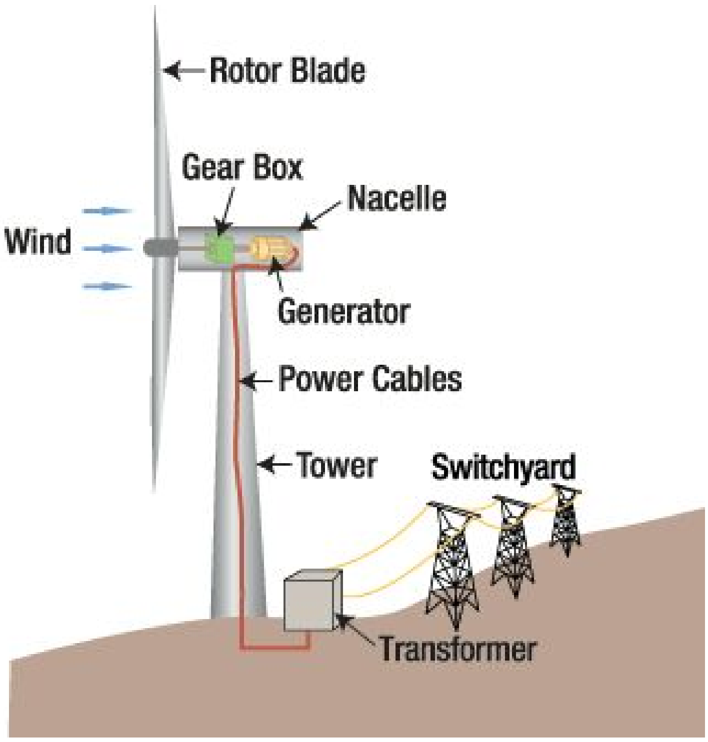


Figure A.4: Generic design for a wind turbine (Source: Tennessee Valley Authority, Wikimedia).

The energy output of a wind turbine ultimately depends on the size of the generator, velocity of the wind, the height of the hub, and the length of the rotor blades. Wind turbines operate at a range of wind speeds and have a start-up speed, which is the speed at which the blades and rotor start to rotate, and a cut-in speed, which reflects the minimum wind speed at which usable power is generated. This is typically about 3 - 4 m/s with full power output occurring at higher wind speeds of approximately 10 to 12 m/s. Wind turbines are also equipped with a cut-out speed or pitch control system as a safety feature to prevent mechanical damage at high or turbulent wind speeds. The cut-out speed is the highest wind speed after which a wind turbine will stop producing power, and a braking system will be activated. This is typically between 25 and 28 m/s depending on the manufacturer and type of turbine selected for implementation. The pitch control system will turn the rotor out of the mean wind direction and change the orientation of the blades so the rotor will capture lower wind speeds and the output power of generator stays within the allowed range. Once the wind drops below the cut-out speed back to a safe level, the turbine can resume normal operation.

Even though wind turbines are relatively tall they do not require extensive land space. Each turbine will have a concrete base. The concrete foundation of each turbine will have a footprint of approximately 1 500 m^2. The comparatively small base of the turbine allows other activities to continue uninterrupted in the space underneath and around the turbine. Conventional large scale development footprints often lead to habitat fragmentation and interference with fauna. As such the micro-siting of the wind turbines will be in an optimum position that minimises the possibility of habitat fragmentation and interference with movement of fauna.

In terms of wind turbine technology to be used as part of the proposed development, the Project Applicant is currently considering a range of wind turbine designs and capacity. The exact turbine specifications have not been determined yet. Some turbine specifications will only be finalised closer to construction. However, the “worst-case scenario” was presented and assessed by the specialists.

The turbine technology selection process shall be subjected to further wind analysis and is also dependent on technical, commercial and site suitability assessment that will, in part, be informed by the BA.

A.5.2 Associated Infrastructure

Construction Laydown and Hardstand Areas

During construction, a temporary laydown area with a maximum footprint of 4.5 ha (including the O&M buildings) and hardstand areas (including boom erection, storage and assembly area) will be established. These hard stand areas will be utilised by cranes during the construction phase (and also possibly when maintenance is done in the operational phase). The crane platform covering a footprint of approximately 1 500 m^2 will be established at each wind turbine. The crane platform will support turbine assembly, off-loading and storage during the construction phase. A schematic illustration of a typical hard stand area and crane platform is provided in Figure A.5 below.

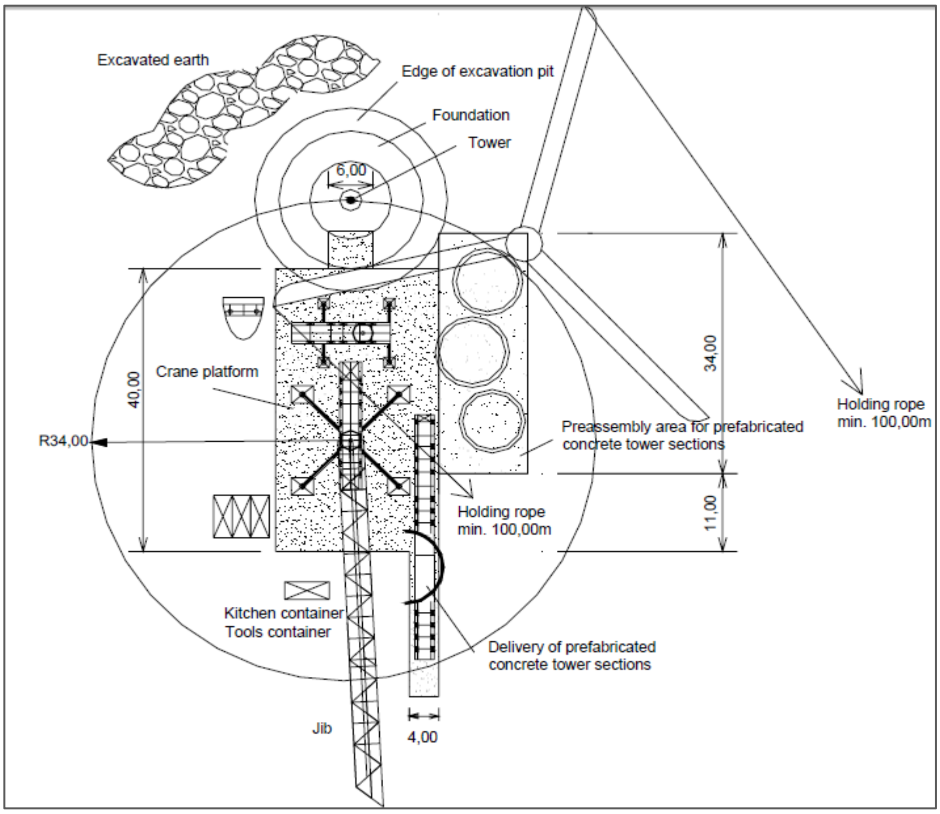


Figure A.5: Example of a hard standing area and crane platform.

Fencing

For various reasons (such as security, public protection and lawful requirements), the proposed Komas WEF will be secured via the installation of boundary fencing. Permanent fencing will be required around the O&M Building, BESS and on-site SS. The fencing, comprising of galvanised steel, is planned to be approximately 2 - 3 m high. Access points will be managed and monitored by an appointed security service provider.

Stormwater Channels

Stormwater drainage systems will be constructed on site to ensure that stormwater run-off from site is appropriately managed. Water from these systems will not contain any chemicals or hazardous substances, and will be released into the surrounding environment based on the natural drainage contours. Details of storm water management are to be confirmed once the Engineering, Procurement and Construction (EPC) contractor has been selected and the design is finalised. It is proposed that a detailed storm water management plan be developed during the detailed design phase. Recommendations for the management of storm water are included in Section 6 of the EMPr (Appendix G).

Batching plant

A concrete batching plant is proposed on site and the footprint will be determined by the EPC contractor.

Operations and Maintenance Area

The on-site O&M area is required to support the functioning of the proposed Komas WEF and provide services to personnel who will be responsible for the operation and routine maintenance of the facility. The O&M buildings will form part of the temporary construction laydown area. The proposed infrastructure entails establishment of the following: operational control centre, workshop or warehouse, ablution facilities, site office, security enclosures, and an area for the storage of maintenance equipment.

- **Lithium-ion BESS and On-site Substation complex area**

The proposed project will include a lithium-ion BESS and on-site SS complex area of 4 ha to allow for micro-siting of the BESS components and to accommodate internal roads (as required), a temporary construction laydown area and a firebreak around the BESS footprint.

The height of the on-site SS will range between approximately 7 - 10 m and may extend up to 22 m including the lighning mast; and from 5 – 10 m for the BESS. Fencing around the on-site SS and BESS complex area as well as the O&M buildings will be approximately 1- 3 m high.

The BESS will be pre-assembled and delivered to site for placement as per specifications of the supplier. It is proposed that the BESS would be housed in containers, with associated operational, safety and control infrastructure. The BESS will be a sealed unit and will remain sealed during operations.

Lithium-ion batteries are solid state batteries that 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 several cells working in conjunction. The negative electrode for a lithium-ion cell is typically carbon. The positive electrode can be lithium-ion phosphate or a lithium metal oxide. The electrolyte is usually a lithium salt dissolved in an organic solvent. Appendix B of the BA Report includes a facility illustration and examples of a typical lithium-ion BESS.

A lithium-ion BESS is different to a Redox Flow Battery (RFB), where the energy is stored in two chemical components, which are dissolved in a liquid to form electrolytes, which in turn are stored in above-ground storage tanks which contain the positive and negative electrolytes separately. Examples of electrolytes for RFB's include Hydrochloric Acid and Sulphuric Acid, which are considered as dangerous goods in terms of the NEMA EIA Regulations, 2014, as amended. The risk of spillage tends to be higher for an RFB than a lithium-ion BESS. Solid State Batteries carry less of a potential risk to the environment in terms of potential spillages. Furthermore, the risk of spillage from lithium-ion BESS is remote due to the sealed state of the BESS, as opposed to the storage tanks of RFB's, which may be subjected to leaks or spills during the replacement or blending of the electrolyte or during transport of the BESS to and from site.

The supplier of the BESS will be confirmed during the detailed design, however the associated impacts and management measures have been captured in Section D of this BA Report, as well as the Draft EMPr included in Appendix G.1.

Battery storage offers a wide range of advantages to South Africa including electricity supply reliability and quality improvement. The main purpose of the BESS is to mitigate intermittency of wind energy by storing and dispatching of electricity when needed i.e. to contribute to the grid 24 hours/day, during peak demand at night or during power outages. In essence, this technology allows renewable energy to enter the completely independent power generation market.

- **Internal Roads**

Internal roads will also be constructed within the footprint of the proposed Komas WEF. The internal roads are expected to be composed of gravel and will extend approximately 10 m wide, including turning circle/bypass areas of up to 20 m wide at some sections during the construction phase. As such, the roads and cables will be positioned within a 20 m wide corridor. These roads will provide access to each turbine and will accommodate cable trenches and stormwater channels, as required. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary. The total internal road length will be determined by the EPC contractor. The total internal road length may vary slightly, depending on the final design.

- **External Access Roads**

The Transport Impact Assessment (Appendix C.10 of the BA Report) states that it will be possible to transport the imported wind turbine components by road to the proposed sites via two possible main routes, both located off the R355. The first option is the surfaced road between the R355 and Komaggas, shown in blue in Figure A.6. The second option is the unnamed gravel road between the R355 and the intersection point of the provincial gravel roads to the west of Komaggas, shown in green in Figure A.6. Although both options are feasible, the surfaced road is the preferred Main Route option as it would require less infrastructure improvements.

The nearest towns in relation to the proposed Komas WEF site are Komaggas, Springbok and Kleinsee. Komaggas is situated within 18 km from the proposed Komas WEF, Kleinsee within 38 km and Springbok within 60 km. The main route linking Kleinsee and Springbok to the proposed Komas WEF is the R355. It is envisaged that the majority of materials, plant and labour will be sourced from these towns and transported to the Komas WEF via the R355.

Should concrete batch plants or quarries not be available in the surrounding areas, mobile concrete batch plants and temporary construction material stockpile yards could be commissioned on vacant land near the proposed Komas WEF site. Delivery of materials to the mobile batch plant and the stockpile yard could be staggered to minimise traffic disruptions.

It is envisaged that most materials, water, plant, services and construction personnel will be procured within a 60 km radius from the proposed Komas WEF.

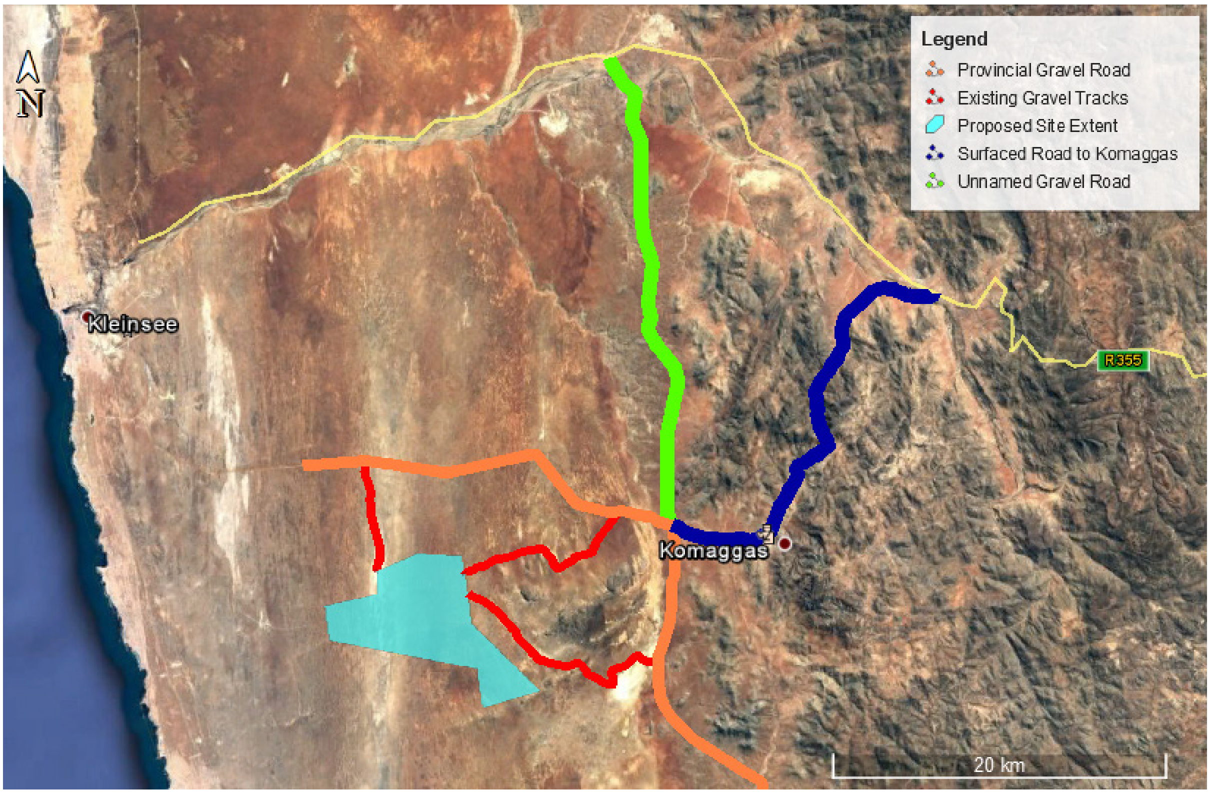


Figure A.6: Main Routes to the Proposed Komas WEF Site

Proposed main access road to the proposed WEF

The proposed site layout indicates three possible access points to the proposed Komas WEF site, shown in the Figure A.7 below. The three potential access points are located off existing provincial gravel roads. The alignment of the proposed access roads follows existing gravel roads and tracks as far as possible.

Proposed access road 1 (show in red in Figure A.7) is not deemed suitable as it falls within the proposed power line alignment alternatives (subject to a separate Environmental Assessment process). Proposed access roads 2 and 3 are both deemed suitable (light blue and purple respectively in Figure A.7).

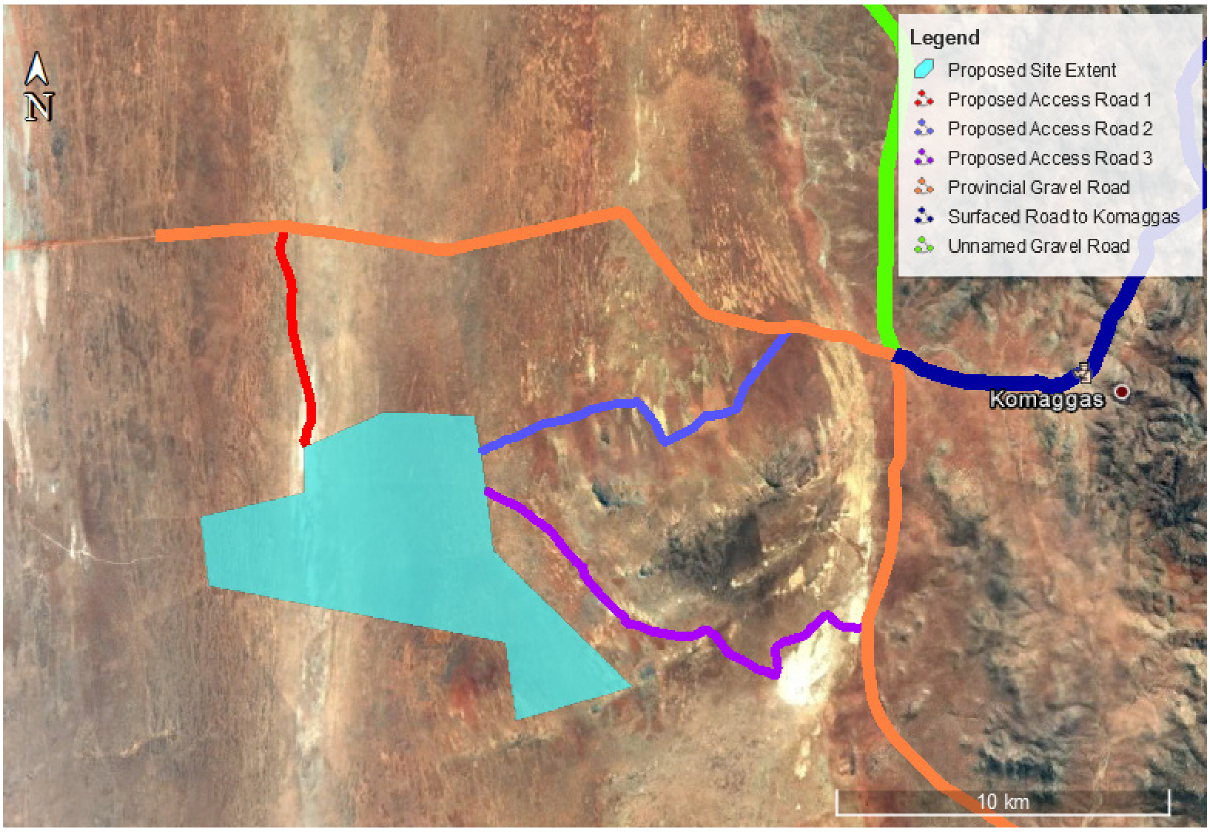


Figure 1: Proposed Access Roads to the Komas WEF site.

The proposed Komas WEF will predominately comprise of new internal gravel roads as there are few existing gravel roads. These roads will be approximately 10 m wide, including turning circle/bypass areas of up to 20 m wide at some sections during the construction phase.

A minimum required road width of 4 m needs to be kept and all turning radii must conform with the specifications needed for the abnormal load vehicles and haulage vehicles. Turning radii will be dependent on the size of the abnormal load vehicle and the size of the component being transported.

It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will hence need to be maintained during the additional loading of the construction phase and then reinstated after construction completion. The gravel roads will require grading with a road grader to obtain a flat even surface and the geometric design of these gravel roads need to be confirmed at detailed design stage. The road designer should take cognizance that roads need to be designed with smooth, relatively flat gradients to allow an abnormal load vehicle to ascend to the top of a hill.

It should be noted that any overhead lines (e.g. Eskom lines) along the gravel road will have to be moved to accommodate any abnormal load vehicles.

A.6 Overview of the Project Development Cycle

The project can be divided into the following three main phases:

- Planning and Design Phase (Pre-construction phase);
- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

Each activity undertaken as part of the above phases may have environmental impacts and, where applicable, has therefore been assessed by the specialist studies (summarised in Section D and full studies included Appendix C of this BA Report).

A.6.1 Planning and Design Phase (Pre-construction phase)

The project layout, including the placement of each individual turbine and subsequent proposed access roads, was finalised prior to the submission of the Draft BA Report for comment. The project layout was informed by the findings of the specialist studies, which included the identification of sensitive biophysical areas that need to be avoided. The specialists were requested to comment on the final layout. The specialists confirmed that the updated project layout does not impact their specialist studies and assessment ratings and is therefore acceptable. The turbine manufacturer and turbine capacity to be used will be dependent on availability of turbines in the international market, suitability to the South African wind climate, and service levels and experience in South Africa.

A.6.2 Construction Phase

The construction phase will take place subsequent to the issuing of an EA from the DEFF and a successful bid in terms of the REIPPPP (i.e. the issuing of a PPA from the Department of Mineral Resources and Energy (DMRE)). The construction phase for the proposed project is expected to extend approximately 24 months.

The main activities that will form part of the construction phase are:

- Removal of vegetation within the footprint of the infrastructure that will be constructed (including but not limited to the turbines, laydown areas, internal access roads and building structures);
- Stockpiling of topsoil and cleared vegetation, where necessary;
- Establishment of a temporary laydown area to enable the storage of construction equipment and machinery and will include the establishment of the construction site camp (including site offices and other temporary facilities for the appointed contractors);
- Excavations for the wind turbine foundations at each turbine location and excavations for other infrastructure;
- Construction and erection of the wind turbines on site, and additional infrastructure;
- Construction of the on-site SS, including the SS building. The construction of the SS building will entail construction of the foundation and building structure as well as the installation of electrical infrastructure (such as transformers, conductors, etc.); and
- Transportation of material and equipment to site, and personnel to and from site.

In addition to the above, skilled as well as unskilled temporary employment opportunities will be created during the construction phase. It is difficult to specify the actual number of employment opportunities that will be created at this stage; however approximately 200 – 250 employment opportunities are expected to be created during the construction phase. It is anticipated that approximately 55% (110 - 138) of the employment opportunities will be available to low skilled workers (construction labourers, security staff etc.), 30% (60 - 75) to semi-skilled workers (drivers, equipment operators etc.) and 15% (30 - 38) for skilled personnel (engineers, land surveyors, project managers etc.).

All efforts will be made to ensure that all construction work will be undertaken in compliance with local, provincial and national legislation, local and international best practice, as well as the compiled EMPrs which are included in Appendix G of this BA Report. An independent Environmental Control Officer (ECO) will be appointed during the construction phase and will monitor compliance with the recommendations and conditions of the EMPrs and EA respectively.

A.6.3 Operational Phase

The following activities will occur during the operational phase:

- The generation of electricity from the proposed WEF which will be fed into the national grid at the Gromis MTS via a 132 kV power line (to be assessed in a separate BA); and
- Maintenance of the WTGs and associated infrastructure.

During the life span of the proposed project (approximately 20 years), on-going maintenance will be required on a scheduled basis. Wind turbines will be operational for this entire period except under circumstances of mechanical breakdown, extreme weather conditions and/or maintenance activities. Wind turbines will be subject to regular maintenance and inspection (i.e. routine servicing) to ensure the continued optimal functioning of the turbine components. It is anticipated that the proposed WEF will operate throughout the day and night. The only development related activities on-site will be routine servicing and unscheduled maintenance.

The projected operations are expected to provide several services and added economic spin offs (as highlighted in Section D of this BA Report). Approximately 20 permanent employment opportunities (skilled and unskilled) will be created during the operational phase of the project. Of this total approximately 12 will be low skilled workers, 6 semi-skilled and 2 skilled workers.

In addition to the above, a Community Trust will be established. The establishment of a community benefit structure such as a Community Trust also creates an opportunity to support local economic development in the area. The requirement for the project to allocate funds to socio-economic contributions (through structures such as Community Trusts) provides an opportunity to advance local community projects, which is guaranteed for a 20-year period (project lifespan). The revenue from the proposed WEF can be used to support a number of social and economic initiatives in the area, including but not limited to:

- Creation of employment opportunities;
- Education;
- Support for and provision of basic services;
- School feeding schemes;
- Training and skills development; and
- Support for Small, Medium and Micro Enterprises (SMMEs).

The 2019 IPPPP Overview notes that the Socio-Economic Development (SED) contributions associated with the 64 IPPs has to date amounted to R 860.1 million. The province with the highest

SED contribution has been the Northern Cape Province, followed by the Eastern Cape and Western Cape (Department of Energy et al. 2016).

The Green Jobs study (2011), found that the case for wind power is enhanced by the positive effect on rural or regional development. Wind farms located in rural areas create an opportunity to benefit the local and regional economy through the creation of jobs and tax revenues. In this regard the towns of as Komaggas, Buffelsrivier, Kleinsee, and Springbok are small rural towns.

The additional income for the landowners from the WEF would also improve job security for farm workers and benefit the community.

A.6.4 Decommissioning Phase

The main aim of decommissioning is to return the land to its original, pre-construction condition. Should the unlikely need for decommissioning arise (i.e. if the actual WEF becomes outdated or the land needs to be used for other purposes), the decommissioning procedures will be undertaken in line with the EMPr and the site will be rehabilitated and returned to the pre-construction state.

Various components of the proposed Komas WEF which are decommissioned will be reused, recycled or disposed of in accordance with the relevant regulatory requirements. All of the components of the wind turbines are considered to be reusable or recyclable. The turbines may also be traded or sold as there is an active second hand market for wind turbines and/or it may be used as scrap metal. The decommissioning phase of the project is also expected to create skilled and unskilled employment opportunities.

On the down-side, approximately 20 permanent employment opportunities associated with the operational phase would be lost. The potential impacts associated with the decommissioning phase can however be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the significance of the impacts is assessed to be Low Negative. The Socio-Economic Impact Assessment (Appendix C.8) recommends that the proponent should also investigate the option of establishing an Environmental Rehabilitation Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20-year operational life of the facility.

A.7 Traffic Generation

As noted above, in terms of traffic generation, a Transport Impact Assessment was undertaken and is included in Appendix C.10 of this BA Report. The types of materials and equipment that will need to be transported to site during the construction phase include the following:

- Building materials will be transported by single-unit trucks within the road freight limitations of South Africa;
- Transformers and turbine components will be transported by abnormal load trucks for which a permit will need to be applied for in terms of Section 81 of the National Road Traffic Act and authorisation needs to be obtained from the relevant road authorities to modify the road reserve to accommodate turning movements at intersections;
- In addition to transporting the wind turbine components and specialised lifting equipment, Civil Engineering construction materials, plant and equipment will need to be brought to the site (e.g. sand, stone, cement, concrete batching plant, gravel for road building purposes, excavators,

trucks, graders, compaction equipment, cement mixers, transformers in the SS, cabling, transmission pylons etc.). Other components, such as electrical cables, pylons and SS transformers, will also be transported to site during construction. The transportation of these items will generally be conducted with normal heavy loads vehicles; and

- In addition, workers from the surrounding area will be transported by taxi/bus/shuttle or private car.

The following number of daily trips has been calculated for the construction phase:

For the transportation of the turbines to the proposed Komas WEF site, it was assumed that the turbine blades will be transported to site individually. Consequently**,** for each steel wind turbine:

- 1 abnormal load for the nacelle;
- 3 abnormal loads will be required for the blades; and
- 10 abnormal loads for the tower sections.

All further components will be transported with normal limitations haulage vehicles. With approximately 14 abnormal load trips (as specified above, the total trips to deliver the components of 50 steel tower turbines to the WEF site will be around 700 trips (14 trips x 50 turbines). **This would amount to approximately 1.3 vehicle trip per day (700 trips / 24 months / 22 working days per month) to site for a typical construction period of 24 months[2].**

The concrete tower sections are typically delivered in 2-4 precast segments, which are then assembled on-site to form the respective tower section. It was assumed that the first 140 m sections will be precast in four segments each and the last 60 m sections in two segments each. The total number of abnormal load trips for a concrete[3] turbine is approximately 34 trips. For concrete tower sections, the 20 m sections of the 200 m tower will be split into 4 segments (1 trip per segment), except for the last 60 m of the tower which would have 2 segments per section. The calculation is therefore – 140 m of the tower / 20 m section = 7 sections, 7 sections x 4 segments = 28 segments (trips). The remaining 60 m of the tower (3 sections of 20m) will consist of 2 segments each = 6 segments. Therefore, the total number of abnormal trips is 28 + 6 segments = 34 segments or trips for concrete towers. The total trips to deliver the components of 50 turbines to the WEF site will be around 1 700 trips (34 trips x 50 turbines). This would amount to approximately 3.2 vehicle trips per day (1 700 trips / 24 months / 22 working days per month) to site for a typical construction period of 24 months.

The construction and decommissioning phases of a WEF are the only significant traffic generators. Fortunately, the duration of these phases is short term i.e. the potential impact of the traffic generated by the proposed Komas WEF during the construction and decommissioning phases on the surrounding road network is temporary and WEFs, when operational, do not add any significant traffic to the road network.

Refer to the Appendix C.10 for the complete Transport Impact Assessment. It is important to note that the Transport Impact Assessment has assumed the worst case construction period of 24 months, and has assumed that water will be trucked in from the municipality or private contractors (in order to cater

[2] Please note that trips are one-directional as it is assumed that trips to the development will occur during the peak hour, whilst the returning trip will occur outside the peak hour.

[3] This refers to the use of concrete tower sections instead of steel. The calculation is included in case concrete tower sections are deemed feasible at a later stage.

for potential traffic generation for water requirements). The section below provides a description of the water usage and other service requirements.

A.8 Service Provision: Water Usage, Sewage, Solid Waste and Electricity Requirements

The Applicant will consult with the surrounding municipalities in order to confirm the supply of services (in terms of water usage, sewage removal, solid waste removal, and electricity requirements) for the proposed project. The municipality will be consulted as part of the 30-day public review period of this Draft BA Report and the confirmation services provision will be included in the Final BA Report, if obtained.

However, it must be noted that should the local municipality not have adequate capacity for the handling of waste, provision of water and sewage handling provisions available; then the Project Applicant will make use of private contractors to ensure that the services are provided. An outline of the services that will be required are discussed below.

A.8.1 Water Usage

Raw and potable water will be required during the construction, operation and decommissioning phases of the proposed Komas WEF project, for staff consumption purposes, for the roads and earthworks, as well as for the batching plant.

Water supply will be sourced by the contractor and is typically through a water purchase agreement between the municipal water board and the contractor. Should the onsite existing boreholes not be able to meet the water demands, water will be purchased and trucked to the site in water tankers. The monthly was consumption will vary during the construction phase, however it is anticipated that a maximum of 3000 m^3/month would be required for the construction phase. During the operational and decommissioning phases, water use will be minimal.

A.8.2 Sewage or Liquid Effluent

The proposed project will require sewage services during the construction, operational and decommissioning phases of the proposed Komas WEF project. Low volumes of sewage or liquid effluent are estimated. More specifically, it is estimated that a peak approximately 28,000 *l* per month of sewage will be generated during the construction phase. During the operational phase, it is estimated that 10,000 *l* of sewerage per month will be generated.

Liquid effluent will be limited to the ablution facility during the construction and operational phases. Portable sanitation facilities (i.e. chemical toilets) will be used during the construction phase, which will be regularly serviced and emptied by a suitable (private) contractor on a regular basis. Permanent ablution facilities may be installed during the operational phase. The effluent will be stored on site in watertight concrete structures (conservancy tanks) and thereafter transported to and disposed of at the Local Municipal sewerage treatment works. Due to the remote locality of the project site, sewage cannot be disposed in the municipal waterborne sewage system. The provisioning of this service will also be confirmed with the NKLM before construction commences.

A.8.3 Solid Waste Generation

The quantity of waste generated will depend on the construction phase, which is estimated to extend over 24 months. However, it is estimated that approximately 2 000-5 000 kg of general waste will be generated every month during the construction phase. During the construction phase, the following waste materials are anticipated:

- Packaging material, such as the cardboard, plastic and wooden packaging and off-cuts;
- Hazardous waste from empty tins, oils, soil containing oil and diesel (in the event of spills), and chemicals;
- Building rubble, discarded bricks, wood and concrete;
- Domestic waste generated by personnel; and
- Vegetation waste generated from the clearing of vegetation.

Solid waste will be managed via the EMPrs during the construction and operational phases (Appendix G of the BA Report), which incorporates waste management principles. During the construction phase, general solid waste will be collected and temporarily stockpiled in skips in a designated area on site and thereafter removed, emptied into trucks, and disposed at a registered waste disposal facility on a monthly basis by an approved waste disposal Contractor (i.e. a suitable Contractor) or the municipality. In addition, a skip will be placed on site and any damaged or broken WEF components (i.e. those not returned to the supplier) will be stored in this skip. A specialist waste management company will be commissioned to manage and dispose of this waste.

Any hazardous waste (such as contaminated soil as a result of spillages) will be temporarily stockpiled (for less than 90 days) in a designated area on site (i.e. placed in leak-proof storage skips), and thereafter removed off site by a suitable service provider for safe disposal at a registered hazardous waste disposal facility.

Waste disposal slips and waybills will be obtained for the collection and disposal of the general and hazardous waste. These disposal slips (i.e. safe disposal certificates) will be kept on file for auditing purposes as proof of disposal. The waste disposal facility selected will be suitable and able to receive the specified waste stream (i.e. hazardous waste will only be disposed of at a registered/licenced waste disposal facility). The details of the disposal facility will be finalised during the contracting process, prior to the commencement of construction. Where possible, recycling and re-use of material will be encouraged. Waste management is further discussed in the EMPrs (Appendix G of this BA Report).

During the operational phase, the facility will produce minor amounts of general waste (as a result of the offices). It is estimated that approximately 2.5 m^3 of waste will be generated every month during the operational phase. Waste management is discussed in the EMPrs (Appendix G of this BA Report).

A.8.4 Electricity Requirements

In terms of electricity supply for the construction and operational phases, since there are no existing Eskom or municipal infrastructure supply services in the area, the Project Developer will make use of generators on site during the construction, operation and decommissioning phases of the proposed Komas WEF project.

A.9 Applicable Legislation

The scope and content of this BA Report has been informed by the legislation, guidelines and information series documents listed in Table A.5. It is important to note that the specialist studies included in Appendix C of this BA Report also include a description of the relevant applicable legislation.

Table A.5. Legislation Applicable to the Proposed Project

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
The National Environmental Management Act, 1998 (Act 107 of 1998), as amended	The proposed project will require the implementation of appropriate environmental management practices.	National DEFF	19 November 1998
NEMA EIA Regulations published in GN R982, R983, R984 and R985 on 8 December 2014, and as amended on 7 April 2017 in GN R326, R327, R325 and R324	These Regulations provide the procedures that need to be followed for the BA process.	National DEFF	8 December 2014 and amended on 7 April 2017
NEMA EIA Regulations published in Government Notice R983 and R985, and as amended on 7 April 2017 in GN R327, R325 and R324	These Regulations contain the relevant listed activities that are triggered, thus requiring a BA. Please refer to Section A (10) of this BA Report for the complete list of listed activities.	National DEFF	8 December 2014 and amended on 7 April 2017
GN 114 – Notice of identification in terms of section 24(5)(a) and (b) of the NEMA of the procedure to be followed in applying for EA for large scale wind and solar PV energy development activities identified in terms of section 24(2)(a) of the NEMA when occurring in geographical areas of strategic importance (i.e. REDZs)	The proposed project falls within the Springbok REDZ (REDZ 8) and a BA process is therefore required instead of a full EIA.	National DEFF	16 February 2018
GN 960 – Notice of the requirement to submit a report generated by the National Web Based Environmental Screening Tool, in terms of Section 24(5)(h) of the NEMA and Regulation 16(1)(b)(v) of the NEMA EIA Regulations, 2014, as amended, when submitting an Application for EA in terms of Regulations 19 and 21 of the NEMA EIA Regulations, 2014, as amended	GN 960 was published on 5 July 2019 and came into effect for compulsory use of the National Web Based Environmental Screening Tool from 4 October 2019. As such, the Application for EA for the proposed project has been run through the National Web Based Environmental Screening Tool, and an associated report was generated and attached to the Application for EA.	National DEFF	5 July 2019

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
GN 320 - 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 NEMA, when applying for EA	GN 320 prescribes general requirements for undertaking site sensitivity verifications and for protocols for the assessment and minimum report content requirements of environmental impacts for environmental themes for activities requiring EA. The Specialist Assessments undertaken as part of this BA process comply with GN 320, where applicable, such as the Aquatic Biodiversity and Agriculture Compliance Statements as well as the Noise Specialist Assessment. The Defence and Civil Aviation Site Sensitivity Verifications comply with GN 320. The Bat, Visual, Heritage (including Archaeology, Cultural Landscape and Palaeontology), and Transport specialist studies comply with Part A of GN 320, which contains site sensitivity verification requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed. The Terrestrial Biodiversity, Avifauna, Socio-Economic and Transport Impact Assessments were undertaken in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended. The protocols were enforced within 50 days of publication of the notice i.e. on 9 May 2020.	National DEFF	20 March 2020
GN 1150 - 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, when applying for EA	GN 1150 prescribes protocols in respect of specific environmental themes for the assessment of, as well as the minimum report content requirements on, the environmental impacts for activities requiring EA. GN 1150 includes a protocol for the specialist assessment	National DEFF	30 October 2020

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
	and minimum report content requirements for environmental impacts on a) terrestrial animal species and b) terrestrial plant species. The requirements of these protocols apply from the date of publication (i.e. from 30 October 2020), except where the Applicant provides proof to the competent authority that the specialist assessment affected by these protocols had been commissioned by the date of publication of these protocols in the Government Gazette, in which case Appendix 6 of the NEMA EIA Regulations, 2014, as amended, will apply to such applications. It is important to note that the Specialist Assessments undertaken as part of this BA process were commissioned prior to the publication of the Species Protocols published on 30 October 2020. Details of the specialist site visits (as applicable) undertaken prior to 30 October 2020 is detailed in Appendix C. Contractual proof showing appointments of the specialists prior to 30 October 2020 is included in Appendix J of the BA Report.		
National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA)	General and hazardous waste will be generated during the construction phase, which will require proper management. Such management actions are recommended in the EMPrs, which are included in Appendix G of this BA Report.	National DEFF National DEFF	6 March 2009 2 June 2014
National Environmental Management: Air Quality Act	The proposed stockpiling activities, including	National DEFF	19 February 2005

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
(Act 39 of 2004)	earthworks, may result in the unsettling of, and temporary exposure to, dust. Appropriate dust control methods will need to be applied. Such management actions are recommended in the EMPrs, which are included in Appendix G of this BA Report.		
Section 50 of the National Environmental Management: Protected Areas Act (Act 57 of 2003), as amended (NEMPAA)	Section 50 of NEMPAA relates to the regulation of commercial and community activities in nature reserves and world heritage sites. Section 50 (5) states: *No development, construction or farming may be permitted in a national park, nature reserve or world heritage site without the prior written approval of the management authority.* The proposed Komas WEF does not fall inside the Namaqua National Park, but falls partly within the Parks' Expansion Footprint Area and its Buffer Zone. SANParks acknowledged in their letter dated 12 February 2012 that the NNP expansion footprint and buffer zone are not currently within the declared area of the NNP, and confirms that Section 50 of NEMPAA would not apply to the proposed Komas WEF.	National DEFF	2003
Water Services Act (Act 108 of 1997)	Raw and potable water will be required during the construction, operation and decommissioning phases of the proposed Komas WEF project, for staff consumption purposes, for the roads and earthworks, as well as for the batching plant. Water supply will be sourced by the contractor and is typically through a water purchase agreement between the municipal water board and the	National Department of Water Affairs	1997

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
	contractor. Should the onsite existing boreholes not be able to meet the water demands, water will be purchased and trucked to the site in water tankers. Compliance with this act will be undertaken during the relevant phases of the project, in consultation with the local and district municipalities, if relevant (i.e. if water is sourced from the local municipality).		
Hazardous Substances Act (Act 15 of 1973)	During the proposed project, fuel and diesel will be utilised to power vehicles and equipment. In addition, potential spills of hazardous materials could occur during the relevant phases. Such management actions are recommended in the EMPrs, which are included in Appendix G of this BA Report.	Department of Health	1973
National Forest Act (Act 84 of 1998)	Protected Tree species are listed under the National Forests Act (Act 84 of 1998, as amended). In terms of section 15(1) of the act, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. The Terrestrial Biodiversity Assessment (Appendix C.1 of the BA Report) notes that two protected tree species have been observed in the area, *Aloe dichotoma* and *Acacia erioloba*. However, neither of these has been observed present on the proposed	National DEFF	1998

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
	Komas WEF site and no protected trees are likely to be affected by the proposed Komas WEF. If any protected plant species are found on site during the search and rescue or construction, the DEFF will be contacted to discuss the relevant permitting requirements.		
National Water Act (Act 36 of 1998), as amended (NWA)	The NWA controls activities in and around water resources, as well as the general management of water resources, including abstraction of groundwater and disposal of water. Authorisation for changes in land use, up to 500 m from a defined water resource / wetland system will require at the minimum the compilation of a risk assessment and depending upon outcome, an application for use under a General Authorisation or a Water Use Licence from the Department of Human Settlements, Water and Sanitation (DHSWS). The crossing of watercourses e.g. roads and cables is considered to be a water use as defined within the NWA and would require authorisation from the DHSWS. However, the Aquatic Biodiversity Compliance Statement (Appendix C.2 of the BA Report) confirms that no watercourses are located within the study area boundary and the proposed Komas WEF infrastructure does not fall within the	DHSWS	1998

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
	regulated area of a watercourse. The regulated area of a watercourse as defined in GN 509 (General Authorisation in terms of Section 39 of the NWA) is indicated below (it includes wetlands): *"regulated area of a watercourse" for section 21(c) or (i) of the Act water uses in terms of this Notice means: (a) The outer edge of the 1 in 100 year flood line and /or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam; (b) In the absence of a determined 1 in 100 year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or (c) A 500 m radius from the delineated boundary (extent) of any wetland or pan".* Water uses listed within Section 21 (c) and (i) of the NWA therefore do not apply to the proposed construction and operation of the proposed Komas WEF as there will be no crossing of water courses on site. However, water may be abstracted from existing		

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
	boreholes on site as raw and potable water will be required during the construction, operation and decommissioning phases of the proposed Komas WEF project, for staff consumption purposes, for the roads and earthworks, as well as for the batching plant. Therefore, Section 39 of the NWA may be applicable and a General Authorisation (or WUL) may be required. This will be confirmed with DHSWS prior to construction.		
Integrated Environmental Management (IEM) guideline series published by DEFF (various documents dated from 2002 to present)	The IEM Guideline series provides guidance on conducting and managing all phases and components of the required BA and PPP, such that all associated tasks are performed in the most suitable manner. Relevant guidelines have been considered in this BA process.	National DEFF	2002 - present
National Heritage Resources Act (Act 25 of 1999)	The proposed project may require a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA) prior to any fossils or artefacts being removed by professional palaeontologists and archaeologists. If archaeological mitigation is needed, then the appointed archaeologist will need to submit a Work Plan to the South African Heritage Resources Agency (SAHRA) to do the work. This must be carried out well in advance of construction to ensure that there is	National Department of Arts and Culture	1999

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
	enough time for SAHRA to approve the mitigation work before construction commences. Should professional palaeontological mitigation be necessary during the construction phase, the palaeontologist concerned will need to apply for a Fossil Collection Permit from SAHRA. Palaeontological collection should comply with international best practice. All fossil material collected must be deposited, together with key collection data, in an approved depository (museum / university). Palaeontological mitigation work including the ensuing Fossil Collection reports should comply with the minimum standards specified by SAHRA (2013). Additional information regarding this is provided in the Heritage Impact Assessment (HIA) and Palaeontological Impact Assessment (Appendix C.6 of the BA Report).		
Conservation of Agricultural Resources Act (Act 43 of 1983)	The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA) provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. CARA defines different categories of alien plants and those listed under Category 1 are prohibited and must be	National Department of Agriculture	1983

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
	controlled while those listed under Category 2 must be grown within a demarcated area under permit. Category 3 plants includes ornamental plants that may no longer be planted but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the floodline of water courses and wetlands. The Terrestrial Biodiversity Assessment (Appendix C.1 of the BA Report) notes that the predominant alien of concern at the site is *Acacia cyclops*, which is listed as Category 1b. The relevant application will be submitted to the Department of Agriculture and the requirements in terms of CARA will be adhered to. Rehabilitation after disturbance to agricultural land is managed by the CARA.		
National Environmental Management: Biodiversity Act (Act 10 of 2004), as amended (NEMBA)	This Act serves to control the disturbance and land utilisation within certain habitats, as well as the planting and control of certain exotic species. Effective disturbance and removal of threatened or protected species encountered on or around the site, will require specific permission from the applicable authorities, i.e from DEFF. Should protected plant and animal species be found on site, DEFF will be contacted to discuss the permitting requirements. In addition, the management of exotic plant species, will be governed by the Alien and Invasive Species	National DEFF	September 2004

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
	(AIS) regulations, which were gazetted in 2014. These regulations compel landowners to manage exotic weeds on land under their jurisdiction and control. The Terrestrial Biodiversity Assessment (Appendix C.1 of the BA Report) notes that the predominant alien of concern at the site is *Acacia cyclops*. The relevant requirements of NEMBA will be adhered in terms of the effective management thereof by the relevant landowners. In addition, the most prominent statute containing provisions directly aimed at the conservation of birds is the National Environmental Management: Biodiversity Act (Act 10 of 2004), as amended, read with the Threatened or Protected Species Regulations, February 2007 (TOPS Regulations). Chapter 1 sets out the objectives of the Act, and they are aligned with the objectives of the Convention on Biological Diversity, which are the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of the benefits of the use of genetic resources. The Act also gives effect to CITES, the Ramsar Convention, and the Bonn Convention on Migratory Species of Wild Animals. The State is endowed with the trusteeship of biodiversity and has the responsibility to manage, conserve and sustain the biodiversity of South Africa.		

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
Subdivision of Agricultural Land Act (Act 70 of 1970)	The Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA) requires that any long term lease associated with the renewable energy facility be approved by the Department of Agriculture, Land Reform and Rural Development (DALRRD). The SALA consent is separate from the Application for EA, and needs to be applied for and obtained separately. An application for the change of land use (re-zoning) for the development on agricultural land will be lodged by the Applicant for approval in terms of the SALA as required.	Republic of South Africa	1970
Section 53 of the Mineral Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), as amended (MPRDA)	This section of the MPRDA deals with the use of land surface rights contrary to objects of the Act. It states "any person who intends to use the surface of any land in any way which may be contrary to any object of this Act or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner". Therefore, the Project Applicant will submit an application to DMRE in terms of Section 53 of the MPRDA. All mining right holders on the farm portions to be affected by the proposed Komas WEF and within a 2km radius have been included on the database of I&APs in order to ensure meaningful consultation.	DMRE	2002
The Astronomy Geographic Advantage Act (Act 21 of 2007)	The Astronomy Geographic Advantage (AGA) Act (Act 21 of 2007) aims to provide for the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy; to	Department of Higher Education, Science and Technology (previously the Department of Science and	2007

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date
	provide for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas; and to provide for matters connected therewith. The purpose of the AGA Act is to preserve the geographic advantage areas that attract investment in astronomy. The AGA Act also notes that declared astronomy advantage areas are to be protected and properly maintained in terms of Radio Frequency Interference (RFI). The AGA Act is administered by the Department of Higher Education, Science and Technology (previously the Department of Science and Technology). The location of the proposed project does not pose an Electromagnetic Interference (EMI) or RFI risk to the Square Kilometre Array (SKA), as the proposed project is located outside of the Karoo Central Astronomy Advantage Area (KCAAA). Refer to Figure A.8 for the location of the proposed project in relation to the SKA and KCAAA. The National Web-Based Screening Tool indicates that the project Komas WEF site falls within an area of low sensitivity in terms of the relative RFI theme sensitivity).	Technology).	

A.10 Listed Activities Associated with the Proposed Project

Section 24(1) of the NEMA states: "*In order to give effect to the general objectives of integrated environmental management laid down in this Chapter, the potential impact on the environment of listed activities must be considered, investigated, assessed and reported to the competent authority charged by this Act with granting the relevant environmental authorization*".

The reference to "listed activities" in Section 24 of the NEMA relates to the regulations promulgated in GN R326, R327, R325 and R324, dated 7 April 2017. The relevant GN published in terms of the NEMA collectively comprises the NEMA EIA Regulations, 2014, as amended, listed activities that require either a BA, or Scoping and EIA be conducted. As noted previously, due to the project being proposed in a REDZ, the proposed project requires a BA process and is subject to a reduced decision-making period of 57 days (instead of the 107 days).

The Application for EA for this BA process is being submitted to the DEFF together with the Draft BA Report, which makes reference to all relevant listed activities forming part of the proposed development.

Table A.5 below provides a list of the applicable listed activities associated for the proposed project in terms of Listing Notice 1 (GN R 327), Listing Notice 2 (GN R325) and Listing Notice 3 (GN R324) in terms of the NEMA EIA Regulations, 2014, as amended.

Table A.6. Applicable Listed Activities

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R327) of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
Activity 11 (i)	The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	The proposed project will entail the construction of a 33/132 kV on-site SS. The proposed project will take place outside of an urban area. *This activity would therefore be triggered.*
Activity 14	The development and related operation of facilities or infrastructure, or for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	Storage tanks will be required on site at the proposed Komas WEF site for the storage of diesel and other fuels to service the generators for electricity supply. The storage tanks constitute the development and related operation of infrastructure, for the storage and handling, of a dangerous good (i.e. fuel), where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. *This activity would therefore be triggered*.
Activity 24 (ii)	The development of a road – (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	An existing unnamed gravel public road off the R355 will be used to gain access to the site. Internal access gravel roads of approximately 10 m wide, including turning circle/bypass area of up to 20 m at some sections during the construction phase are proposed. As such, the roads and cables will be positioned within a 20 m wide corridor. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.

Activity No(s):	**Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R327) of the EIA Regulations, 2014 as amended**	**Describe the portion of the proposed project to which the applicable listed activity relates.**
		This activity would therefore be triggered.
Activity 28 (ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	The land is currently used for agricultural purposes (mainly grazing). The proposed Komas WEF is considered to be a commercial/industrial development and, will have a footprint of approximately 90 ha (including internal roads, but excluding existing access roads leading to the site which will be used). The associated infrastructure includes a solid state lithium-ion BESS and various structures, buildings and electrical grid infrastructure (EGI) such as, but not limited to an on-site 33/132 kV SS. The BESS and on-site SS (known as the BESS and SS complex) comprises a site of approximately 4 ha. The proposed project will take place outside of an urban area. *This activity would therefore be triggered.*
Activity 56 (i) (ii)	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre – (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres;	The existing unnamed public gravel road off the R355 and existing onsite gravel roads may be widened by more than 6 m in some places to provide access to the WEF site. Internal access roads will be up to 20 m wide. Where possible existing gravel roads will be upgraded, and may be widened by more than 6 m and lengthened by more than 1 km. *This activity would therefore be triggered.*
Activity No(s):	Provide the relevant **Scoping and EIA Activity(ies**) as set out in **Listing Notice 2 (GN R 325)** of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
Activity 1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facility or infrastructure is for photovoltaic installations and occurs -	The proposed Komas WEF entails the construction of a WEF with a maximum capacity of up to 300 MW. It will be located on Portion 1 of the Farm Zonnekwa No. 326, Portions 2, 3 and 4 of the Farm Zonnekwa No. 328 and on Portion 4 of the Farm Kap Vley No. 315. The proposed wind farm will therefore be developed outside of an

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R327) of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	a) within an urban area; or b) on existing infrastructure.	urban area. Note that GN 114 states that Applications for EA for large scale Wind and Solar PV energy facility, when such facility trigger Activity 1 of Listing Notice 2 of 2014 of the NEMA EIA Regulations, 2014, as amended, and any other listed and specified activities necessary for the realisation of such facility, and where the entire proposed facility is to occur in such REDZs, must follow a BA process, in order to obtain EA. *Therefore although this activity would therefore be triggered, a BA will be undertaken instead of a Scoping and EIA.*
Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed 300 MW Komas WEF will have a footprint of approximately 90 ha (i.e. more than 20 ha). As a result, more than 20 ha of indigenous vegetation would be removed for the construction of the proposed Komas WEF. It is located outside an urban area where indigenous vegetation will be cleared for the construction of the proposed WEF. Note that GN 114 states that Applications for EA for large scale Wind and Solar PV energy facility, when such facility trigger Activity 1 of Listing Notice 2 of 2014 of the NEMA EIA Regulations, 2014, as amended, and any other listed and specified activities necessary for the realisation of such facility, and where the entire proposed facility is to occur in such REDZs, must follow a BA process, in order to obtain EA. *Therefore although this activity would therefore be triggered, a BA will be undertaken instead of a Scoping and EIA.*
Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 3 (GN R 324)** of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
Activity 4 (g) (ii) (bb)	The development of a road wider than 4 metres with a reserve less than 13,5	An existing unnamed gravel public road off the R355 will be used

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R327) of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
(ee) (gg)	metres. g. Northern Cape ii. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks.	to gain access to the site. Internal access gravel roads of approximately 10 m wide, including turning circle/bypass area of up to 20 m at some sections during the construction phase are proposed. As such, the roads and cables will be positioned within a 20 m wide corridor. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary. Although the proposed Komas WEF Development Area is 13.2 km from the boundary of NNP and the nearest turbine placement is 15.66 km from the boundary, it falls partly within the Park's buffer zone. The proposed project area falls within the National Protected Areas Expansion Strategy Focus Areas (NPAES) and within a CBA 2. *This activity would therefore be triggered.*
Activity 10 (g) (iii) (bb) (ee) (gg)	The development and related operation of facilities or infrastructure for the storage, or storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. g. Northern Cape iii. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks.	Storage tanks will be required on site at the proposed Komas WEF site for the storage of diesel and other fuels to service the generators for electricity supply. The storage tanks constitute the development and related operation of infrastructure, for the storage and handling, of a dangerous good (i.e. fuel), where such storage occurs in containers with a combined capacity of 30 cubic metres or more but not exceeding 80 cubic metres. The proposed Komas WEF falls within a National Protected Area Expansion Strategy Focus Area and within a CBA2. Although the proposed Komas WEF Development Area is 13.2 km from the boundary of NNP and the nearest turbine placement is 15.66 km from the boundary, it falls partly within the Park's buffer zone. The 2014 NEMA EIA Regulations, as amended, defines a "protected area" as those protected areas contemplated in section

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R327) of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
		9 of the NEMPAA and the core area of a biosphere reserve and shall include **their buffers.** *This activity would therefore be triggered.*
Activity 12 (g) (ii)	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;	The proposed 300 MW WEF will have an estimated footprint of approximately 90 ha. As a result, more than 300 m^2 of indigenous vegetation would be removed for the construction of the proposed Komas WEF and associated infrastructure. The southern section of the project area falls within a CBA 2. *This activity would therefore be triggered.*
Activity 18 (g) (ii) (bb) (ee) (ii)	The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometre: g) Northern Cape ii) Outside Urban Areas: (bb) National Protected Area Expansion Strategy Focus areas; (ee) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. (gg) Areas within 10 kilometres from national parks.	The existing unnamed gravel public road off the R355 may be widened by more than 4 m in some places to provide access to the WEF site. Internal access roads will be up to 20 m wide. Where possible existing gravel roads will be upgraded, and may be widened by more than 4 m and lengthened by more than 1 km. The southern section of the project area falls within a NC-NPAES Focus Area and a CBA 2. Although the proposed Komas WEF Development Area is 13.2 km from the boundary of NNP and the nearest turbine placement is 15.66 km from the boundary, it falls partly within the Park's buffer zone. *This activity would therefore be triggered.*

It must be noted that the above listed activities have been identified in line with the following:

- The activities in Listing Notice 2 (GN R325); i.e. Activities 1 and 15, have been provided above, however as captured in GN 114 of February 2018, a BA process is required for Renewable Energy Developments in the REDZ (instead of a Scoping and EIA process).
- Based on the sensitivity screening undertaken and the Terrestrial Biodiversity Impact Assessment for the site, the proposed project falls within a CBA 2, an Ecological Support Area (ESA) and the NC-PAES Focus Area.
- Activity 21 of GN R327 (Listing Notice 1) is not applicable at this stage of the BA. However, if the EPC contractor in future determines that a borrow pit is required, then the necessary approvals will be obtained.

A.11 National Web-Based Environmental Screening Tool

As noted above, GN 960 (dated 5 July 2019) published a notice of the requirement to submit a report generated by the National Web Based Environmental Screening Tool, in terms of Section 24(5)(h) of the NEMA and Regulation 16(1)(b)(v) of the NEMA EIA Regulations, 2014, as amended, when submitting an Application for EA in terms of Regulations 19 and 21 of the NEMA EIA Regulations, 2014, as amended, GN 960 came into effect for compulsory use of the National Web Based Environmental Screening Tool from 4 October 2019. As such, the Application for EA for the proposed project has been run through the National Web Based Environmental Screening Tool, and an associated report was generated and attached to the Application for EA.

Based on the selected classification, the National Web Based Environmental Screening Tool provides a list of specialist studies that should be undertaken as part of the BA process, as well as identifies the sensitivities on site that need to be verified by either the EAP or the specialists, where relevant, as noted in the Assessment Protocols of 20 March 2020 (GN 320). The classification that applies to the proposed project is **Utilities Infrastructure; Electricity; Generation; Renewable; Wind**

The following list of Specialist Assessments have been identified by the National Web Based Environmental Screening Tool for inclusion in the BA Report (Table A.7). The National Web Based Environmental Screening Tool Report notes that it is the responsibility of the EAP to confirm this list and to motivate in the BA Report, the reason for not including any of the identified specialist studies (if applicable).

Table A.7. List of Specialist Assessments identified by the Screening Tool and confirmation of assessment and type thereof undertaken in this BA.

	Specialist Study Required by the Screening Tool	Assessment undertaken in BA	Type of Assessment undertaken in BA	Appendix of BA Report
1a	Terrestrial Biodiversity Impact Assessment	Yes	Appendix 6: Impact Assessment. The Terrestrial Biodiversity Impact Assessment includes feedback on Terrestrial Plant and Animal Species. This study was commissioned in September 2018. This is a substantial period prior to the Assessment Protocol published in GN 320 on 20 March 2020 came into effect. This study was also undertaken and commissioned prior to the Species Protocol published in GN 1150 dated 30 October 2020 (as discussed above in Section A.10) came into effect. Proof of the date of appointment of the Biodiversity specialist, Simon Todd of 3Foxes Biodiversity Solutions, is provided in Appendix F.2 of this BA report. Therefore, this study was undertaken in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended. The study undertaken as part of the BA is referred to as Terrestrial Biodiversity Impact Assessment.	C.1
1b	Plant Species Assessment			
1c	Animal Species Assessment			
2	Aquatic Biodiversity Assessment	Yes	Protocol GN320: Aquatic Biodiversity Compliance Statement. Please note that although the Screening Tool notes that an Aquatic Biodiversity Assessment must be undertaken, a Compliance Statement was undertaken instead. The motivation for this is provided in the section below and also in Section B.8 of this BA report. The study undertaken as part of the BA is referred to as the Aquatic Biodiversity Compliance Statement. Note there is no Species Protocol published yet for Aquatic Plants and Animals.	C.2
3	Avian Impact Assessment	Yes	Appendix 6: Impact Assessment Please refer to the section below this table for a motivation why an Avifauna Impact was done in terms of Appendix 6 of the 2014 NEMA EIA Regulations and not in terms of the Avifauna protocol	C.3

	Specialist Study Required by the Screening Tool	Assessment undertaken in BA	Type of Assessment undertaken in BA	Appendix of BA Report
			in GN320.	
4	Bat Impact Assessment	Yes	Appendix 6: Impact Assessment As there is no relevant protocol applicable.	C.4
5	Landscape/Visual Impact Assessment	Yes	Appendix 6: Impact Assessment As there is no relevant protocol applicable	C.5
6	Archaeological and Cultural Heritage Impact Assessment	Yes	Appendix 6: Impact Assessment. An integrated HIA, including Archaeology, Cultural Landscape and Palaeontology, has been undertaken. Refer to Appendix C.6. As there is no relevant protocol applicable	C.6
7	Palaeontology Impact Assessment			
8	Agricultural Specialist Assessment	Yes	Protocol GN320: Agricultural Assessment Compliance Statement	C.7
9	Socio-Economic Assessment	Yes	Appendix 6: Impact Assessment As there is no relevant protocol or theme on the National Web-based Screening Tool.	C.8
10	Noise Specialist Assessment	Yes	Protocol GN 320: Noise Specialist Assessment	C.9
11	Traffic Impact Assessment	Yes	Appendix 6: Impact Assessment As there is no relevant protocol or theme on the National Web-based Screening Tool.	C.10
12	Geotechnical Impact Assessment	Yes	Appendix 6: Impact Assessment As there is no relevant protocol or theme on the National Web-based Screening Tool.	C.11
13	Civil Aviation Assessment	Yes	Protocol GN 320: Site Sensitivity Verification (No requirements for low sensitivity in terms of GN 320)	C.12
14	Defense Assessment	Yes	Protocol GN 320: Site Sensitivity Verification (No requirements for low sensitivity in terms of GN 320)	C.13
15	RFI Assessment	No	Motivation not to undertake a specialist assessment. This motivation was discussed and approved by the DEFF at the pre-application meeting that took place on 18 August 2020. Refer to the motivation provided below in Section A.12.1.	N/A

Therefore, all the Specialist Assessments identified in the Screening Tool had been undertaken and are included in this BA Report (Appendices C.1 - C.13).

The Terrestrial Biodiversity Impact Assessment (Appendix C.1) was commissioned in September 2018. It was therefore commissioned a substantial period prior to the Assessment Protocol for Terrestrial Biodiversity and Species in GN 320 dated 20 March 2020 came into effect. This study was also commissioned and undertaken prior to the Species Protocol published in GN 1150 dated 30 October 2020 (as discussed above in Section A.10) came into effect. Therefore, the Terrestrial Biodiversity Impact Assessment was undertaken in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended. Proof of the date of appointment of the Terrestrial Biodiversity specialist, Simon Todd of 3Foxes Biodiversity Solutions, is provided in Appendix F.2.

The Avifauna Impact Assessment (Appendix C.3) was commissioned in February 2019. It was therefore also commissioned a substantial period prior to the publishing and promulgation of the Assessment Protocol in GN 320 on 20 March 2020. Therefore, the Avifauna Impact Assessment was also undertaken in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended. This aspect was discussed with the DEFF at the second pre-application meeting which took place on 7 October 2020 (see Presentation of meeting and meeting notes included in Appendix H.2 and Appendix H.3 respectively). DEFF agreed to this approach that the Avifauna Impact Assessment could be undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended, as confirmed via approval of the pre-application meeting notes (included in Appendix H.4 of this BA Report). In addition, proof of the date of appointment of the Avifauna specialist, Dr. Rob Simmons of Birds and Bats Unlimited, is provided in Appendix F.2 of this BA Report.

An Aquatic Biodiversity Compliance Statement was undertaken (Appendix C.2). According to the National Wetland Map 5 (CSIR, 2018), a large depression wetland is located within the western portion of the Komas WEF study area (Figure B.23). This depression has been indicated as an area of very high sensitivity in terms of Aquatic Biodiversity by the National Environmental Screening Tool (Figure B.24). However, upon investigation of this area during the field survey undertaken in January 2020 it was found that the area indicated as wetland habitat is in fact an extensive dune field. This dune field is a flat area located between two ridge lines and is characterised by fresh, wind-blown sand and dry terrestrial vegetation (Figure B.25). There is no indication that water accumulates within this area, and no wetland indicators as defined by the delineation guidelines (DWAF 2005, updated 2008) were encountered e.g. hydromorphic soils, wetland vegetation, signs of salt accumulation or hardened / cracked surface layers. Therefore, the site sensitivity verification disputes the rating of very high sensitivity assigned to this area in the National Web-Based Screening Tool in terms of Aquatic Biodiversity. An Aquatic Biodiversity Compliance Statement was therefore undertaken instead of an Aquatic Biodiversity Specialist Assessment. This approach was discussed and confirmed with DEFF at the first pre-application meeting held on 18 August 2020 (see Appendix H.2 for the presentation, Appendix H.3 for the meeting notes and Appendix H.4 for DEFF's approval of the meeting notes).

A Noise Specialist Assessment was conducted in accordance with the requirements of the Noise Protocol published in GN 320 on 20 March 2020 as there are WTGs within 2 000 m from NSDs (as per the requirements of SANS 10328:2008). This approach was discussed and confirmed with DEFF at the first pre-application meeting held on 18 August 2020 (see Appendix H.2 for the presentation, Appendix H.3 for the meeting notes and Appendix H.4 for DEFF's approval of the meeting notes).

In addition to the specialist studies noted above, technical studies were also undertaken to inform the BA process:

- Terrestrial Biodiversity Mitigation Strategy Assessment
- Biodiversity Offset Implementation
- Wake Effects Assessment
- Geology Assessment

It is important to note that these technical reports do not comply to Appendix 6 of the NEMA EIA Regulations, 2014, as amended. This approach was discussed and confirmed with DEFF at the first and second pre-application meetings held respectively on 18 August 2020 and 7 October 2020 (see Appendix H.2 for the presentations, Appendix H.3 for the meeting notes and Appendix H.4 for DEFF's approval of the meeting notes).

A.11.1 Square Kilometre Array and Radio Frequency Interference

The AGA Act (Act 21 of 2007) aims to provide for the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy; to provide for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas; and to provide for matters connected therewith. The purpose of the AGA Act is to preserve the geographic advantage areas that attract investment in astronomy. The AGA Act also notes that declared astronomy advantage areas are to be protected and properly maintained in terms of RFI. The AGA Act is administered by the Department of Higher Education, Science and Technology (previously the Department of Science and Technology).

According to the CSIR Wind and Solar Phase 2 SEA (DEFF, 2019: Part 3, Page 2), the majority of the mid-frequency dish array of the SKA will be constructed in the core which is in located in the Northern Cape; with dish antennas being located in the spiral arms. The South African component of the SKA will consist of approximately 3 000 receptors comprising dish antennas, each with a diameter of 15 m, and radio receptors known as dense aperture-arrays. The outer stations in the spiral arms will extend beyond the borders of South Africa and at least 3 000 km from the core area. About 80% of the receptors, including a dense core and up to 5 spiral arms, will be located in the KCAAA (DEFF, 2019: Part 3, Page 2).

The KCAAA, which is located between Brandvlei, Van Wyksvlei, Carnarvon and Williston in the Northern Cape Province, was officially declared in 2014 by the Minister of Science and Technology in terms of the AGA Act for the purposes of protection RFI and EMI. The declaration of the KCAAA ensures the long term viability of the area to be used for astronomical installations (DEFF, 2019: Part 3, Page 2).

The main impacts of RE developments on the SKA is RFI. RFI is a part of the Electromagnetic Compatibility (EMC) discipline that includes Electromagnetic emissions and Electromagnetic immunity. The location of the proposed project does not pose an EMI or RFI risk to the SKA, as the proposed project is located outside of the KCAAA. Refer to Figure A.8 for the location of the proposed project in relation to the SKA and KCAAA. Furthermore, based on the findings of the Wind and Solar Phase 1 SEA (DEA, 2015), the proposed project site falls within an area of low sensitivity in terms of SKA sensitivity for the development of wind energy. This also aligns with the findings of the Screening Tool (i.e. the proposed project site falls within a low sensitivity in terms of the relative RFI theme sensitivity).

During the pre-application meeting with DEFF undertaken on 18 August 2020, it was explained that it is not intended to commission a RFI study for the proposed project due to its location away from the

SKA and KCAAA and the findings of the Screening Tool. This motivation for exclusion was acknowledged and approved by the DEFF during the pre-application meeting, with the recommendation for such motivation to also be included in the BA Report. All correspondence relating to the pre-application meeting is addressed in Appendix H of this BA Report.

Furthermore, the SKA is on the project I&AP database as a key stakeholder, and will be informed of the availability of the Draft BA Report for a 30-day comment period. Therefore, the SKA can provide comment on the project during the 30-day comment period.

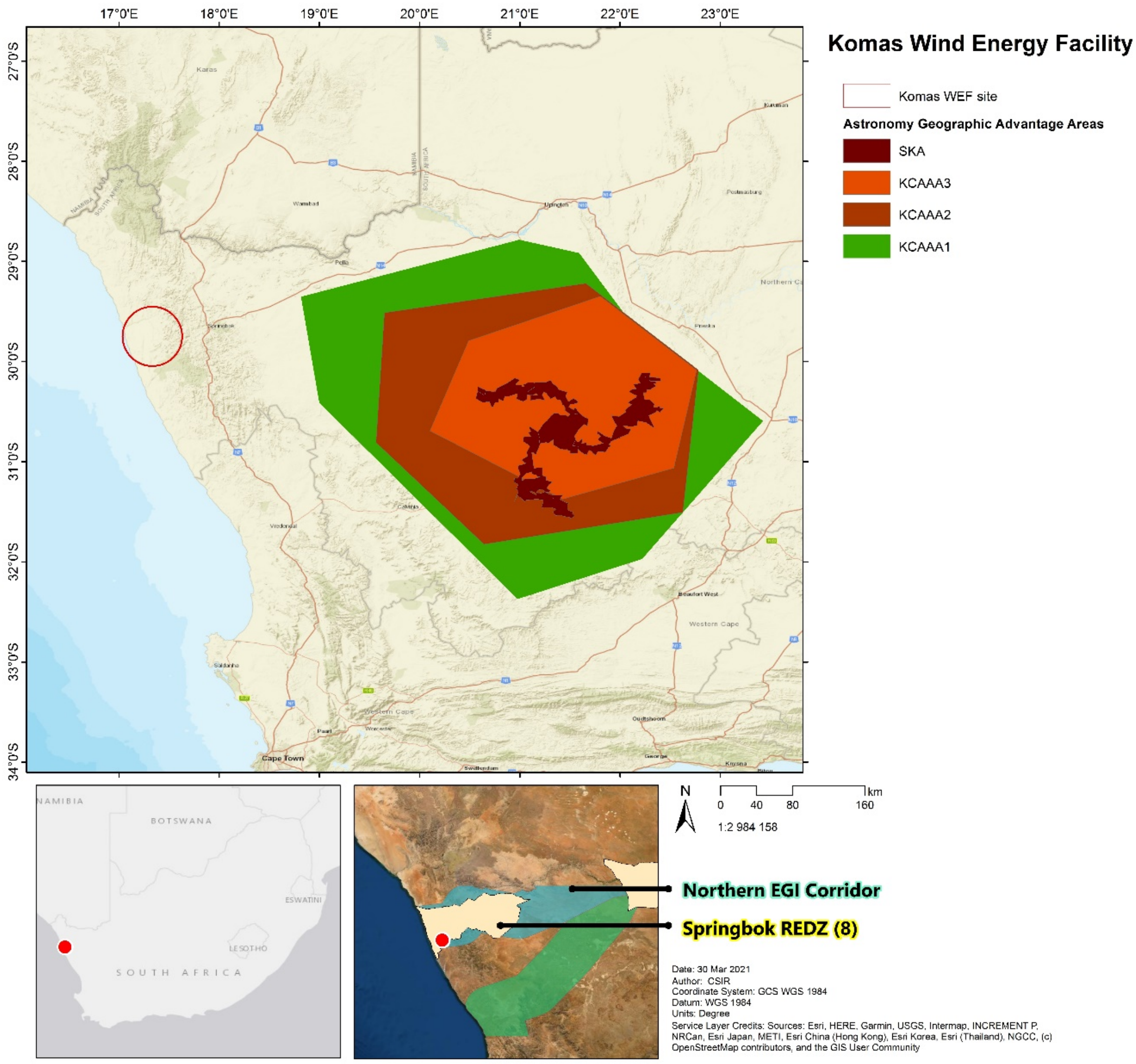


Figure A.8. Location of the proposed project in relation to the SKA and KCAAA

A.12 Description of Alternatives

This section discusses the alternatives that have been considered as part of the BA process. Sections 24(4) (b) (i) and 24(4A) of the NEMA require an Environmental Assessment to include investigation and assessment of impacts associated with alternatives to the proposed project. In addition, Section 24O (1)(b)(iv) also requires that the Competent Authority, when considering an application for EA, takes into account "where appropriate, any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment".

Therefore, the assessment of alternatives should, as a minimum, include the following:

- The consideration of the No-Go alternative as a baseline scenario;
- A comparison of the reasonable and feasible alternatives; and
- Providing a methodology for the elimination of an alternative.

The NEMA EIA Regulations, 2014, as amended, define alternatives, in relation to a proposed activity, as "different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

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

Regulation 2 (e) of Appendix 1 of the NEMA EIA Regulations, 2014, as amended, states that one of the objectives of the BA process is to, through a consultative process, and through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the site and location identified through the life of the activity to (i) identify and motivate a preferred site, activity and technology alternative; (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and (iii) identify residual risks that need to be managed and monitored.

A.12.1No-go Alternative

The No-Go alternative assumes that the proposed project will not go ahead i.e. it is the option of not constructing the proposed Komas WEF and associated infrastructure. This alternative would result in no environmental impacts on the site or surrounding local area as a result of the proposed project. It provides the baseline against which other alternatives are compared and will be considered throughout the report.

The following implications will occur if the "No-Go" alternative is implemented (i.e. the proposed project does not proceed):

- No benefits will be derived from the implementation of an additional land-use;
- No additional power will be generated or supplied through means of renewable energy resources by this project at this location.

- The "no go" alternative will not contribute to and assist the government in achieving its renewable energy target of 26 630 MW total installed capacity by 2030 (for Wind, Solar PV and Concentrated Solar Power);
- Electricity generation will remain constant (i.e. no renewable energy generation will occur on the site for the proposed project) and the local economy in terms of surrounding communities and towns within the local municipality will not be diversified;
- There will be lost opportunity for skills transfer and education/training of local communities;
- The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realised;
- There will be no opportunity for additional employment in an area, where job creation is identified as a key priority;
- The local economic benefits associated with the REIPPPP will not be realised, and socio-economic contribution payments into the local community trust will not be realised;
- Coal fired power stations will not promote the generation of green energy and will therefore not directly contribute to South Africa's response to climate mitigation; and
- Electricity from coal is more expensive compared to Wind and solar energy which are the cheapest sources of electricity in South Africa. The development of the proposed Komas WEF can contribute to the competitive nature of the REIPPPP to drive prices down even further to ensure that South Africans have access to affordable yet clean electricity. Hence, if renewable energy facilties are not developed, this opportunity will be lost.

Converse to the above, the following benefits could occur if the "No-Go" alternative is implemented:

- The agricultural land use, i.e. sheep farming will remain;
- No vegetation or SCC (flora and fauna) will be removed or disturbed during the development of the proposed project;
- No impact on the CBA 1 and CBA 2 and the NC-PAES Focus Area;
- No destruction of habitat will occur;
- No visual impacts due to the establishment of the project and no change to the current landscape will occur;
- No heritage artefacts or palaeontological resources will be impacted on;
- No avifaunal impacts will occur due to the establishment of the project;
- No impacts to bats will occur due to the establishment of the project;
- No noise impacts either during the construction phase or during the operational phase when wind turbines are rotating;
- No additional traffic generation and no associated dust will be generated during the construction of the proposed Komas WEF; and
- No additional water use will be required during the construction or operational phases.

Table A.8. Summary of No-Go Alternative from Specialist Assessments

Specialist Study	No-Go Alternative Assessment
Terrestrial Biodiversity Impact Assessment	The No-Go alternative would result in the development not going ahead and the current land-use of extensive livestock grazing continuing at the site. Although extensive livestock grazing can be compatible with biodiversity maintenance, it can also result in a decline in plant and animal species richness if grazing pressure is too high. In the long-term the No-Go alternative would result in the maintenance of the status quo, which can be considered to represent a low negative impact on biodiversity.
Aquatic Biodiversity Impact Assessment	There are no water courses on the proposed Komas WEF project site. Therefore, there will be no impact to the aquatic biodiversity, regardless if the proposed Komas WEF is developed or not.
Avifauna Impact Assessment	The No-Go alternative will result in no additional impacts on avifauna (especially on the Priority bird species) and will result in the ecological status quo being maintained, which will be advantageous to the avifauna. Should the proposed Komas WEF (and other renewable energy projects) not be developed SA will continue its dependence on fossil-fuel instead of turning to green energy which will reduce greenhouse gas emissions and associated climate change which will be a hugely positive move for South Africa.
Bat Impact Assessment	Although the No-Go option was investigated, it is understandable that this is a renewable energy development within the Springbok REDZ, and development is inevitable. One development option, i.e. the proposed WEF, was provided, which is the preferred option.
Visual Impact Assessment	The 'No-Go' alternative is essentially the option of not developing a WEF in this area. The area would thus retain its visual character and sense of place and there would be no visual impacts
Heritage Impact Assessment (Archaeology, Cultural Landscape and Palaeontology)	• **Archaeology and Cultural Landscape:** The No-Go alternative would entail the site staying as it currently is. This means its continued use for small stock grazing and the continued natural erosion, weathering and trampling by animals. Palaeontological resources would not likely be affected because significant fossils will remain buried, but archaeological materials would suffer very minimal impacts. The landscape would remain unchanged. Overall, the significance of impacts related to the No-Go alternative is considered to be very low negative. • **Palaeontology:** The No-Go alternative would entail the site staying as it currently is. This means its continued use for small stock grazing and the continued natural erosion, weathering and trampling by animals. Palaeontological resources would not likely be affected because significant fossils will remain buried. Overall, the significance of impacts related to the No-Go

Specialist Study	No-Go Alternative Assessment
	alternative is considered to be very low negative.
Agricultural Compliance Statement	The No-Go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. The one identified potential such impact is that due to continued low rainfall in the area, in addition to other economic and market pressures on farming, the agricultural enterprises will come under increased pressure in terms of economic viability, with resultant potential decrease in productivity. The proposed development has both positive and negative agricultural impacts. The balance of positive and negative agricultural impacts associated with both the development and the No-Go alternative – that is the extent to which the development and the No-Go alternative will impact agricultural production – cannot reliably be determined to be significantly different. Therefore, from an agricultural impact perspective, there is no preferred alternative between the development and the No-Go alternative. The agricultural impact of the proposed development can confidently be assessed as negligible without entering into a more formal assessment.
Socio-Economic Impact Assessment	The No-Go alternative would represent a lost opportunity for South Africa to supplement is current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost. The No-Go Development alternative also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) associated with the proposed Komas WEF and the benefits associated with the establishment of a Community Trust. This also represents a negative social cost. However, at a provincial and national level, it should be noted that the proposed Komas WEF development is not unique. In this regard, a significant number of other renewable energy developments are currently proposed in the Northern Cape and other parts of South Africa. Foregoing the proposed establishment of WEFs would therefore not necessarily compromise the development of REFs in the Northern Cape Province and or South Africa. However, the socio-economic benefits for local communities in the NKLM would be forfeited. Given the decline in the role played by mining and the limited economic opportunities in the NKLM, the No-Go Development Alternative would represent a significant lost opportunity for the area and is not supported by the findings of the Socio-Economic Assessment. The No-Go Development alternative is rated as High Negative.
Noise Assessment	The No-Go alternative will result in the ambient sound levels remaining

Specialist Study	No-Go Alternative Assessment
	as is (relatively low).
Transport Impact Assessment	Based on the findings of this assessment, the potential increase in traffic and the associated noise and dust pollution have been rated as high before mitigation during the construction and decommissioning phases of the proposed Komas WEF. However, the phases will be short-term and the traffic volumes are expected to be low. Therefore, the significance of the impacts can be reduced to moderate after mitigation. It is envisaged that most materials, water, plant, services and people will be procured within a 60 km radius from the proposed Komas WEF. The potential impacts associated with proposed Komas WEF and associated infrastructure are acceptable from a transport perspective and it is therefore recommended that the proposed facility be authorised, provided that the proposed recommendations and mitigation measures are adhered to.
Geotechnical Impact Assessment	Should the proposed Komas WEF not be developed, there will be no geotechnical impacts associated with the proposed development.

As outlined in Section D of this report, the majority of the negative impacts identified as part of this assessment can be reduced to moderate or low significance with the implementation of mitigation measures. None of specialists found that the proposed project should not go ahead i.e. no fatal flaws were identified. As noted above, the Socio-Economic Impact Assessment identified positive impacts from a social upliftment perspective. These include benefits to the local community via employment opportunities and the development of locally-owned industries to support construction related activities.

Hence, while the "No-Go" alternative will not result in any negative environmental impacts as a result of the proposed project; it will also not result in any positive community development or socio-economic benefits. It will not assist government in addressing climate change, reaching its set targets for renewable energy, nor will it assist in supplying the increasing electricity demand within the country. Hence the "No-Go" alternative is not a preferred alternative, or a reasonable and feasible alternative considered in this BA process.

A.12.2Land-use Alternatives

All farm portions forming part of the project are zoned for agricultural land-use, and are mainly used for either commercial livestock grazing, communal use or subsistence farming. As noted in the Agriculture Compliance Statement (Appendix C.7) of this BA Report, agricultural potential is uniformly low across the affected farms. The major limitations to agriculture are the severely limited climatic moisture availability and the sandy soils with low water holding capacity. As a result of these limitations, the agricultural use of the study area is limited to low intensity grazing only. The project site is classified with a predominant land capability evaluation value of 5 (low), although it varies from 4 to 6 across the site (Land Capability Classification for South Africa, 2017). The grazing capacity on AGIS is classified as low at 45 hectares per large stock unit. Hence, agricultural land use is not a preferred, or a reasonable and feasible alternative considered in this BA process. The proposed Komas WEF will generate an additional income stream to the landowners and is therefore the preferred land use alternative and will not impede on the existing agricultural practises to still continue on site.

In order for South Africa to achieve its renewable energy generation goals, agriculturally zoned land will need to be used for renewable energy generation. It is far more preferable to incur a cumulative loss of agricultural land in a region such as the one being assessed, which has no cultivation potential, and low grazing capacity, than to lose agricultural land that has a higher potential, and that is much scarcer, to renewable energy development elsewhere in the country. The limits of acceptable agricultural land loss are far higher in this region than in regions with higher agricultural potential.

It is important to re-iterate that the economic benefits to the landowners associated with the proposed WEF are likely to be more significant than that of the current livestock farming activities on site. The proposed development offers a land use with much higher income generating capacity than any viable agricultural land use on the site. <u>Based on the above, the agricultural land use is not a preferred alternative</u>.

Refer to Sections B and D of this report for a summary of the Agriculture Compliance Statement, as well as Appendix C.7 for the complete report.

A.12.3Type of Activity - Renewable Energy Alternatives

Where the “activity” is the generation of electricity from a renewable energy source, i.e. wind, possible alternatives that could be considered on the project site include renewable energy technologies such as Hydro Energy, Biomass, and Solar Energy. **However, based on the preliminary investigations undertaken by the Applicant, the generation of electricity from wind is deemed to be most appropriate for the site**. The other renewable energy development options for the site, as well as the potential risks and impacts of each, are discussed below.

A.12.3.1 Hydro Energy

The proposed project site does not contain any large inland water bodies, which excludes the possibility of renewable energy from small or large scale hydro energy generation. In terms of micro hydro power potential, the South African Renewable Energy Resource Database (SARERD), has classified the proposed project site as “Not Suitable” (Figure A.9). <u>Therefore, the implementation of a Hydro Energy Facility at the proposed site is not considered to be a reasonable and feasible alternative to be assessed as part of this BA process</u>.

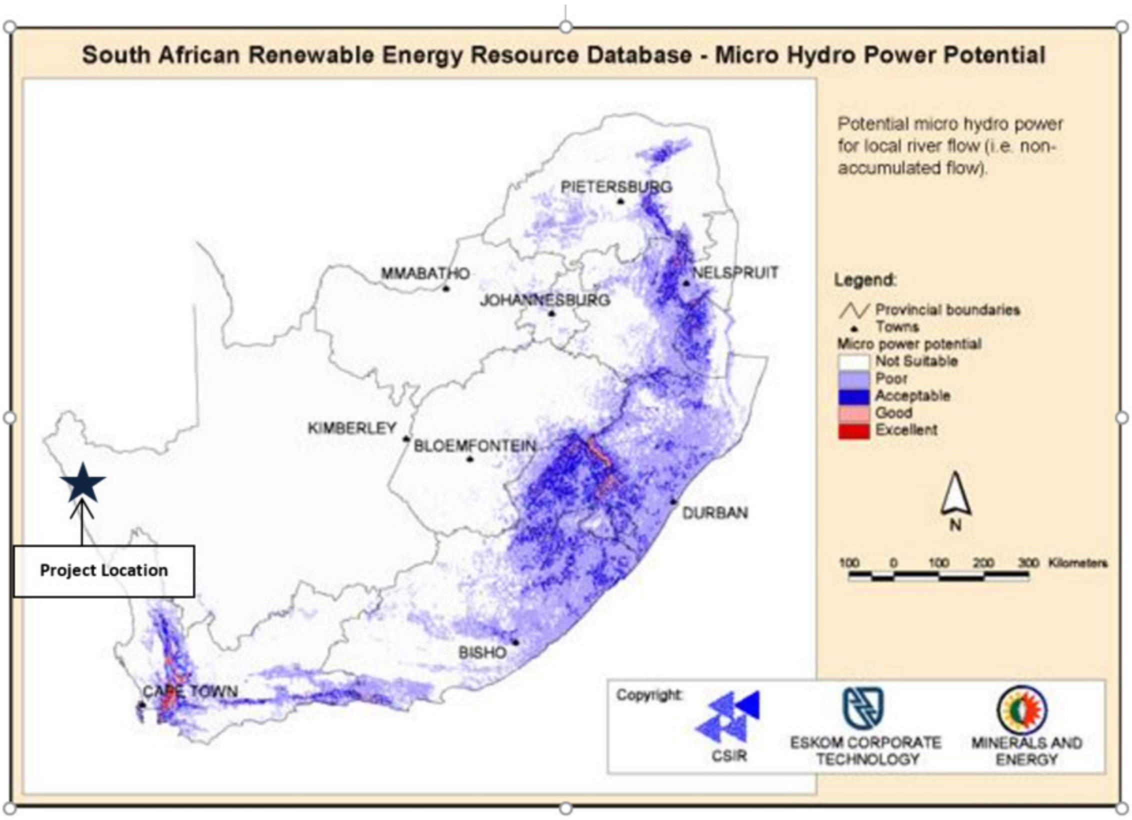


Figure A.9: Micro Hydro Power Potential (Source: SARERD, 2016).

A.12.3.2 Biomass Energy

According to the SARERD, the project site does not contain any abundant or sustainable supply of biomass (Figure A.10). Therefore, the implementation of a Biomass Energy Facility at the proposed site is not considered to be a reasonable and feasible alternative to be assessed as part of this BA process.

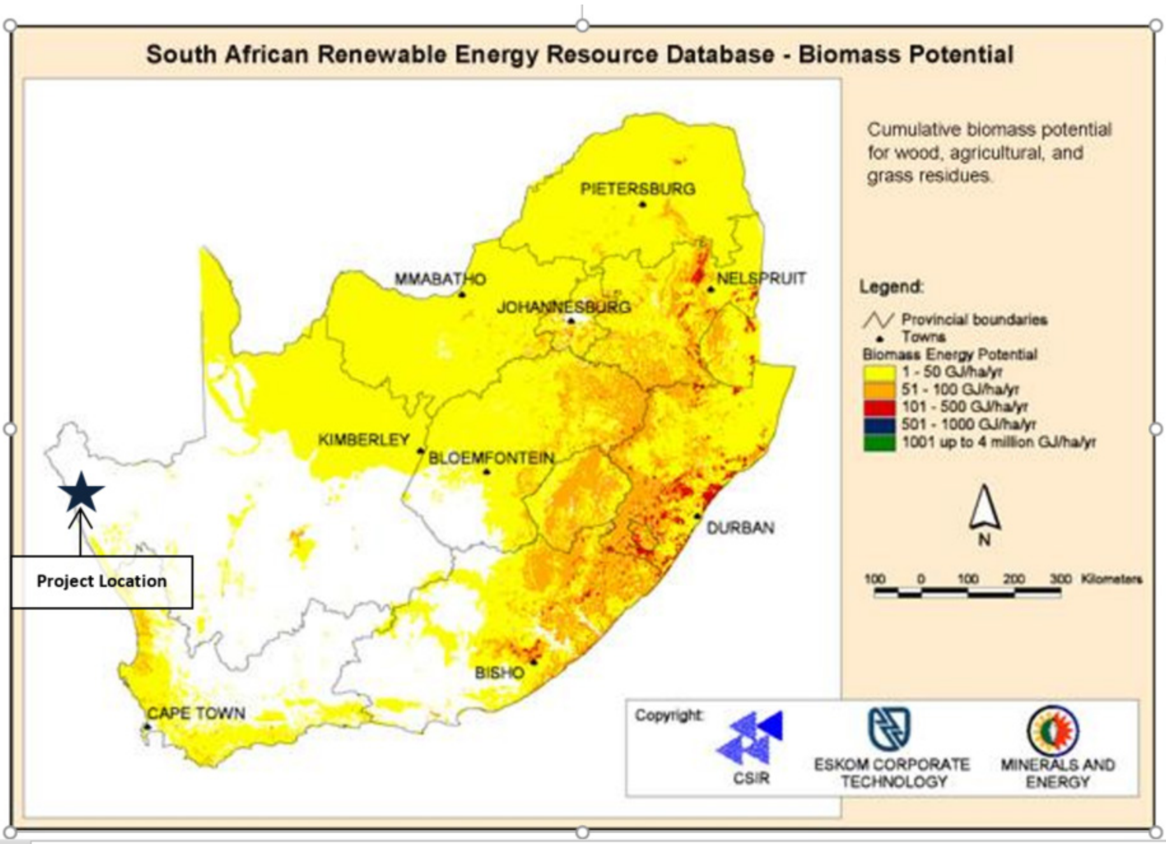


Figure A.20: Biomass Potential (Source: SARERD, 2016).

A.12.3.3 Wind and Solar Energy

- 2019 Integrated Resource Plan, Wind and Solar SEA

The 2019 Integrated Resource Plan (IRP) was published in GG 42784, GN 1360 on 18 October 2019 for the period 2019 to 2030. As indicated in Figure A.11, coal makes up approximately 43 % of the total installed capacity indicated in the 2019 IRP, whereas Wind and Solar PV respectively make up 23 % and 10 %.

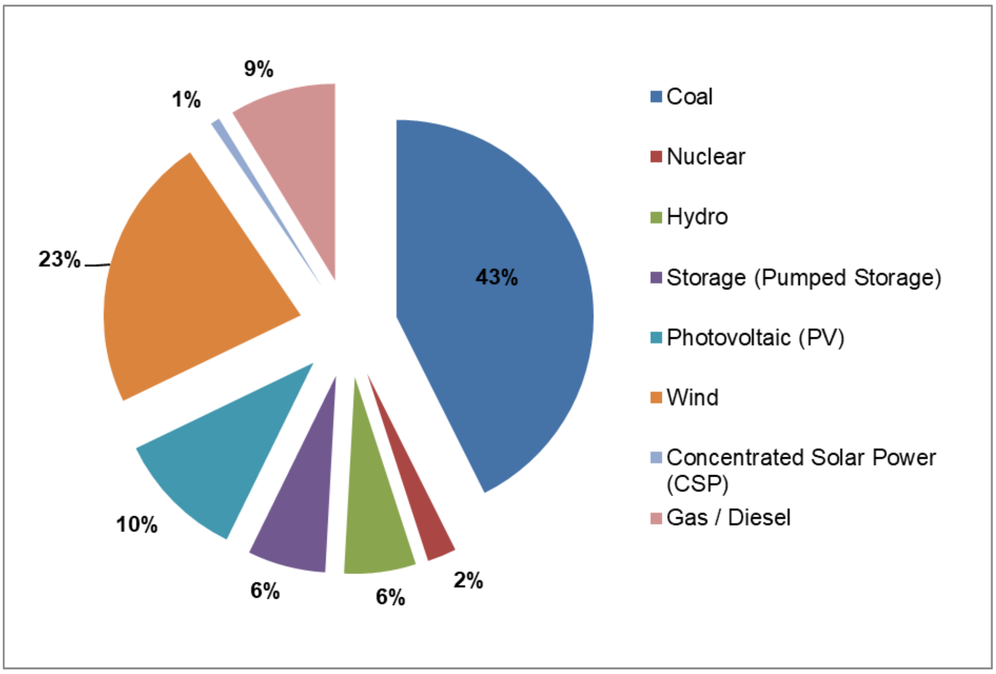


Figure A.11. 2019 IRP Total Installed Capacity (% of MW)

The 2019 IRP proposes to secure 26 630 MW of renewable energy capacity by 2030 (for Wind, Solar PV and Concentrated Solar Power (CSP)). This amount excludes Hydropower and Pumped Storage. Of this total, 1 980 MW of Wind, 1 474 MW of Solar PV, and 300 MW of CSP is already installed capacity. In addition, of the 26 630 MW, approximately 1 362 MW of Wind, 814 MW of Solar PV, and 300 MW of CSP is committed or already contracted capacity. Furthermore, 14 400 MW of Wind and 6 000 MW of Solar PV is new additional capacity. This is indicated in Figure A.12.

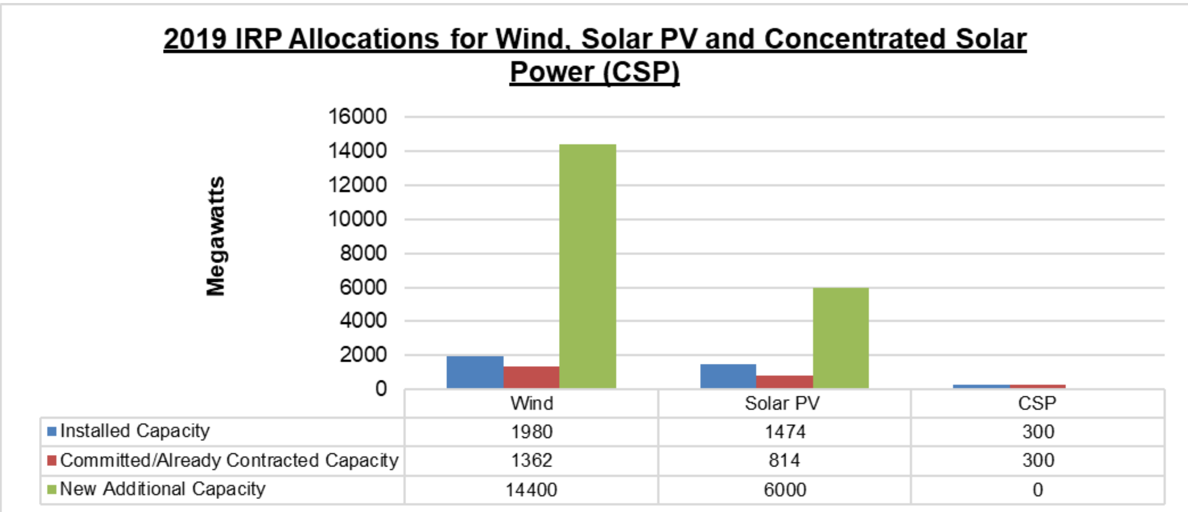


Figure A.12. 2019 IRP Allocations for Wind, Solar and CSP in MW

Linked to the 2010 IRP, the DMRE entered into a bidding process for the procurement of 3 725 MW of renewable energy from IPPs by 2016 and beyond. On 18 August 2015, an additional procurement target of 6 300 MW to be generated from renewable energy sources was added to the REIPPPP for the years 2021 - 2025, as published in GG 39111.

On 7 July 2020, in GG 43509 and GN 753, the Minister of the DMRE, in consultation with the National Energy Regulator of South Africa (NERSA), determined that new generation capacity needs to be procured to contribute towards energy security. Specifically, 2 000 MW will be procured from a range of energy source technologies in accordance with the short-term risk mitigation capacity allocated for the years 2019 to 2022 (under “other” in the allocation table contained in 2019 IRP). In line with this, the Risk Mitigation IPP Procurement Programme (RMIPPPP) was designed and launched in August 2020 by the DMRE in order to fulfil the GN 753 Ministerial Determination.

In order to submit a bid in terms of the REIPPPP, the proponent is required to have obtained an EA in terms of the NEMA EIA Regulations, 2014, as amended as well as several additional authorisations or consents. Linked to this, the DEA in discussion with the Department of Energy (DoE) (now respectively operating as the DEFF and DMRE), was mandated by Ministers and Members of Executive Council (MinMec) to commission a SEA to identify the areas in South Africa that are of strategic importance for Wind and Solar PV development. The Phase 1 Wind and Solar PV SEA[4] was completed in 2015, and was in support of the Strategic Infrastructure Plan (SIP) 8, which focuses on the promotion of green energy in South Africa. As noted above, the SEA aimed to identify strategic geographical areas best suited for the roll-out of large scale wind and solar PV energy project, referred to as REDZs. Through the identification of the REDZs, the key objective of the SEA was to enable strategic planning for the development of large scale wind and solar PV energy facility in a manner that avoids or minimises significant negative impact on the environment while being commercially attractive and yielding the highest possible social and economic benefit to the country – for example through strategic investment to lower the cost and reduce timeframes of grid access. Following the completion of the SEA, the REDZs were gazetted in February 2018 in GN 114 by the Minister of Environmental Affairs. The location of the proposed project within a REDZ (specifically the Springbok REDZ (REDZ 8)) supports the development of a large scale renewable energy project in the location (Refer to Figure A.13). The proposed project is therefore in line with the national planning vision for wind and solar development in South Africa.

[4] More information on the SEA can be accessed at https://redzs.csir.co.za

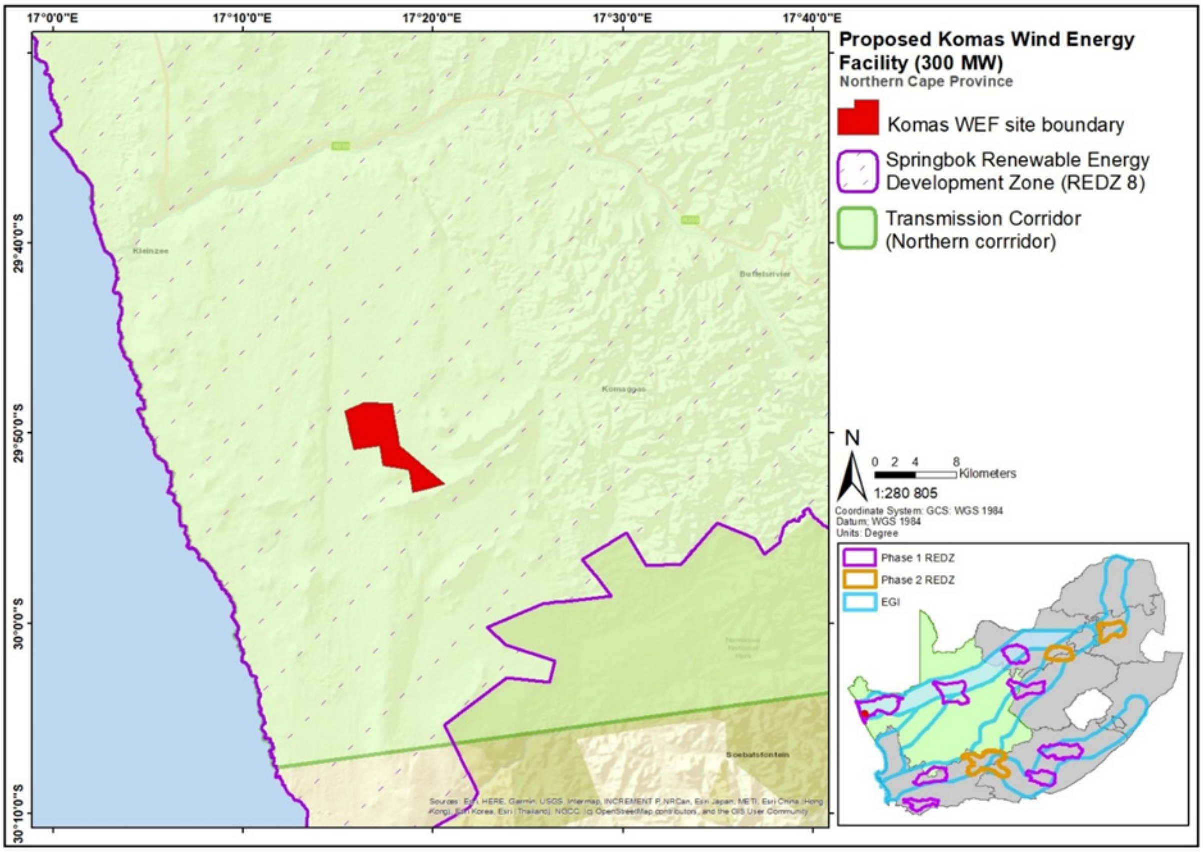


Figure A.13: Renewable Energy Development Zones identified in the SEA which were gazetted in Phase 1 in GG 41445 on 16 February 2018 (the proposed Komas WEF falls within the Springbok REDZ (REDZ 8)) and Phase 2 in Gazette 44191, GN 144 on 26 February 2021.

Solar Energy

- National Level Considerations: Solar Radiation

In terms of the suitability of solar development at this location, the proposed project site has a high Global Horizontal Irradiation[5] (GHI), relevant to solar PV installations (Figure A.14). As indicated in Figure A.14, the site has a GHI of 2 000 – 2 200 kWh/m^2 in terms of the long-term yearly total. Therefore, this area is deemed suitable for the construction and operation of solar PV facilities as opposed to other areas and provinces within South Africa.

[5] Global Horizontal Irradiance is the total amount of shortwave radiation received from above by a surface horizontal to the ground

Solar energy is therefore considered to be the most feasible alternative to wind energy for this site when compared to biomass and hydro energy; however, the site specific requirements for a solar PV facility make it a less feasible alternative when compared to wind energy for this particular site. The most important limitation for a solar PV development on this site is the topography. With sandy ridges there is limited flat suitable land on which to place large PV arrays. Furthermore, the site is foggy in the morning, so the solar panels will only be able to absorb the sun later in the day, hence the generation of electricity will be less effective. Solar panels need to be cleaned regularly and access to good quality water is required. Due to the scarcity of water in the area this is a limiting factor. Solar PV facilities comprises a bigger footprint compared to WEF and would thefore require more vegetation clearing which is a limiting factor to the conservation of biodiversity on site.

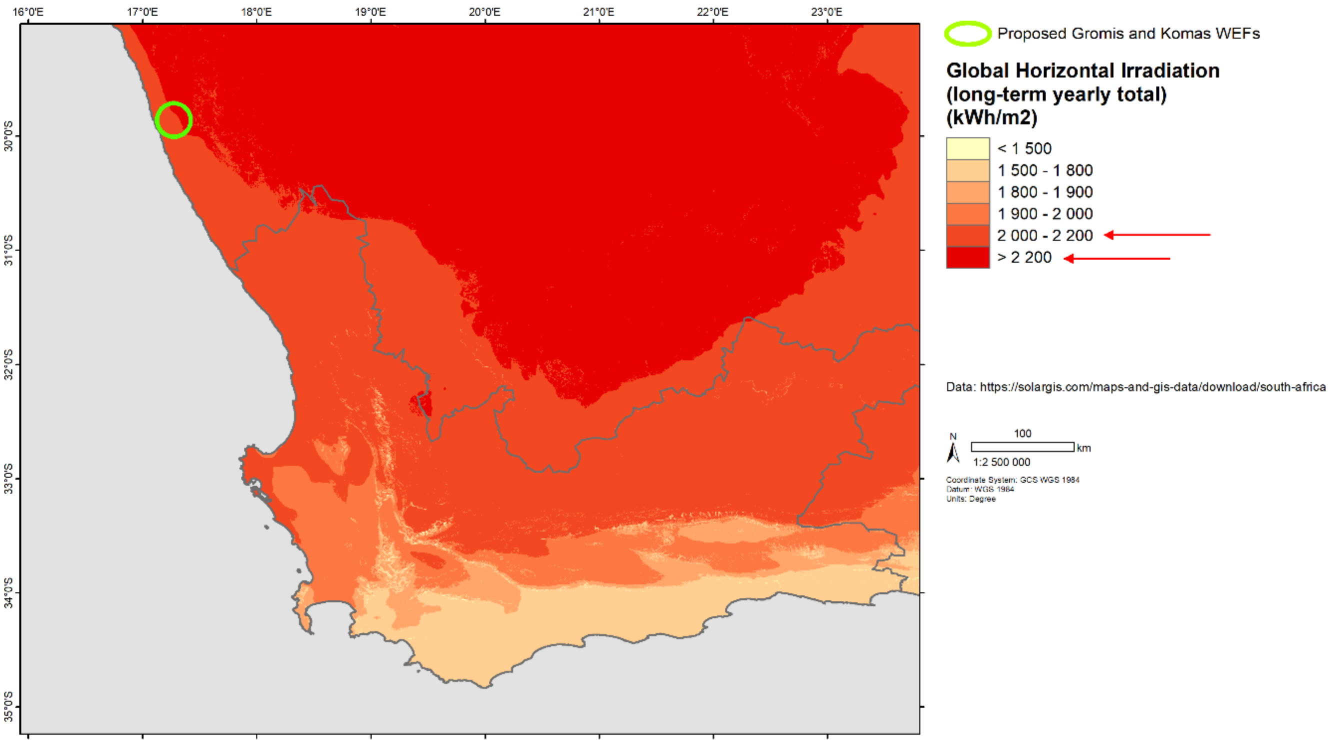


Figure A.14. Solar Resource Availability in South Africa and at the proposed Komas WEF site

Concentrated Solar Power (CSP)

Due to the scarcity of water in the proposed project area and the large volume of water required for CSP, this technology is not deemed feasible or sustainable and will not be considered in the BA. Furthermore, CSP technology requires a larger development footprint to obtain the same energy output as wind technology, and it requires active solar tracking to be effective. As described above, in terms of the 2019 IRP, 300 MW capacity is already installed for CSP; and an additional 300 MW has been allocated for 2019, whilst there is no new additional capacity allocated for this technology. Wind energy is allocated an additional new capacity of 14 400 MW in terms of the 2019 IRP. This means that the need and desirability of CSP is not as evident and justified compared to wind energy. Due to the proximity to the coast and resulting fogging, the scarcity of water, and the uneven topography of the site, solar PV and CSP technologies are therefore not considered to be reasonable and feasible alternatives to be assessed as part of this BA process.

Wind Energy

One of the most important criterion to take into consideration when selecting a potential site for a WEF is the availability of a reliable wind resource. Wind resource is defined in terms of average wind speed and includes Weibull distribution (used to describe wind speed distributions); turbulence, wind direction, and pattern of wind direction (as depicted by a wind rose). These factors are all key considerations used in determining whether a site is suitable for the development of a WEF. Measurements provided by the Wind Atlas of South Africa (WASA) indicate that the mean wind speed at the proposed Komas WEF site is 6-8 ms^{-1} (as shown in Figure A.15).

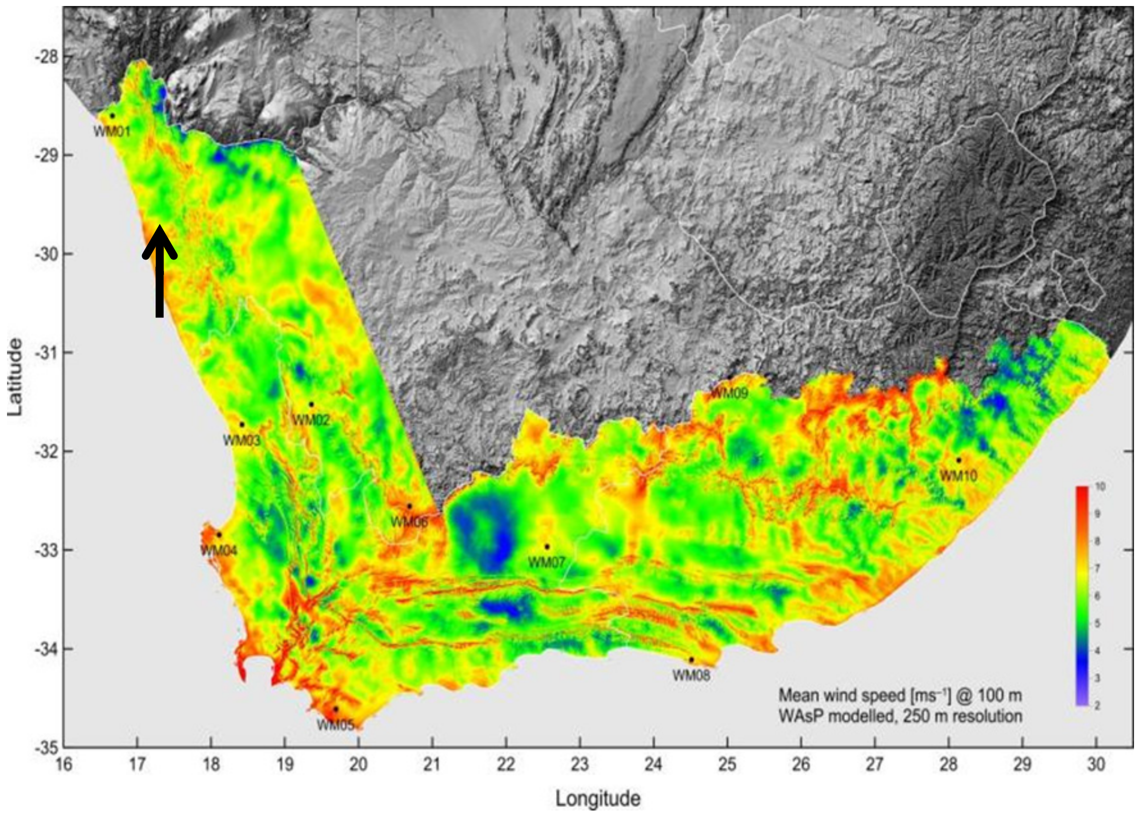


Figure A.15: Representation of Mean Wind Speed (ms^{-1} at 100 m) (*Source*: WASA, 2014).

A mean wind power density map has also been created (CSIR, 2018), which is not related to any specific turbine type and demonstrates the wind resource of the country. The mean wind power density map shows that the project site falls within an area of 400 W/m^2, which is considered as good viability for a wind project (Figure A.16).

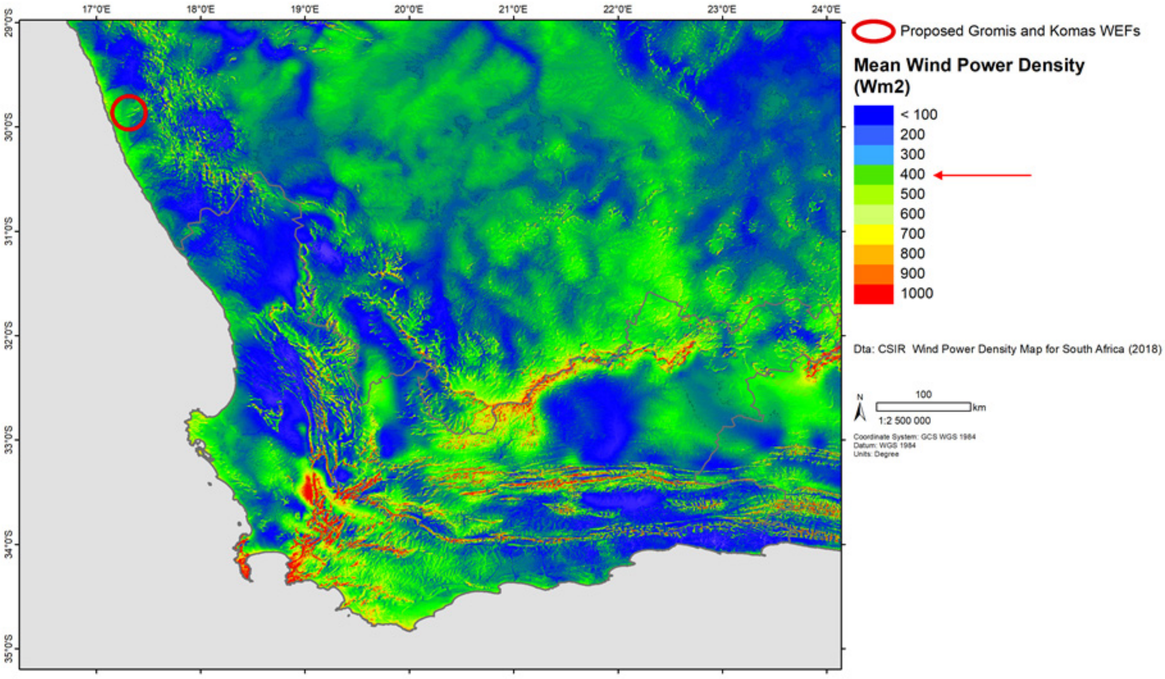


Figure A.16: Wind Power Density map (Wm^2) for South Africa and the Komas WEF site (Source: CSIR, 2018).

Based on the Project Applicant's research of the proposed Komas WEF site as a potential site for the development of a WEF, the proposed land portions located near Kleinsee were selected as an area with a good wind resource. A wind measuring mast has been installed on site to provide wind measurements to verify the potential of the resource. The process of collecting on-site wind data is necessary to confirm the bankable viability of the proposed project. The provision of at least 12 months' on-site wind monitoring data is also a requirement of the REIPPPP. Data received from consistent measurements for more than a year indicated that the wind resource at the proposed Komas WEF site is very good. Furthermore, the 2019 IRP allocated a higher additional target to wind energy compared to solar energy (i.e. 14 400 MW as opposed to 6 000 MW) which further supports the development of a WEF at this location.

Therefore, the Project Applicant has determined that the generation of electricity from wind at the Komas site is considered to be the preferred technology alternative, as it would be able to generate sufficient energy to support an economically viable WEF.

Given the above, the **development of a WEF is the preferred technology** to be developed on site because:

- The proposed Komas WEF falls within the Springbok REDZ (REDZ 8). The REDZs were gazetted on 16 February 2018 in GG No. 41445. The proposed project is therefore aligned with the criteria of the SEA and located in an area of strategic importance for wind energy development in South Africa;
- The site has a good wind resource based on WASA data (6-8 ms^{-1}) on-site measurements, and based on the wind power density map prepared by the CSIR;

- Solar energy, a potential developable technology on site, would not be as economically viable compared to wind development at this location. Limitations include the topography of the site, fog in the morning which prohibits the absorption of sunlight and the scarcity of water in the area to wash the solar panels; and
- The IRP2019 allocated a higher allocation target to wind energy compared to solar energy (i.e. 14 400 MW compared to 6 000 MW).

Based on the motivation provided above, no other renewable energy technologies alternatives (apart from wind energy) were further assessed during the BA process.

A.12.4Site Alternatives

The following farm portions are considered feasible for the proposed development of the Komas WEF:

- Portion 1 of the Farm Zonnekwa No. 326;
- Portion 2 of the Farm Zonnekwa No. 328;
- Portion 3 of the Farm Zonnekwa No. 328
- Portion 4 of the Farm Zonnekwa No. 328; and
- Portion 4 of the Farm Kap Vley No. 315.

The above areas were subject to intensive screening by the specialists in order to identify the areas to be avoided from an environmentally sensitivity perspective. Therefore, the initial layout went through several iterations following specialist inputs and outcomes to identify the most suitable site from an environmental perspective, whereby all the No-Go areas have been avoided.

The requirement to avoid impacts (and consider alternatives) is paramount in environmental assessment and the mitigation hierarchy and must be pursued before subsequent mitigation steps, especially offsets, are considered.

However, in this context, a few aspects militate against complete avoidance being pursued as usually envisaged:

1. **National planning initiatives:** The proposed Komas WEF is located within the Springbok REDZ (REDZ 8) and the Northern EGI Corridor. The area has therefore been identified as being suitable for the establishment of REFs and the associated grid connection infrastructure. The location of the proposed development is also aligned with the national planning and investment initiatives which aim to strengthen the transmission infrastructure in order to support much needed new generation capacity set out in the IRP, which has allocated 14.4 GW of wind power by 2030.
2. **Proximity to the grid:** The location of a WEF in relation to the EGI is a key consideration of the feasibility of the proposed project. The proposed Komas WEF will connect to the existing Gromis MTS which is approximately 30 km from the site. This was one of the key factors which informed the suitability of the proposed Komas WEF from a technical and feasibility perspective.
3. **Connection to the Gromis MTS:** As the area is a designated REDZ, several IPPs are developing REFs in the area. As such, Eskom has a strategic plan for all IPPs to connect to the Gromis MTS via two 132 kV servitudes running alongside the Juno-Gromis 400 kV line via a Collector SS where all IPPs will connect to avoid multiple power lines running to Gromis MTS.

4. **Land use conflicts and existence of mining rights:** The multiple degraded areas in this landscape are almost invariably located along the coast, in current mine lease areas. Section 53 (1) of the Mineral Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) requires permission from the Minister of Mineral Resources and Energy to use the surface of any land contrary to the object of the Act. There is a long history of frustrated attempts to obtain approval in terms of Section 53 (1) of the MPRDA and to secure old mine land to locate turbines– most of which have been unsuccessful unless the applicant is or is supported by the mining right holder. This requirement excludes most of the prospective degraded areas along the coast.
5. **Degraded areas within a REDZ:** The process of securing sites for WEF development prevents any applicant from perfectly exhausting degraded areas within any REDZ: it can only really be achieved at a site scale. Almost all the areas are extensive stock farms, with only small degraded areas which do not always align with turbine placement requirements.
6. **Agreements with landowners:** Concluding an agreement with the landowner giving the developer the exclusive option to register a lease over the property for the development of the wind farm can be complicated and challenging on land that is not privately owned.
7. **Other competing WEF applications:** The DEFF Renewable Energy EIA Application (REEA) database (q3 2020) indicates that much of the surrounding areas are subject to some form of renewable energy lease application, environmental assessment process, or already have authorised WEFs located on the land. This is not surprising given the location in a REDZ.
8. **Physical and technical constraints:** Salt-driven corrosion militates against many coastal sites, and geotechnical concerns prevent (or make extremely costly) turbine location on unconsolidated sediments.
9. **Joint Venture:** The Project Applicant comprises a Joint Venture (JV) between Genesis Eco-Energy Developments (Pty) Ltd (Genesis) and ENERTRAG South Africa (Pty) Ltd (ENERTRAG). Genesis also formed a JV to develop the Namas and Zonnequa WEFs which is located in close proximity to the proposed Komas WEF. The Namas and Zonnequa WEFs received EA and are proposed by Genesis Namas Wind (Pty) Ltd and Genesis Zonnequa Wind (Pty) Ltd respectively. The site was therefore also chosen as Genesis has already established themselves as a wind energy Project Developer in this specific area.

On a site specific (local) level, the site was deemed suitable due to all the site selection factors (such as land availability, high wind speed levels, distance to the national grid, site accessibility, topography, current land use and landowner willingness) being favourable. The site selection criteria considered by the Project Applicant are discussed in detail below Table A.9.

Table A.9. Site selection factors and suitability of the site

FACTOR	SUITABILITY OF THE SITE
Land Availability	The land assessed to develop the proposed Komas WEF extends approximately 5 070 ha. The area identified for the Komas WEF site within the affected farms is approximately 2 725 ha. However, the footprint of the Komas WEF within the WEF site is only approximately 90 ha (excluding access roads to the site). Therefore, the site is of a suitable size for the proposed project.
Wind Speed Levels	Above average (6-8 m/s^{-1})
Distance to the Grid	The proposed Komas WEF will connect to the existing Gromis MTS which is located approximately 30 km from the site. The proposed connection of the proposed Komas WEF to the Gromis MTS was assessed as part of a separate BA process.

FACTOR	SUITABILITY OF THE SITE
Site Accessibility	The proposed project site can be accessed via an existing, unnamed public gravel road off the R355. Internal access gravel roads of approximately 10 m wide, including turning circle/bypass area of up to 20 m at some sections during the construction phase. As such, the roads and cables will be positioned within a 20 m wide corridor. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.
Topography	The maximum slopes that would be impacted by any footprint of the development is not likely to exceed 10%. There are no steep slopes of 1:4 on the proposed project site.
Fire Risk	The proposed Komas WEF site is restricted almost entirely to the Namaqualand Strandveld vegetation type with a small extent of Namaqualand Klipkoppe Shrubland in the southeast corner of the site. The Namaqualand Strandveld has a low fire risk as it is dominated by succulent species which don't burn easily. For the Namaqualand Klipkoppe Shrubland the fire risk is very low and not likely to be an issue.
Current Land Use	Agriculture – Low potential grazing
Landowner Willingness	The landowners have signed consent for the use of the land for the proposed project (Copies of the letters of consent are included as an appendix to the Application form). This is considered an important aspect of the proposed project in terms of its viability (i.e. this will limit potential appeals during the decision-making process, as the landowners are willing and supportive of the proposed project being undertaken on their farms).

Furthermore, from an impact and risk assessment perspective, the implementation of the proposed Komas WEF on the said farms will most likely result in fewer risks in comparison to its implementation at alternate site within the Northern Cape (i.e. regions with similar wind speeds), based on the following points:

- There is no guarantee that the current land use of an alternative site will be flexible in terms of development potential, for example the agricultural potential for an alternative site/s might be higher and of greater significance. An alternative site may also have mining rights that prohibit the development.
- There is no guarantee of the willingness of other landowners to allow the implementation of a WEF on their land and if the landowners strongly object, then the project will not be feasible.
- There is no guarantee that other alternative sites will be located close to existing or proposed EGI to enable connection to the national grid. The proximity to the Eskom Gromis MTS was a major determinant for identifying a suitable site for the proposed development. The further away a project is from the grid, the higher the potential for significant environmental and economic impacts.

Given the site selection requirements associated with the proposed WEF and the suitability of the land available on the said farms and no fatal flaws identified on site, no other site alternatives were considered as part of the BA process. The proposed Komas WEF site was therefore deemed feasible and selected as the preferred site.

A.12.5Development Footprint Location and Layout Alternatives

The project assessment area extends approximately 5 070 ha, while only approximately 90 ha (i.e. 1.78% of the available land) will be required for the proposed development of the Komas WEF. The preferred development footprint of the Komas WEF on the site is shown in Figure A.17, Figure D.13 and in Appendix A.2. The project site and location were screened and assessed in detail in order to develop the proposed WEF, power line routings and associated electrical infrastructure for the proposed Komas project. The determination of the development footprint within the sites was determined through detailed sensitivity screening which was done by the specialists on the team to identify possible areas that should be avoided by the proposed development (i.e. exclusion zones or No-Go areas). These No-Go areas have been excluded from the proposed development footprints as shown in the sensitivity maps in Figure D.12 and in Appendix A.5). The specialist studies (Appendix C) have highlighted sensitive features within the original development footprint, and thus the footprint has been adjusted multiple times to avoid such features Following the exclusion of the required sensitive areas, sufficient developable area is still available on the sites which does not compromise the current ecological integrity of the sites. Based on the findings of the specialist studies, an environmental sensitivity map has been produced (as included in Figure D.12 in Section D of this report and in Appendix A.5). This map shows the sensitivities on site (e.g. terrestrial biodiversity, avifauna, bats, visual, and sensitive heritage features etc.) within the study area that need to be avoided.

The sensitive environmental features found within the preferred site, as described in the specialist studies (Appendix C) and discussed in Sections B and D of this BA Report, have been avoided by the location, layout and design of the proposed project.

Following the exclusion of the required areas, sufficient developable area is still available on site which does not compromise the current ecological integrity of the site or go against the requirements of the landowners.

A semi-detailed engineering design has also been undertaken to develop the current layout contained in Appendix A and B of this BA Report, which avoids all the environmental sensitivities identified on site, where required. The current layout is thus a culmination of extensive technical, economic and environmental planning.

A.12.5.1 BESS and On-site Substation complex area alternatives

Two site alternatives for the BESS and on-site SS (known as the BESS and SS complex) (i.e. Option 1 and Option 2) have been identified for assessment as part of the BA process (Figure A.1). The preferred alternative identified by each specialist on the specialist team is provided in Table A.10 below.

All the specialists, indicated that both BESS and on-site SS complex area alternatives (Option 1 and Option 2) are feasible. The Aquatic Bat, Heritage, Agriculture, Socio-Economic, Noise, Transport and Geotechnical specialists indicated that there is no preference between the Option 1 and Option 2 alternatives and that both are feasible (Table A.10). The Terrestrial Biodiversity specialist indicated that there is not a strong preference, but Option 2 is preferred as it is adjacent to the proposed Collector SS (if required). The Avifauna specialist noted that Option 2 is the preferred avian alternative since it is (i) closer to the incoming power line and (ii) there are slightly fewer priority bird flights in this area than at Option 1. However, both these specialists confirmed that Option 1 is also favourable from a Terrestrial Ecology and Avifauna impact perspective and does therefore not comprise a fatally flawed alternative. The Visual specialist noted that Option 1 is their preferred alternative as Option 2 is closer to the nearest receptor.

Based on the assessment undertaken by the specialists it is apparent that both BESS and on-site SS site alternatives (Option 1 and Option 2) are feasible and can be implemented. Therefore, as none of the alternatives are fatally flawed, the Project Applicant selected Option 1 to be the preferred alternative as the site is in an optimal location in relation to the proposed turbine layout (see Figure A.17).

Table A.10. Selection of the preferred BESS and on-site Substation complex area alternative (Option 1 or Option 2) by the specialists

Specialist study	**BESS and on-site Substation complex area alternative**	
	Option 1	**Option 2**
Terrestrial Biodiversity	✓	✓
Aquatic Biodiversity	✓	✓
Avifauna	✓	✓
Bats	✓	✓
Visual (including Flicker)	✓	✓
Heritage (Archaeology, Cultural Landscape and Palaeontology)	✓	✓
Agriculture	✓	✓
Socio-Economic	✓	✓
Noise	✓	✓
Transport	✓	✓
Geotechnical	✓	✓

Legend:

	Preferred
	No preference
	Favourable

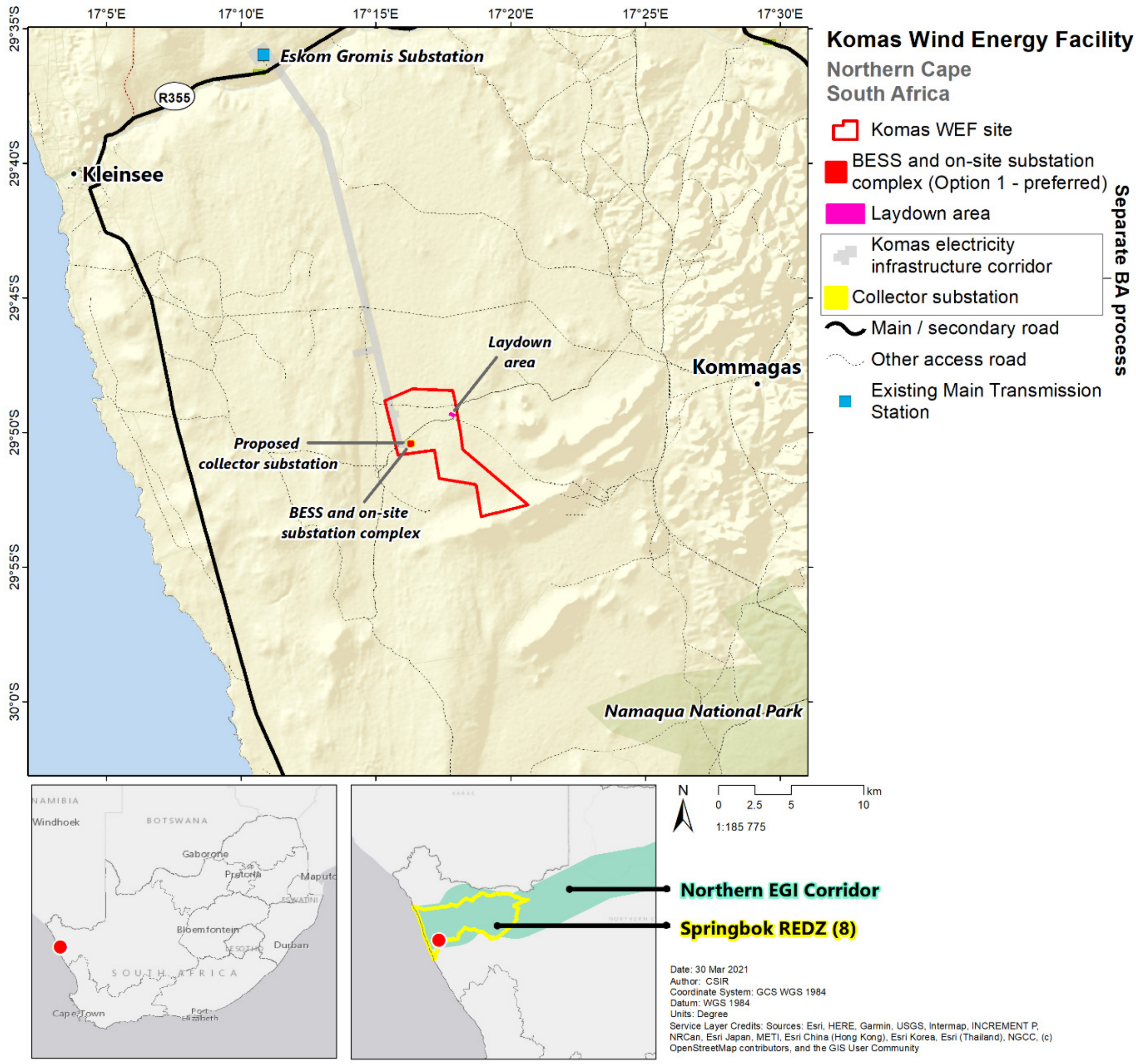


Figure A.17: Preferred layout for the Komas WEF which includes the preferred BESS and on-site SS complex area alternative (Option 1)

A.12.6 Concluding Statement for Alternatives

The following alternatives were considered in the BA Phase:

- **No-Go Alternative:**

The No-Go alternative assumes that the proposed project will not go ahead i.e. it is the option of not constructing the proposed Komas WEF. This alternative would result in no environmental impacts (positive and negative) on the site or surrounding local area, as a result of the proposed facility. The No-Go alternative was investigated in this BA. **The No-Go alternative is not the preferred alternative.**

- **Land Use Alternative:**

The site has very low agricultural potential because of, predominantly, aridity constraints, but also due to soil constraints. It is generally unsuitable for cultivation, and agricultural land use is limited to low density grazing. The economic benefits to the landowner associated with the proposed WEF is likely to be more significant than that of the current livestock grazing activities on site. **Based on the above, the agricultural land use is not a preferred alternative.**

- **Type of Activity - Renewable Energy Alternatives:**

In terms of project and location compatibility, the proposed WEF is considered to be the most favourable and feasible renewable energy activity alternative (i.e. in comparison to Hydro Energy, Biomass and Solar Energy (solar PV and CSP)). **Wind energy is the preferred and only renewable energy technology alternative to be developed on site as a result of**:

- The proposed Komas WEF falls within the Springbok REDZ (REDZ 8). The proposed project is therefore aligned with the criteria of the SEA and located in an area of strategic importance for wind energy development;
- The site has a good wind resource (6-8 m/s^{-1});
- Solar energy, a potential developable technology on site, would not be as economically viable compared to wind development at this location. This is due to its proximity to the coast and the resulting fogging, the scarcity of water, and the uneven topography of the site, solar PV and CSP technologies are therefore not considered to be reasonable and feasible alternatives to be assessed as part of this BA process; and
- IRP2019 allocated a higher additional target to wind energy compared to solar energy (14 400 MW vs 6 000 MW).

- **Site Alternatives:**

The site has a good wind resource 6-8 m/s^{-1}, it is located within approximately 30 km from the Gromis MTS, and is located in the Springbok REDZ (REDZ 8). In addition, the landowners consented to the development of a WEF on their farms. Given these factors and the site selection requirements associated with a WEF and the suitability of the land available on the said farms and no initial fatal flaws being present, **no other site alternatives were considered as part of the BA process**.

- **Development Footprint Location and Layout Alternatives:**

The land assessed to develop the proposed Komas WEF extends approximately 5 070 ha. The area identified for the Komas WEF site within the affected farms is approximately 2 725 ha. However, the footprint of the Komas WEF within the WEF site is only approximately 90 ha (excluding access roads to the site). Therefore, there is sufficient land available to develop the proposed Komas WEF.
The project footprint was informed by environmental sensitivities identified by the specialists. Based on the inputs from the specialists, the layout was revised multiple times to avoid environmentally sensitive areas (No-Go areas), while still retaining technical and financial viability, as well as the requirements of landowners (as applicable). The current proposed layout is the preferred layout that was assessed by all the specialists on the project team (Figure D.13 and Appendix A.2 of this BA Report).

- **BESS and on-site Substation complex area alternatives:**

Two site alternatives for the BESS and on-site SS (known as the BESS and SS complex) (i.e. Option 1 and Option 2) have been identified for assessment as part of the BA process (Figure A.1). The specialists indicated that none of the alternatives are fatally flawed. The Terrestrial Ecology and Avifauna specialists selected Option 2 as their preferred alternative, but indicated that Option 1 is also feasible from a Terrestrial Ecology and Avifauna impact perspective and can therefore be implemented. Therefore, as none of the alternatives are fatally flawed, the Project Applicant selected Option 1 to be the preferred alternative as the site is in an optimal location in relation to the proposed turbine layout (see Figure A.17). The Visual specialists also confirmed that Option 1 is their preferred alternative. BESS and SS complex.

- **Summary Statement:**

Based on the above, the <u>preferred activity</u> is the development of renewable energy facility on site using wind energy as the <u>preferred technology</u>. In terms of the <u>preferred location of the site</u>, the location of the proposed Komas WEF on Portion 1 of the Farm Zonnekwa No.326 as well as on Portions 2, 3 and 4 of Farm Zonnekwa No. 328 and on Portion 4 of Farm Kap Vley No. 315 is preferred. <u>The location and layout of the activity</u> have been informed by the outcomes of the specialist assessments and technical feasibility, as well as landowner requirements. The initial layout went through several iterations to avoid areas of very high and high environmental sensitivity. The preferred layout is therefore a culmination of all the specialist inputs and outcomes to ensure that the proposed Komas WEF footprint avoids all No-Go areas and that the project is developed in an environmentally sustainable manner. The preferred layout is further discussed in Section D of this report. Two site alternatives for the BESS and SS complex area (i.e. Option 1 and Option 2) have been identified for assessment as part of the BA process (Figure A.1). Both alternatives are deemed feasible by the specialists. <u>However, the Project applicant</u> selected Option 1 as the preferred BESS and on-site SS complex area alternative as the site is in an optimal location in relation to the proposed turbine layout (see Figure A.17). The Visual specialists also confirmed that Option 1 is their preferred alternative as Option 2 is closer to the nearest receptor.

A.13 Need and Desirability

It is an important requirement in the BA process to review the need and desirability of the proposed project. Guidelines on Need and Desirability were published in the GG of 20 October 2014. These guidelines list specific questions to determine need and desirability of proposed developments. This checklist is a useful tool in addressing specific questions relating to the need and desirability of a project and assists in explaining that need and desirability at the provincial and local context. Need and desirability answer the question of whether the activity is being proposed at the right time and in the right place. Table A.11 includes a list of questions based on the DEFF's Guideline to determine the need and desirability of the proposed project. It should be noted this table was informed by the outcomes of the BA process.

Table A.11. The Guideline on the Need and Desirability's list of questions to determine the "Need and Desirability" of a proposed project

NEED	
Question	**Response**
1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area)?	
1.1. How were the following ecological integrity considerations taken into account? 1.1.1. Threatened Ecosystems, 1.1.2. Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure, 1.1.3. Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs"), 1.1.4. Conservation targets, 1.1.5. Ecological drivers of the ecosystem, 1.1.6. Environmental Management Framework, 1.1.7. Spatial Development Framework, and 1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR site, Climate Change, etc.).	**The environmental sensitivities present on site and ecological integrity considerations were addressed within the Terrestrial Biodiversity Impact Assessment undertaken as part of this BA process (Appendix C.1). The Avifauna and Bat Impact Assessments (Appendix C.3 and Appendix C.4 respectively) also address ecological integrity.** **The impact of the proposed Komas WEF on the NNP Expansion Footprint, the National and Northern Cape PAES Focus Area, and the CBA2 have been assessed by Mr. Botha in his additional Biodiversity Offset Report. The impacts have been assessed to be of Moderate significance before and after mitigation, but prior to the implementation of a Biodiversity Offset. According to the additional Biodiversity Offset Report (Botha 2021), should an offset be implemented, the impact has been assessed to be of low significance.** **According to the additional Biodiversity Offset Report (Botha 2021), the implementation of a Biodiversity Offset is appropriate as the residual impact is negative and of moderate significance. An offset of 810 ha, in Namaqualand Strandveld or an adjacent, related vegetation type in the PAES Focus Area is prudent. The implementation of an offset is supported by the Project Applicant and the EAP.** **The project site and location were screened and assessed in detail in order to develop the proposed WEFs, power line routings and associated electrical infrastructure for the proposed Komas projects. The determination of the development footprint within the sites was determined through detailed sensitivity screening which was done by the specialists on the team to identify possible areas that should be avoided by the proposed development (i.e.**

NEED	
Question	**Response**
	exclusion zones or No-Go areas). These No-Go areas have been excluded from the proposed development footprints as shown in the sensitivity maps in Figure D.12 and in Appendix A.5). The specialist studies (Appendix C) have highlighted sensitive features within the original development footprint, and thus the footprint has been adjusted multiple times to avoid such features Following the exclusion of the required sensitive areas, sufficient developable area is still available on the sites which does not compromise the current ecological integrity of the sites. Based on the findings of the specialist studies, an environmental sensitivity map has been produced (as included in Figure D.12 in Section D of this report and in Appendix A.5). This map shows the sensitivities on site (e.g. terrestrial biodiversity, avifauna, bats, visual, and sensitive heritage features etc.) within the study area that need to be avoided.
1.2. How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	**The environmental sensitivities present on site and ecological integrity considerations were addressed within the Terrestrial Biodiversity Impact Assessment (Appendix C. 1 of the BA Report). The Avifauna and Bat Impact Assessments (Appendix C.3 and C.4 respectively of the BA Report) also address ecological integrity and environmental sensitivities. The specialists identified all ecological sensitive areas on site that would need to be avoided by the proposed development as well as how to suitably develop around these areas so that the ecological integrity of the areas is maintained (refer to Section D and Appendix C of this BA Report).** **The No-Go and buffer areas recommended by the specialists have been avoided in the updated layout of the proposed Komas WEF. A sensitivity map produced based on the input obtained from the various specialist studies is included in Figure D.12 in Section D and in Appendix A.5 of this BA Report.** **Measures to avoid, remedy, mitigate and manage impacts are included within the Terrestrial Biodiversity Assessment as well as within the Avifauna and Bat**

NEED	
Question	**Response**
	Impact Assessments (Appendices C.3 and C.4 respectively). It is also included in the EMPr which is included in Appendix G of this BA Report.
1.3. How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	**This proposed development has the potential to impact on the ecology of the area. The proposed development of the Komas WEF and associated infrastructure is expected to result in an overall moderate ecological impact that may be reduced to "low" significance if suitable mitigation measures are employed. Refer to the Terrestrial Biodiversity Impact Assessment (Appendix C.1 of the BA Report) as well as the summary of the assessment provided in Section D of the BA Report.** **Measures to avoid, remedy, mitigate and manage impacts are included within the Terrestrial and Aquatic Biodiversity Assessment as well as within the Avifaunal and Bat Impact Assessment. It is also included in the EMPr, included as Appendix G of this BA Report.**
1.4. What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether; what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	**The description of the potential waste generation is included in Section A of this BA Report (this Section). It is not anticipated that a significant amount of waste will be generated. Waste generation during the construction phase will include liquid effluent and solid waste, and other general and hazardous waste (e.g. contaminated spilled material). Waste generation during the operational phase will be very limited.** **Measures to avoid, remedy, mitigate and manage impacts are included within the EMPr, included as Appendix G of this BA Report.**
1.5. How will this development disturb or enhance landscapes and/or site that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	**A HIA (Archaeology, Cultural Landscape and Palaeontology) was undertaken as part of this project (included as Appendix C.6 of this BA Report). Potential impacts to archaeological resources was identified as an impact during the construction and decommissioning phases. Potential impacts to the cultural landscape was identified as an impact during the construction, operation and decommissioning phases. Potential impacts to palaeontological resources were identified during the construction phase. The overall findings of the HIA are that**

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	impacts to Archaeology are of very low significance during the construction phase. Impacts to the Cultural Landscape are of moderate significance during the construction and operational phases. **From a palaeontology perspective, disturbance, damage or destruction of fossils within the development footprint due to excavations and surface clearance was identified as an impact, rated with an overall low significance during construction with the implementation of mitigation measures.**
1.6. How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	**Raw and potable water will be required during the construction, operation and decommissioning phases of the proposed Komas WEF project, for staff consumption purposes, for the roads and earthworks, as well as for the batching plant.** **Water supply will be sourced by the contractor and is typically through a water purchase agreement between the municipal water board and the contractor. Should the onsite existing boreholes not be ableto meet the water demands, water will be purchased and trucked to the site in water tankers.** **Management actions to ensure the responsible and equitable use of water during the construction, operation and decommissioning phases are provided in the EMPr (Appendix G of this BA Report).**
1.7. How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts? 1.7.1. Does the proposed development exacerbate the increased dependency	**The proposed project aims to harness wind energy for the generation of electricity. This proposed project is seen as a source of 'clean energy' and reduces the dependence on non-renewable energy sources, such as coal fired power plants. The proposed development is located in the Springbok REDZ (REDZ 8). The REDZs represent areas where wind and solar PV energy development is being incentivized from resource, socio-economic and environmental perspectives. For more information, refer to Section A.12 of this BA Report, which deals with Alternatives, and thus outlines the suitability of this activity.**

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on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life) 1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources of the proposed development alternative?) 1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?	**The environmental sensitivities present on site and ecological integrity considerations were addressed within the Terrestrial Biodiversity Impact Assessment (Appendix C.1 of the BA Report) undertaken as part of this BA process. The Avifauna and Bat Impact Assessments (Appendix C.3 and Appendix C.4 respectively of the BA Report) also address ecological integrity.**
1.8. How were a risk-averse and cautious approach applied in terms of ecological impacts?: 1.8.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? 1.8.2. What is the level of risk associated with the limits of current knowledge? 1.8.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	**The environmental sensitivities present on site and ecological integrity considerations were addressed within the Terrestrial Biodiversity Assessment (Appendix C.1 of the BA Report). The Avifauna and Bat Impact Assessments (Appendix C.3 and Appendix C.4 respectively of the BA Report) also address ecological integrity.** **The precautionary approach has been adopted for this assessment, i.e. assuming the worst-case scenario will occur and then identifying ways to mitigate or manage these impacts. For example, the cumulative impact assessment considered that all approved renewable energy projects within the 50 km radius would be constructed. However, in reality it is unlikely that all will be constructed as most will be based on the outcomes of the bidding windows in terms of the REIPPPP. Therefore, this approach is considered to be precautionary in nature. Additionally, the location of the proposed WEF within the assessed area and the layout thereof was determined based on the specialist findings.** **Refer to Appendix C of this BA Report for the complete specialist studies. These**

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	studies outline the assumptions and limitations that were applicable to the respective studies.
1.9. How will the ecological impacts resulting from this development impact on people's environmental right in terms following: 1.9.1. Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? 1.9.2. Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	**Refer to Section D and Appendix C of this BA Report which respectively include the findings of the specialist assessments, as well as the complete studies undertaken.** **The Socio-Economic Impact Assessment (included in Appendix C.8 of this BA Report) notes that overall the potential negative impacts are rated with a low significance, whilst the positive impacts are rated with an overall moderate to high significance. The Socio-Economic Assessment further notes that it can be concluded that the prospective socio-economic benefits of the proposed project outweigh the socio-economic losses or impacts. Creation of temporary employment, increased household income attainment and standard of living, and the development and/or growth of locally-owned industries were identified as some of the positive socio-economic impacts during the construction phase of the proposed project. The creation of permanent employment and a Community Trust were also identified as a positive socio-economic impacts during the operation phase of the proposed Komas WEF.** **With regards to the Visual Impact Assessment (VIA) (Appendix C.5 of this BA Report), the visual impact significance was considered to be low after mitigation during the construction and decommissioning phases. The potential visual impact was identified to be of moderate significance following mitigation during the operational phase. The visual landscape could be restored after potential decommissioning.** **With regards to the Noise Assessment (Appendix C.9 of this BA Report), the significance of the potential noise impact was considered to be very low after mitigation. This is except for the potential noise impact identified during the night during the operational phase which was assigned a low significance rating**

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	following mitigation. There are no NSDs within 500 m from the turbines. **Therefore, the overall negative impact to the environmental right of people in terms of social, visual and noise impacts are considered to be low after mitigation.**
1.10. Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	**This is considered and addressed as part of the Socio-Economic Assessment undertaken for this project (included in Appendix C.8 of this BA Report, and summarised in Section D).** **The study confirmed that it should be accepted that the development of the proposed project is likely to result in some form of negative social impact to the local community. However, such a negative impact needs to be weighed against the potential benefits likely to result from the same development. Given the overall low significance of potential negative impacts associated with the proposed project, as compared to the overall moderate to high significance after mitigation of potential positive impact of the project; it can be concluded that the prospective socio-economic benefits of the proposed project outweigh the socio-economic losses or impacts. From a socio-economic impact perspective, in light of the above argument, the specialist conducting the Socio-Economic Assessment recommended that the proposed project should be authorised by the competent authority.** **The above is also supported in terms of the status quo of the socio-economic conditions present in the NKLM, as indicated in the Socio-Economic Impact Assessment (Appendix C.7 of the BA Report).**
1.11. Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	**The impacts on ecological integrity objectives of the area were considered as part of the Terrestrial Ecology Impact Assessment and the Biodiversity Mitigation Strategy which were undertaken for the proposed project (Appendices C.1 and C.15 respectively).**

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	The proposed activity does not compromise any of the objectives set within the NKLM IDP and the NDM's IDP (2017 – 2022). The proposed project will also be supportive of the IDP's objective of creating more job opportunities. The proposed WEF will assist in local job creation during the construction and operation phases of the project (if an EA is granted by the DEFF). However, as noted above, employment opportunities will be temporary during the construction phase and long-term during the operational phase as the proposed Komas WEF is expected to be operational for 20 years.
1.12. Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	**Refer to Section A.12 of this BA Report, which deals with Alternatives. This section outlines the suitability of the proposed activity.**
1.13. Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	**Refer to Section D of this BA Report, which includes the Terrestrial Biodiversity Impact Assessment (Appendix C.1 of the BA Report), as well as the Avifauna and Bat Impact Assessments (Appendix C.3 and Appendix C.4 respectively) which provide a description of the negative direct and cumulative ecological impacts.**
2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	
2.1.1. The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area	**The NDM's IDP (2017-2022) states that an opportunity exists to utilise wind energy more widely and lessen the dependence on wood and gas as energy sources for cooking in households. This opportunity has been identified because of the increasing backlog in electricity provisioning in the municipal area. Even though this WEF will not supply electricity directly to the local or district municipality, the energy produced by the facility will feed into the national grid.** **The IDP has also identified embarking on renewable energy and upgrading electricity supply to water pump stations and incorporation of Eskom electricity network to address the electricity needs in the Komaggas area; this depicts a need for an alternative source of energy.**

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	One of the economic priority issues identified within the NKLM IDP (2017– 2022) is the high levels of unemployment. The IDP further states that the majority of the adult population within the NKLM have low skills levels and need employment. The proposed project will create job opportunities and economic spin offs during the construction and operational phases (if an EA is granted by the DEFF). It is estimated that approximately 200-250 employment opportunities will be created during the construction phase. It is anticipated that approximately 55% (136) of the employment opportunities will be available to low skilled workers (construction labourers, security staff etc.), 30% (76) to semi-skilled workers (drivers, equipment operators etc.) and 15% (38) for skilled personnel (engineers, land surveyors, project managers etc.). **Approximately 20 employment opportunities will be created during the operational phase which is anticipated to extend over 20 years. This includes 12 low skilled, 6 semi-skilled and 2 skilled jobs.** **Therefore, the proposed WEF would help to address the need for increased electricity supply while also providing advanced skills transfer and training to the local communities and creating contractual and permanent employment in the area. The proposed activity does not compromise any of the objectives set within the NKLM IDP (2017 – 2022). The proposed project will also be supportive of the IDP's objective of facilitating job creation to address the high unemployment rate.** **The proposed project is located within the Springbok REDZ (REDZ 8) which is a geographical area that has been identified on a strategic planning level to have reduced negative environmental impacts but high commercial attractiveness (due to its proximity to, inter alia, the national grid) and socio-economic benefit to the country. The development of wind energy is therefore important for South Africa to reduce its overall environmental footprint from power generation**

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	(including externality costs), and thereby to steer the country on a pathway towards sustainability. Therefore, the proposed project is in line with strategic plans and national policy to promote the generation of green energy in South Africa.
2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integration of segregated communities, need to upgrade informal settlements, need for densification, etc.)	**This is not applicable, as the proposed project is located within a rural area and the site is zoned for agricultural use.**
2.1.3. Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.)	**Refer to Section B and D of this report for a description of the receiving environment and impact assessment, respectively. The impact of the proposed project on heritage features, including archaeology, cultural landscape, and palaeontology has been assessed in the HIA (Appendix C.6 of this BA Report).** **The area is a sheep farming area. Low density, natural grazing is by far the predominant agricultural activity in the area. Grazing capacity of the site is very low at 45 hectares per large stock unit.** **Should the proposed project proceed, approximately 90 ha of the land will be developed, and it is not expected that this will significantly threaten the agricultural activities present on site. An Agricultural Compliance Statement (Appendix C.7 of this BA Report, and summarised in Section D) was undertaken as part of this BA to reflect the impact of the proposed project in terms of agriculture. The conclusion of the Agricultural Compliance Statement is that the agricultural potential of the proposed Komas WEF site is low and the proposed development will therefore not have an unacceptable negative impact on the agricultural production capability of the site.**
2.1.4. Municipal Economic Development Strategy ("LED Strategy").	**At a district and local level, the NDM IDP, NDM Climate Change Response Plan, NKLM's IDP and NKLM's SDF all support the establishment of renewable facilities. The proposed Komas WEF is also located within the Springbok REDZ 8, which was formally gazetted in 2018. The area has therefore been identified as suitable for the establishment of REFs, including WEFs. The proposed Komas WEF is therefore**

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	aligned with the LED Strategy of the NKLM. **In addition to the above, the Namakwa District Climate Change Response Plan was developed through the Local Government Climate Change Support program. It includes a climate change vulnerability assessment and associated climate change responses which address these vulnerabilities.** **The vulnerability assessment identified 17 of the DM's socio-economic indicators which are both very exposed and highly sensitive to climate change, but have very low capacity to adapt. These included the agricultural sector, tourism, water-dependent municipal services and the coastal and marine environment.** **Priority responses are identified for the key sectors, including agriculture, biodiversity and habitat conservation, human health, and human settlements. These include mainstreaming climate change preparedness into all future IDPs, and implementation of a Namakwa Renewable Energy Strategy which supports the development and use of non-fossil sources of energy.** **The proposed project would also provide advanced skills transfer and training to the local communities and creating contractual and permanent employment in the area.**
2.2. Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? 2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	**Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix C.8 of this BA Report, for an outline of the socio-economic impacts that could occur due to the proposed development of the Komas WEF.**
2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	
2.4. Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long term? Will the impact be socially and	

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economically sustainable in the short- and long-term?	
2.5. In terms of location, describe how the placement of the proposed development will:	
2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other,	**Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix C.8 of this BA Report for an outline of the socio-economic impacts that could occur due to the proposed development of the Komas WEF.** **The Socio-Economic Assessment notes that overall the potential negative impacts are rated with a low significance, whilst the positive impacts are rated with an overall moderate to high significance. The Socio-Economic Assessment notes that the prospective socio-economic benefits of the proposed project outweigh the socio-economic losses or impacts. Creation of temporary employment during the construction phase, increased household income attainment and standard of living, and the development and/or growth of locally-owned industries were identified as some of the positive socio-economic impacts during the construction phase of the proposed project. The creation of long-term employment opportunities and a Community Trust during the operational phase (which will extend over 20 years) were also identified as positive socio-economic impacts.**
2.5.2. reduce the need for transport of people and goods,	**Not applicable. This is a renewable energy project proposal.**
2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	**Not applicable. This is a renewable energy project proposal.**
2.5.4. compliment other uses in the area, 2.5.5. be in line with the planning for the area,	**All farm portions forming part of the project are zoned for agricultural land-use, and are mainly used for either commercial livestock grazing, communal use or subsistence farming. As noted in the Agriculture Compliance Statement (Appendix C.7) of this BA Report, agricultural potential is uniformly low across the affected farms. The major limitations to agriculture are the severely limited climatic moisture availability and the sandy soils with low water holding capacity. As a result of these limitations, the agricultural use of the study area is limited to low intensity grazing only. The project site is classified with a predominant land**

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	capability evaluation value of 5 (low), although it varies from 4 to 6 across the site (Land Capability Classification for South Africa, 2017). The grazing capacity on AGIS is classified as low at 45 hectares per large stock unit. An Agricultural Compliance Statement was undertaken as part of this BA to reflect the impact of the proposed project in terms of agriculture (Appendix C.7 of this BA Report, and summarised in Section D). The conclusion of the Agricultural Compliance Statement is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. In addition, the proposed Komas WEF is located within the Springbok REDZ (i.e. REDZ 8) and is therefore aligned with national initiatives for the placement of WEFs in South Africa. The proposed project also falls within the Northern EGI Corridor, one of the five EGI Corridors gazetted in February 2018. While Listed Activity 9 of Listing Notice 2 of the NEMA EIA Regulations, 2014, as amended, is not triggered by the proposed project, the fact that the proposed project falls within the Northern EGI Corridor is still important as it indicates that the proposed project aligns with the strategic objectives of the country in terms of infrastructure placement.
2.5.6. for urban related development, make use of underutilised land available with the urban edge,	**Not applicable. The proposed project is located within a rural area and the site is zoned for agricultural use.**
2.5.7. optimise the use of existing resources and infrastructure,	**The proposed Komas WEF project will connect to the existing Gromis MTS where the electricity generated will be fed into the national grid. It will make use of existing access roads as far as possible. The existing unnamed public gravel road off the R355 leading to the proposed Komas WEF will be used for access and will be upgraded as part of the proposed project.**
2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	**This project is a renewable energy project and not related to bulk infrastructure expansion.**
2.5.9. discourage "urban sprawl" and contribute to compaction/densification,	**Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix C.8 of this BA Report, for an outline of the socio-economic impacts that could occur due to the proposed development of the Komas WEF. One of the**

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	potential negative impacts identified is the disruption of local social structures as a result of the construction work force and in-migration of job seekers. Adequate management measures have been identified in this regard and are included in the EMPr (Appendix D of this BA Report.
2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	**This is not applicable as the proposed project is located within a rural area and the site are zoned for agricultural use.**
2.5.11. encourage environmentally sustainable land development practices and Process,	**Based on the findings of this BA, the proposed project will have an overall impact significance rating of moderate to low following the implementation of mitigation measures. Apart from the potential cumulative impacts due to bat fatalities during the operational phase, the proposed project will not have a significant ("high") negative impact on the receiving environment, with the implementation of suitable mitigation measures (Section D). It will therefore not go against sustainable land development practices and process. In addition, the proposed project will be designed according to relevant national specifications and standards which are regarded as best practice in the renewable energy sector. In addition, the proposed project is located in the Springbok REDZ (i.e. REDZ 8) and the development proposal will therefore be aligned with national planning priorities.**
2.5.12. take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	**Refer to Section A.12 of this BA Report, which deals with Alternatives. This section outlines the suitability of the proposed activity, as well as the selection thereof.**
2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),	**Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix C.8 of this BA Report for an outline of the potential socio-economic impacts associated with the proposed development of the Komas WEF. In addition, as noted in the Socio-Economic Assessment, the Applicant will ultimately own the project and, if successful, will compile an Economic Development Plan which will be compliant with REIPPPP requirements and will *inter alia* set out to achieve the following:** ▪ **Create a local community trust which has an equity share in the project life**

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	to benefit historically disadvantaged communities. ▪ **Initiate a training strategy to facilitate employment from local communities.** ▪ **Give preference to local suppliers of components and/or services for the construction of the facility.**
2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	**A HIA (Archaeology, Cultural Landscape and Palaeontology) was undertaken as part of this project (included as Appendix C.6 of this BA Report). Potential impacts to archaeological resources was identified as an impact during the construction and decommissioning phases. Potential impacts to the cultural landscape was identified as an impact during the construction, operation and decommissioning phases. Potential impacts to palaeontological resources were identified during the construction phase. The overall findings of the HIA are that impacts to Archaeology are of very low significance during the construction phase. Impacts to the Cultural Landscape are of moderate significance during the construction and operational phases.** **From a palaeontology perspective, disturbance, damage or destruction of fossils within the development footprint due to excavations and surface clearance was identified as an impact, rated with an overall low significance during construction with the implementation of mitigation measures.**
2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	**The proposed facility is proposed in the Springbok REDZ 8. Several renewable energy facilities are proposed in the area, which lends itself potentially to a renewable energy development area. Refer to Section D of this BA Report for an outline of the renewable energy projects authorised and the ones which have submitted applications for EA within a 50 km radius of the proposed Komas WEF site.**
2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	
2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	**Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix C.8 of this BA Report.**
2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic	

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vulnerability and sustainability) associated with the limits of current knowledge?	
2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
2.7. How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1. Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	**Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix C.8 of this BA Report.**
2.7.2. Positive impacts. What measures were taken to enhance positive impacts?	
2.8. Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	
2.9. What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	
2.10. What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	
2.11. What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by	

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categories of persons disadvantaged by unfair discrimination?	
2.12. What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	
2.13. What measures were taken to:	
2.13.1. ensure the participation of all interested and affected parties,	**The Public Participation Process (PPP) that has been undertaken as part of this BA is detailed in Section C of this report, as well as in Appendix D. The BA Report is currently being released for a 30-day commenting period to all the relevant authorities and stakeholders. Various methods will or have been employed to notify potential Interested and Affected Parties (I&APs) of the proposed project, namely, through a newspaper advert, site notice boards and notification letters via email, as well as SMS texts. The BA process will take cognisance of all interests, needs and values espoused by all I&APs, where relevant. Opportunity for public participation will be provided to all I&APs throughout the BA process in terms of the NEMA EIA Regulations, 2014, as amended.**
2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	
2.13.3. ensure participation by vulnerable and disadvantaged persons,	
2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	
2.13.5. ensure openness and transparency, and access to information in terms of the process,	
2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge,	
2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein was promoted.	
2.14. Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	**Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix C.8 of this BA Report.**
2.15. What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been	**An EMPr has been developed to address environmental impacts, as well as health and safety concerns (Appendix G). An ECO will be appointed to monitor compliance during the construction and decommissioning phases.**

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taken to ensure that the right of workers to refuse such work will be respected and protected?	
2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1. the number of temporary versus permanent jobs that will be created,	**Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix C.8 of this BA Report.**
2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),	
2.16.3. the distance from where labourers will have to travel,	
2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits),	
2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	
2.17. What measures were taken to ensure:	
2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment,	**Legislation, policies and guidelines, which could apply to impacts of the proposed project on the environment, have been considered. The scope and content of this BA Report has been informed by applicable integrated environmental management legislation and policies. This has been included in Section A of this BA Report. Pre-application meetings were held with key authorities and stakeholders namely, the DEFF (on 18 August and 7 October 2020), as well as with SANParks and the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform Northern Cape Department of Environment (DAEARDLR) on 2 November 2020.**
2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	**The PPP that has been undertaken as part of this BA and is detailed in Section C of this report, as well as in Appendix D. The BA Report is currently being released for a 30-day commenting period to all the relevant authorities and stakeholders. Various methods will or have been employed to notify potential I&APs of the proposed project, namely, through a newspaper advert, site notice boards and notification letters via email, as well as SMS texts. The BA process will take cognisance of all interests, needs and values espoused by all I&APs, where relevant. Opportunity for public participation will be provided to I&APs during**

NEED	
Question	**Response**
	the BA process in terms of the NEMA EIA Regulations, 2014, as amended.
2.18. What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	**The outcomes of this BA process and the associated conditions of the EA (should it be granted) will serve to address this question (see Section E of this BA report for proposed conditions to be included in the EA).**
2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	**The proposed mitigation measures included in the EMPr and summarised in Section D of this report have been informed by the specialist studies undertaken and this includes a detailed assessment of the environment as well as the impacts associated with the proposed development. A WEF can be dismantled and completely removed from the site leased for the development and do not permanently prevent alternative land-uses on the same land parcel. The proposed project will generate positive socio-economic benefits and opportunities such as the creation of employment opportunities and the support of local busineeses.**
2.20. What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	**The EMPr (Appendix G) of this proposed project must form part of the contractual agreement and be adhered to by both the contractors/workers and the Applicant.**
2.21. Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	**Refer to Section A12 of this BA Report, which deals with Alternatives. This section outlines the suitability of the proposed activity.**
2.22. Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	**Refer to the Executive Summary and Section D of this report for a summary of the cumulative impacts.**

SECTION B: DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section of the BA Report provides a broad overview of the affected environment for the proposed Komas WEF project and the surrounding region. The receiving environment is understood to include biophysical, socio-economic and heritage aspects which could be affected by the proposed development or which in turn might impact on the proposed development.

This information is provided to identify the potential issues and impacts of the proposed project on the environment. The information presented within this chapter has been sourced from:

- Input from the specialists that form part of the project team;
- Feedback from the Screening Tool, where applicable;
- Review of information available on the South African National Biodiversity Institute (SANBI) Biodiversity Geographical Information System (BGIS) and Agricultural Geo-Referenced Information System (AGIS); and
- The NKLM and NDM's Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs).

Feedback from the Screening Tool is provided in the sections below, only where it is applicable. For example, it is not applicable to the Socio-Economic and the Transport Impact Assessments.

It is important to note that this chapter intends to provide a broad overview of the affected environment. Detailed descriptions of the preferred project site (Komas WEF) focused on significant environmental aspects of this project is provided in the relevant specialist studies (Appendix C of this BA Report).

B.1 Background

The proposed Komas WEF project is situated on the following farm portions:

- Portion 1 of the Farm Zonnekwa No. 326;
- Portion 2 of the Farm Zonnekwa No. 328;
- Portion 3 of the Farm Zonnekwa No. 328;
- Portion 4 of the Farm Zonnekwa No. 328; and
- Portion 4 of the Farm Kap Vley No. 315.

The land assessed for development of the proposed Komas WEF extends approximately 5 070 ha. The area identified for the Komas WEF site within the affected farms is approximately 2 725 ha. However, the footprint of the Komas WEF within the WEF site is only approximately 90 ha (excluding access roads to the site).

As previously noted, the proposed project is located within the NKLM, which falls within the NDM. It is situated approximately 53 km south-west of Springbok, 35 km south-east of Kleinsee and 18 km south-west of Komaggas in the Northern Cape Province. The regional context and study area of the proposed project are provided in Figure B.1 and Figure B.2 respectively.

MAP 1: Regional Context

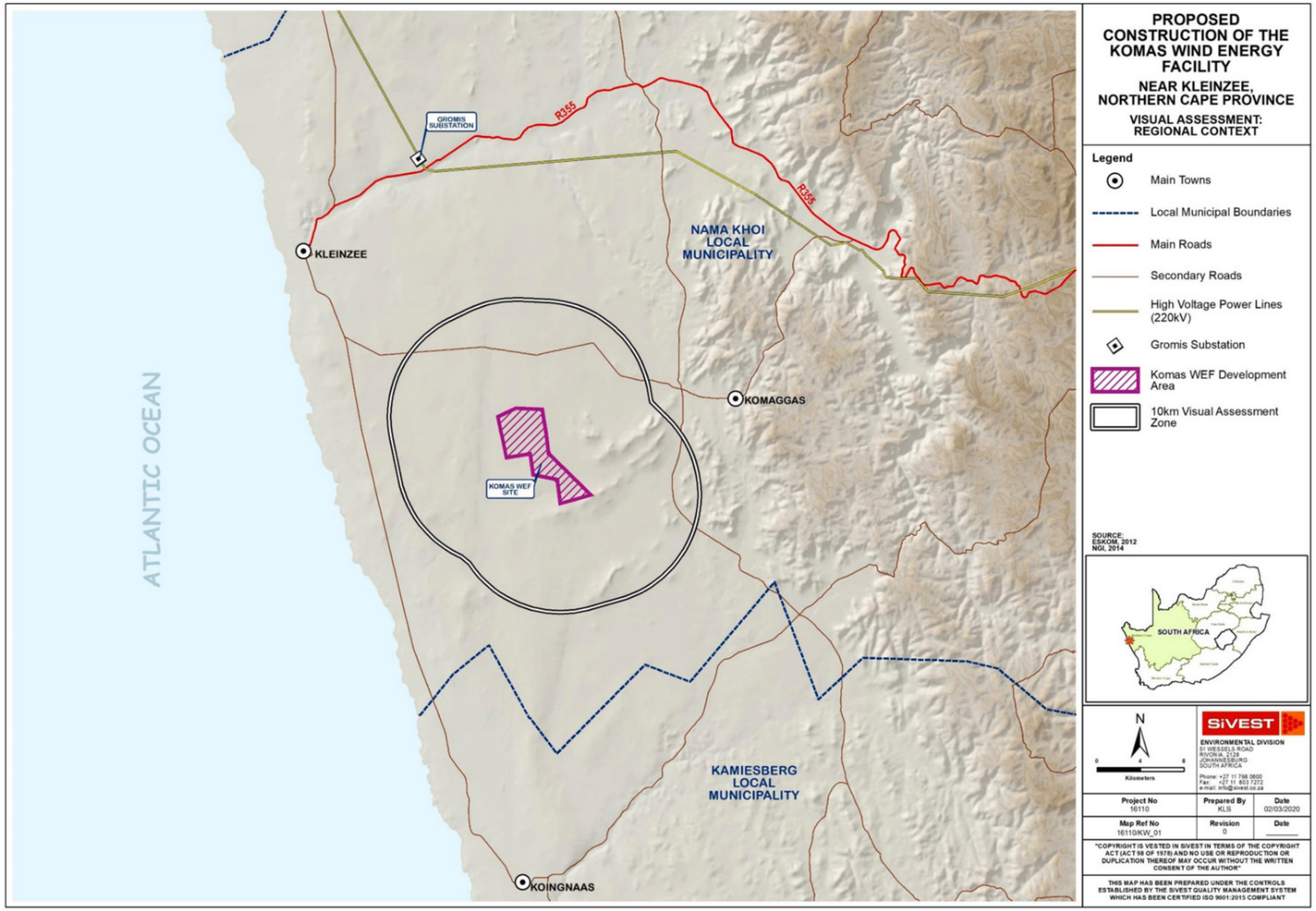


Figure B.1. Regional context of the proposed Komas Wind Energy Facility (SiVEST, 2020).

MAP 2: Study Area

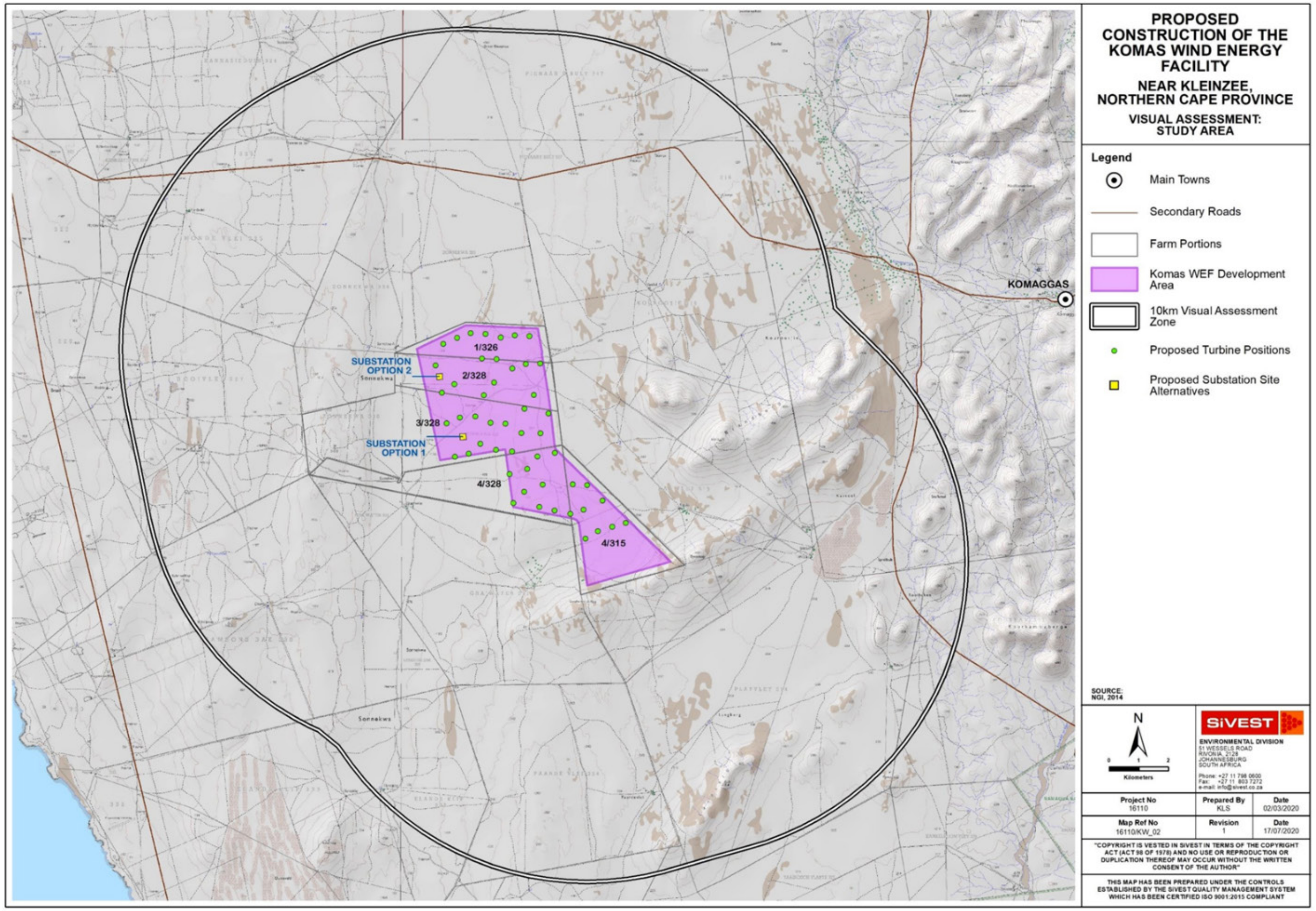


Figure B.2. Study area of the proposed Komas Wind Energy Facility (SiVEST, 2020)

B.2 Climate Conditions

The site has an extremely low average rainfall of 96 mm per annum (The World Bank Climate Change Knowledge Portal, 2016 in Lanz, 2020). The mean annual precipitation is less than 250 mm (Figure B.3). The average monthly temperature and rainfall distribution are shown in Figure B.4. The low rainfall is a very significant agricultural constraint that seriously limits the level of agricultural production (including grazing). There are no dams across the project area.

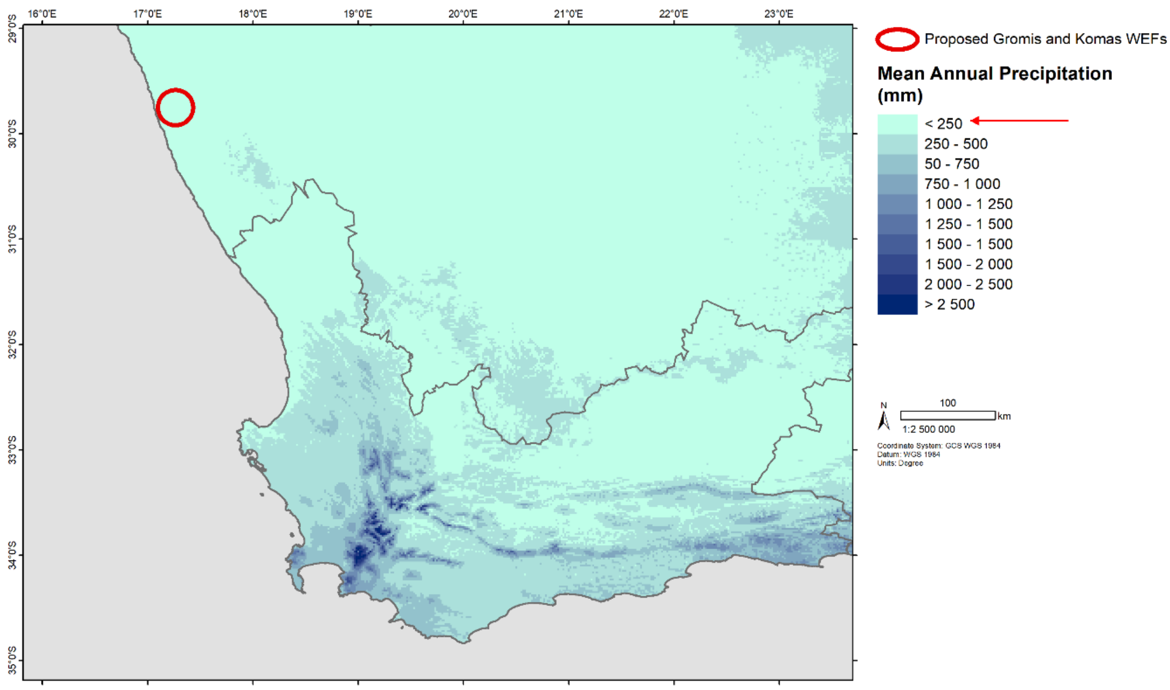


Figure B.3. Mean Annual Precipitation for the study area indicated in red.

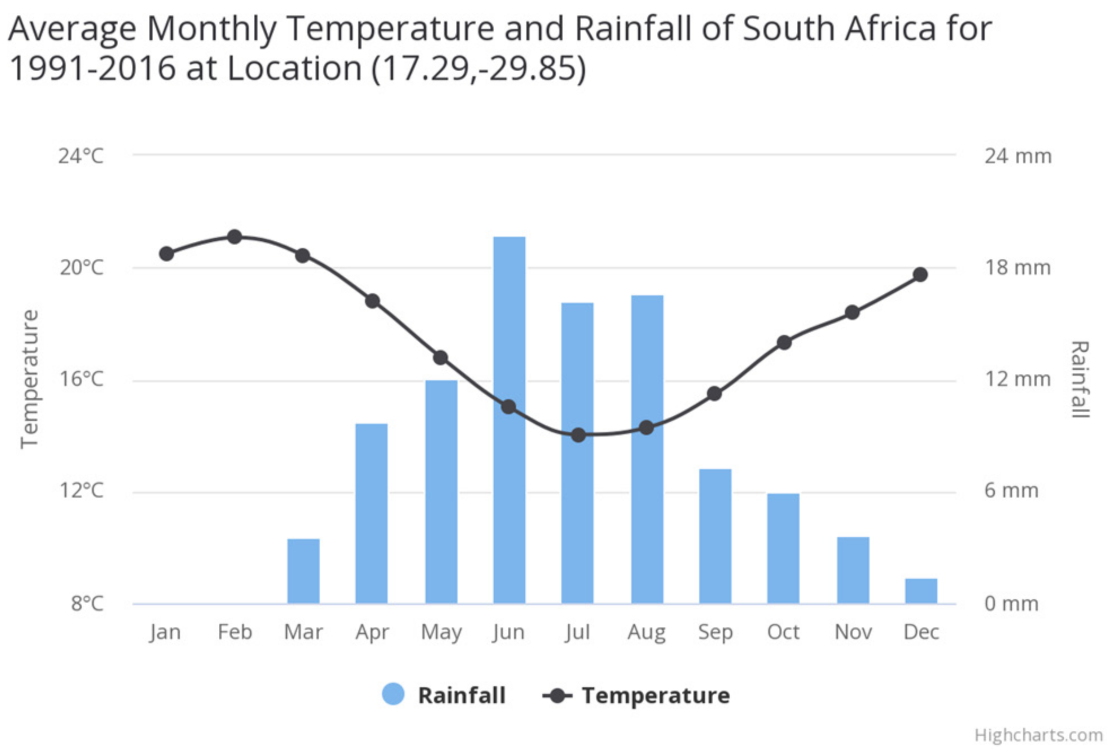


Figure B.4: Monthly average air temperature and rainfall distribution for the study area (The World Bank Climate Change Knowledge Portal, 2016 in Lanz, 2020).

The specialist studies included in Appendix C provide additional details regarding the climatic conditions on site.

B.3 Topography and Landscape

The proposed development is located on fairly level coastal plains at an approximate altitude between 170 and 240 m. It includes the slopes up one ridge to an altitude of 375 m. Slopes across the site are almost entirely less than 2%, with some steeper slopes on the side of the ridge. The geology of the coastal plains is aeolian material overlying Tertiary and Quaternary marine sediments (Lanz, 2020).

The VIA (Appendix C.5 of the BA Report), states that the study area for the proposed Komas WEF project is located on relatively flat to gently undulating terrain situated between the Komaggas Mountains in the east and the Atlantic Coastline in the west. The most prominent physical feature in the predominantly flat landscape of the study area is a low mountain range to the east and south of the Komas WEF development area. This range is characterised by relatively steep slopes and is visible across much of the study area (Figure B.5 and Figure B.6). The broader landscape of the study area is generally flat, with a few rocky hills occurring sporadically. The Terrestrial Biodiversity Impact Assessment (Appendix C.1 of this BA Report) notes that few elevated features are evident across the corridors.

Figure B.5: View east-south-east across the proposed Komas WEF development area showing a typical view of the low range of mountains / hills which dominate the eastern sector of the study area (Photo courtesy of SiVEST, 2020).

Figure B. 6: View south-west from the secondary main road, (some 5 km north of the proposed Komas WEF development area) showing the topography typical of much of the study area (Photo courtesy of SiVEST, 2020).

The topography and slope of the study area are illustrated in Figure B.7 and B.8 respectively (taken from Appendix D of the VIA which is included in Appendix D.5 of this BA report).

MAP 3: Topography

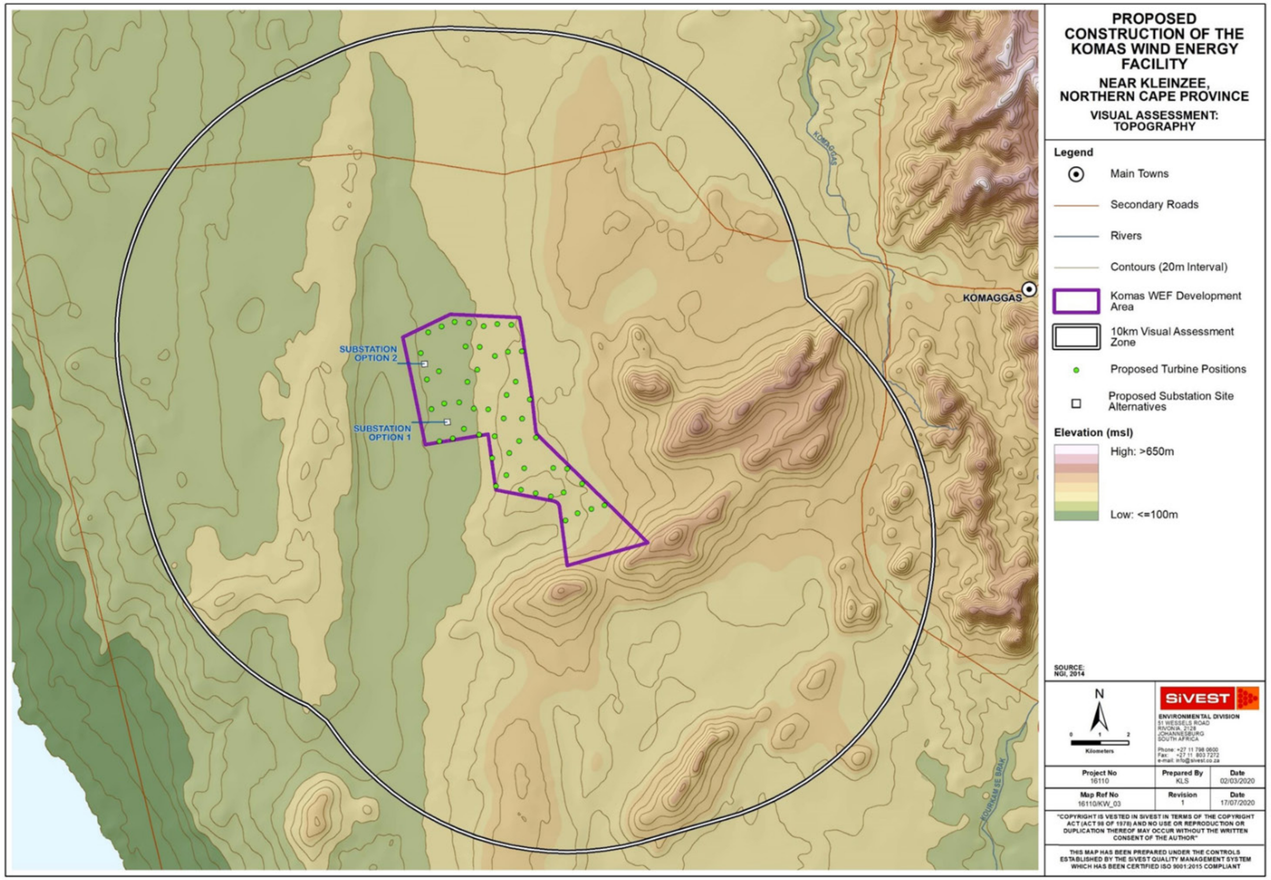


Figure B.7: Topography of the study area of the proposed Komas WEF (SiVEST, 2020)

MAP 4: Slope Classification

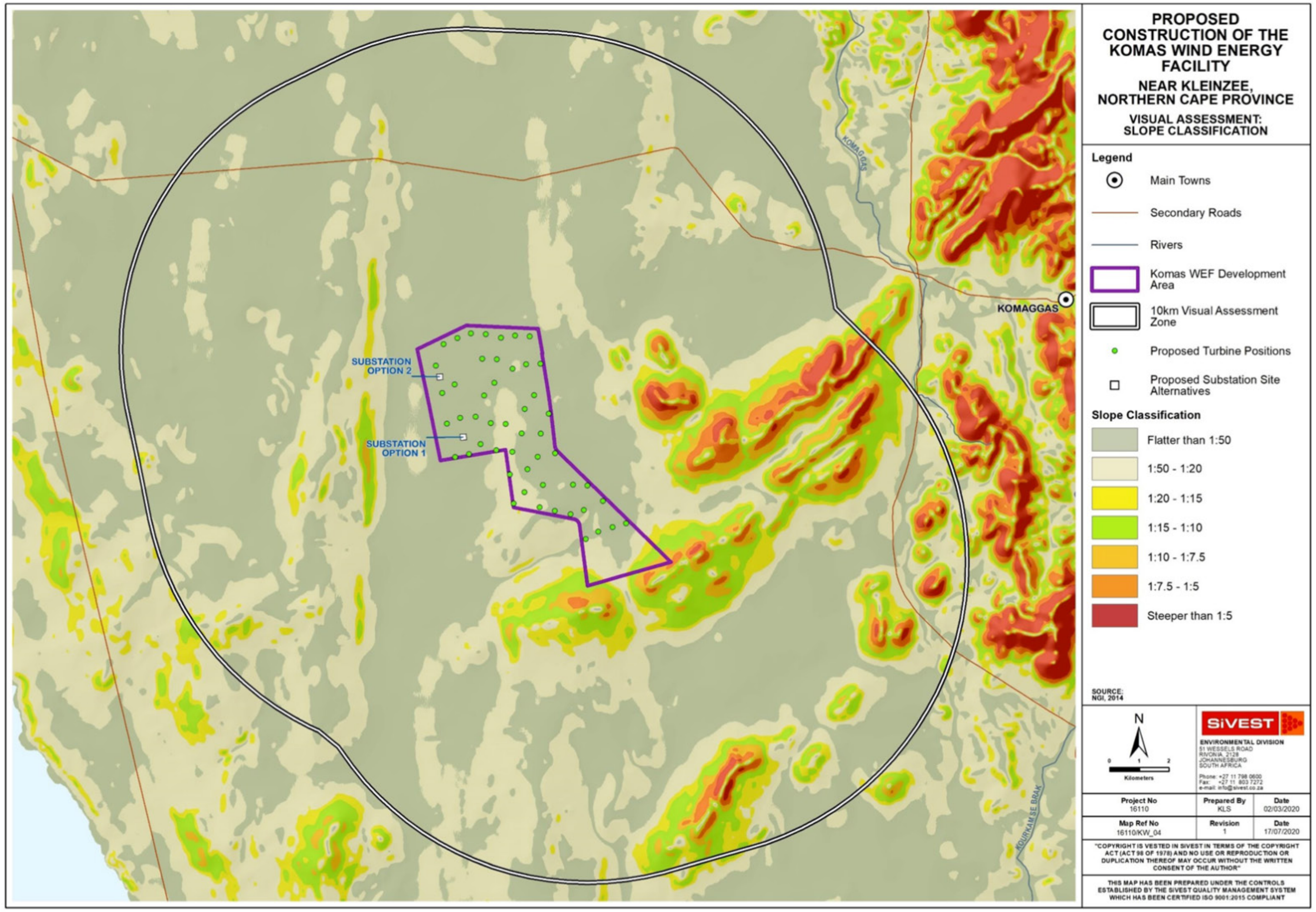


Figure B.8: Slope classification of the study area of the proposed Komas WEF (SiVEST, 2020)

Visual Implications in terms of topography

Areas of flat relief, including the flat plains and the higher-lying ridges, are characterised by wide ranging vistas, although the vistas eastwards will be somewhat constrained by the Komaggas Mountains (Figure B.9). Bearing in mind that wind turbines are very large structures (potentially up to 300 m in height including the rotor blades), these could be visible from an extensive area around the site. Although the low mountain range immediately east of the site would limit views of the WEF from some areas in the eastern-most sector of the study area (Figure B.10), across the remainder of the study area there would be very little topographic shielding to lessen the visual impact of the wind turbines from any locally-occurring receptor locations.

Figure B.9: View south-east towards the Komaggas Mountains from the secondary road that traverses the northern sector of the study area showing limited vistas eastwards (Photo courtesy of SiVEST, 2020).

Figure B.10: View south-west from the secondary road that traverses the eastern sector of the study area (approximately 9 km from the proposed Komas WEF Development Area) showing topographical screening provided by the low mountain range (Photo courtesy of SiVEST, 2020).

B.4 Land use

According to the South African National Land Cover dataset (GeoTerra Image 2018), much of the area is characterised by natural vegetation which is dominated by Karoo and Fynbos shrubland (Figure B.11).

Agricultural activity in the area is severely restricted by the arid nature of the local climate and livestock rearing (sheep and cattle) is the dominant activity (Figure B.12). There are no areas of cultivation present within the assessment zone and as such, the natural vegetation has been retained across much of the study area.

MAP 7: Land Cover Classification

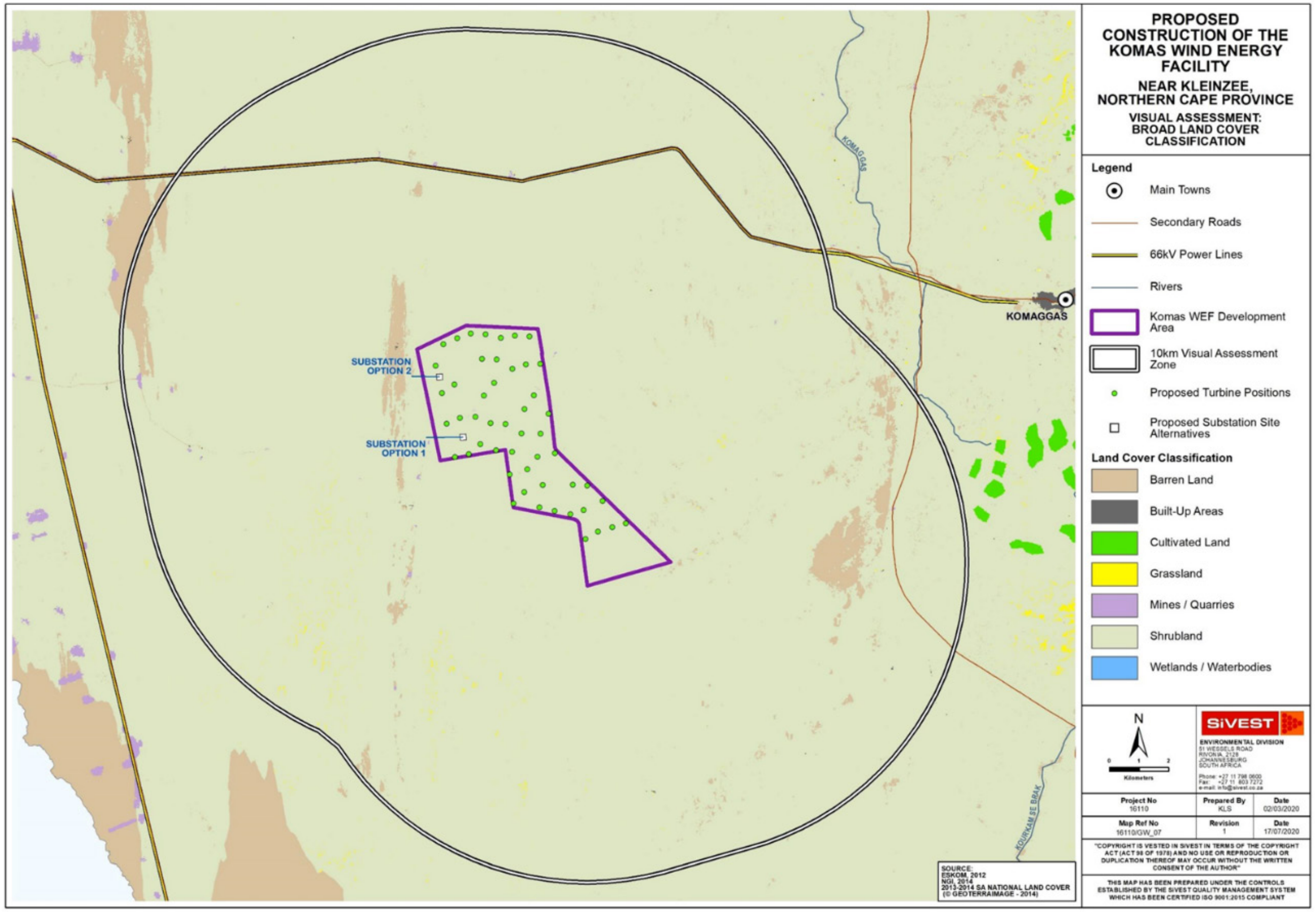


Figure B.11: Land use classification of the study area

Figure 3: Evidence of livestock rearing taking place within the proposed Komas WEF study area

The nature of the climate and the corresponding land use has resulted in low densities of livestock and relatively large farm properties across the area. Thus the area has a very low density of rural settlement, with relatively few farmsteads scattered across the area (Figure B.13). Built form in much of the proposed Komas WEF study area is limited to isolated farmsteads, including farm worker's dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences (Figure B.14) and windmills (Figure B.15).

Figure B.13: Typical view of an isolated farmstead in the distance

Figure 5: Example of farm infrastructure found within the proposed Komas WEF study area

Figure 6: A wind mill in the proposed Komas WEF study area

Other human influence is visible in the area in the form of the two secondary roads which traverse the study area. One road runs in an east to west direction, across the northern sector of the study providing a local link between Komaggas and Kleinsee. The other road affects a small section of the eastern sector of the study area, running in a north-south direction. Both of these are gravel roads which are predominantly used by local farmers to access the nearby towns of Komaggas and Kleinsee. Existing 66 kV power lines directly adjacent to the Komaggas-Kleinsee link road form significant man-made features in an otherwise undeveloped landscape (Figure B.16).

The closest built-up areas are the small towns of Komaggas to the east and Kleinsee to the west. Both of these are situated well outside the visual assessment zone for the proposed Komas WEF and are thus not expected to have an impact on the visual character of the study area.

Figure B.16: View of a 66 kV power line along the Komaggas-Kleinsee link road

Visual Implications

As stated above, 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. In addition, there are no towns or settlements in the visual assessment zone and thus, there are very low levels of human transformation and visual degradation across the major portion of the study area.

Significant elements of human transformation are however present in the northern and eastern sectors of the proposed Komas WEF study area, these being the gravel secondary roads and the existing 66 kV power lines (Figure B.16). These elements are considered to have degraded the visual character to some degree.

Thus, the proposed Komas WEF development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area, although elements of human transformation in parts of the study area will reduce the level of contrast to a degree.

B.5 Visual character and Landscape

The above physical and land use-related characteristics of the study area contribute to its overall visual character. Visual character largely depends on the level of change or transformation from a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at the opposite end of the scale to a largely natural undisturbed landscape. Visual character is also influenced by the presence of built infrastructure such as buildings, roads and other objects such as telephone or electrical infrastructure.

As mentioned above, much of the study area is characterised by natural landscapes with some rural / pastoral elements and low densities of human settlement. Livestock grazing is the dominant land use, with no areas of cultivation in evidence. Grazing activities have not transformed the natural landscape to any significant degree and as such, a large portion of the study area has retained its natural character and is dominated by largely natural, scenic views. Along the coast to the west and northwest and along the Buffels River to the north mining for diamonds has occurred for nearly a century. The Komaggas Communal Reserve lies to the east of the study area.

As there are no towns or built-up areas in the visual assessment zone influencing the overall visual character, there are very low levels of human transformation and visual degradation across much of the study area. Prominent anthropogenic elements in the study area however include 66 kV power lines and the two gravel secondary roads in the study area. Other, less prominent elements present in the area include telephone poles, windmills, gravel farm access roads and farm boundary fences. The presence of this infrastructure is an important factor in this context, as the introduction of the proposed WEF would result in less visual contrast where other anthropogenic elements are already present, especially where the scale of those elements is similar to that of the proposed development.

The scenic quality of the landscape is also an important factor contributing to the visual character of an area or the inherent sense of place. The greater area surrounding the development site is an important component when assessing visual character. The area can be considered to be a typical Karoo or "platteland" landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa's dry Karoo interior consists of wide-open, uninhabited spaces sparsely punctuated by widely scattered farmsteads and small towns. Over the last couple of decades, an increasing number of tourism routes have been established within the Karoo, and in a context of increasing urbanisation in South Africa's major centres, the Karoo is being marketed as an undisturbed getaway or a stop on a longer journey from the northern parts of South Africa to the Western and Eastern Cape coasts. Examples of this may be found in the "Getaway Guide to Karoo, Namaqualand and Kalahari" (Moseley and Naude-Moseley, 2008).

The typical Karoo landscape can also be considered a valuable 'cultural landscape' in the South African context. Although the cultural landscape concept is relatively new, it is becoming an increasingly important concept in terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002). In 1992 the World Heritage Committee[6] adopted the following definition for cultural landscapes:

Cultural landscapes represent the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal.

Cultural Landscapes can fall into three categories (according to the World Heritage Committee's Operational Guidelines):

Cultural Landscapes can fall into three categories (according to the Committee's Operational Guidelines):

- "a landscape designed and created intentionally by man";
- an "organically evolved landscape" which may be a "relict (or fossil) landscape" or a "continuing landscape"; and
- an "associative cultural landscape" which may be valued because of the "religious, artistic or cultural associations of the natural element".

The typical Karoo landscape consisting of wide open plains, and isolated relief, interspersed with isolated farmsteads, windmills and stock holding pens, is an important part of the cultural matrix of the South African environment. The Karoo farmstead is also a representation of how the harsh arid nature of the environment in this part of the country has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction. The presence of small towns, such as Kleinsee and Komaggas, engulfed by an otherwise rural environment, form an integral part of the wider Karoo landscape. As such, the Karoo landscape as it exists today has value as a cultural landscape in the South African context.

In terms of the types of cultural landscape listed above, the Karoo cultural landscape would fall into the second category, that of an organically evolved, “continuing” landscape.

In light of this, the study area, as visible to the viewer, represents a typical Karoo cultural landscape. This is important in the context of potential visual impacts associated with the development of a WEF as introducing this type of development could be considered to be a degrading factor in the context of the natural Karoo character of the study area. However, considering the fact that a number of WEFs have been developed or are likely to be developed across the Karoo, it is conceivable that WEFs may in the future become an integral part of the typical Karoo cultural landscape. In addition, the study area is located within the Springbok REDZ (REDZ 8) and thus the relevant authorities support the concentration of renewable energy developments and associated transformation in this area.

In this instance visual impacts on the cultural landscape would be reduced by the fact that the area is relatively remote and there are very few tourism or nature-based facilities in the study area. In addition, the nearest recognised or potential tourism routes (R355 and the Namaqua Coastal route) are some distance away.

Further descriptions of the topography, landscape, land use and visual character of the proposed Komas WEF site and surrounding regions are provided in the Specialist Assessments included in Appendix C of this BA Report.

[6] UNESCO, 2005. Operational Guidelines for the Implementation of the World Heritage Convention. UNESCO World Heritage Centre. Paris

B.6 Geology

The Aquatic Compliance Statement (Appendix C.2) notes that the majority of the study area is underlain by quaternary alluvium, sand and calcrete with an isolated area of quartzites and schists of the Bushmanland Group and Khurisberg Subgroup occurring in the south (Figure B.17). The soils associated with the study area are red and yellow, well drained, sandy soils (SA Soil Map, SANBI BGIS).

The following information was taken from the Geological desktop report which was compiled by WSP Environmental (Pty) Ltd (2020) which serves as background information for the proposed project (see Appendix J.2 for the full Geology report). The Geological Map (1:250 000, 2916 Springbok) indicates that the proposed development area is predominantly underlain directly by Quarternary deposits described as semi consolidated piedmont deposits and red sands. These are deposited on the wide (±30 km) coastal foreland that stretched from the west coast to the escarpment, east of the site. Due to the widespread nature of these recent deposits the distribution of geological units under the sediments is not well defined. The deposits are known to be underlain by the Bushmanland Terrane which consists of basement granitic gneisses, granulite grade supracrustal rocks and late granitoid intrusions.

The Steinkopf Gneiss of the Gladkop Suite is exposed in the north where the Buffels River has eroded into the underlying bedrock. This unit is part of the older basement of the Bushmanland Terrane. The next unit that is mapped in the area, and is mapped as outcrop on the proposed development site is the Khurisberg Subgroup which is part of the Bushmanland Group supracrustal rocks that were deposited on the basement and later metamorphosed to form gneiss, quartzite and schist. Younger units mapped in the area, but only significantly to the east of the development area include the Mesklip Gneiss (Little Namaqua Suite) and the Rietberg Granite (Spektakel Suite). These both represent late stage granitic intrusions, some of which were metamorphosed.

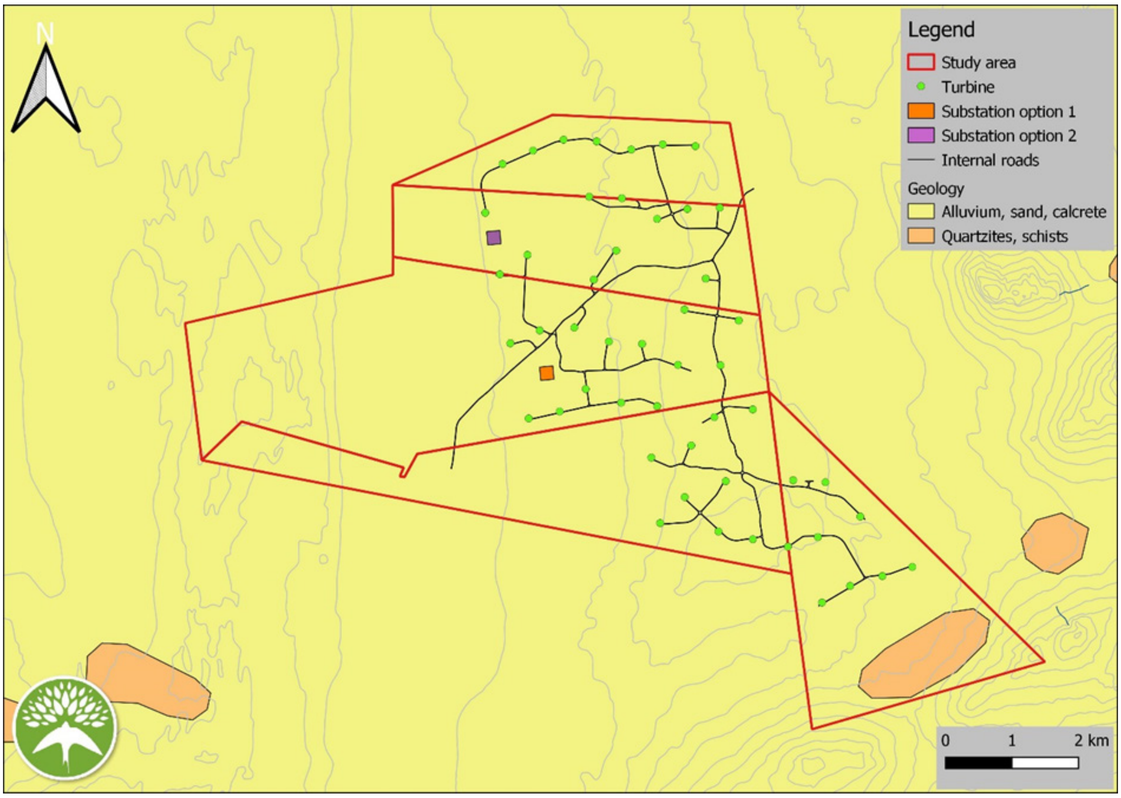


Figure B.17: Geology associated with the study area (Republic of South Africa Geology layer) (Map prepared by EnviroSwift, 2020).
Please note the indicated SS site alternatives (Option 1 and Option 2) will also house the BESS and are referred to as the BESS and SS complex site alternatives (Option 1 and Option 2)

Based on the geological setting and the well-known mining history in the surrounding areas, the likelihood of minable geological deposits occurring in the proposed development area is considered to be very low. The majority of the area and especially the Komas WEF area is therefore not considered to have any exploitable mineral deposits on it.

The Palaeontology Impact Assessment (included as Appendix 4 of the HIA which comprises Appendix C.6 of the BA Report) notes that the geology of the study area is outlined in the 1:250 000 map, Sheet 2916 SPRINGBOK and the 1:50 000 topo-cadastral maps are 2917CC BRAZIL, 2917CD KOMAGGAS and 2916DB & 2917CA KLEINSEE. The assessment notes that affected surficial formations include Holocene dunes of the Hardevlei Formation and earlier late Quaternary coversands of the Koekenaap Formation. Beneath these unconsolidated sands are compact, pedogenically-altered aeolianites termed the Dorbank Formation which are fossil dune plumes of later mid-Quaternary age. Between the fossil dune plume ridges is a non-depositional area (Zonnekwa Valley) which is closely underlain by pale calcrete pedocrete which is likely to have formed within the upper part of an older aeolianite formation such as correlates of the Olifantsrivier or Graauw Duinen formations.

A detailed description of the geology of the region is provided in the Palaeontology Impact Assessment (included as Appendix 4 of the HIA which forms Appendix C.6 of the BA Report) as well as in the Geology study (Appendix J.2 of this BA report).

B.7 Terrestrial Biodiversity

B.7.1 General Context

The study area falls within the Succulent Karoo Biodiversity Hotspot (Northern Cape SDF, 2012). The Succulent Karoo is the only arid ecosystem to be recognised as a global biodiversity hotspot. Nearly one-third of the floral species of the region are unique to the hotspot and the region boasts the richest variety of succulent flora in the world. The Succulent Karoo hotspot is under extreme pressure from human activities, including overgrazing, mining, illegal collection of wild plants and animals and the impact of climate change (Critical Ecosystem Partnership Fund (CEPF), 2003)).

Details pertaining to the Terrestrial Biodiversity environment are provided in the Terrestrial Biodiversity Impact Assessment (Appendix C.1 of this BA Report). The information provided in this section is based on this assessment (Todd, 2020).

B.7.2 Vegetation Types

According to the national vegetation map (Mucina & Rutherford 2006 and 2018 SANBI Update), there are several vegetation types in the area, but the proposed Komas WEF site is restricted almost entirely to the Namaqualand Strandveld vegetation type with a small extent of Namaqualand Klipkoppe Shrubland in the southeast corner of the site (Figure B.18).

The Namaqualand Strandveld occurs in the Northern and Western Cape Provinces from the southern Richtersveld as far south as Donkins Bay. Especially in the north of this unit it penetrates up to 40 km inland and approaches the coast only near the river mouths of the Buffels, Swartlintjies, Spoeg, Bitter and Groen Rivers. In the south of the unit it is variably narrow and approaches the coast more closely. It consists of flat to undulating coastal peneplains with vegetation being a low species richness shrubland dominated by a plethora of erect and creeping succulent shrubs as well as woody shrubs and in wet years annuals are also abundant. It is associated with deep red or yellowish-red Aeolian dunes and deep sand overlying marine sediments and granite gneisses. Mucina and Rutherford (2006 and 2018) list eight endemic species for this vegetation type. About 10% of this vegetation type has been lost mainly to coastal mining for heavy metals and it is not currently listed.

A very small area in the far south east of the site is mapped as Namaqualand Klipkoppe Shrubland (Figure B.18). This vegetation unit occupies 10 936 km^2 of central Namaqualand from Steinkopf to Nuwerus in the south. Namaqualand Klipkoppe Shrubland is associated with the rocky hills, granite and gneiss domes of the mountains of central Namaqualand. Due to its' steep and rocky nature, Namaqualand Klipkoppe Shrubland has not been impacted by intensive agriculture. Approximately 6% is currently conserved, mainly within Goegap and the Namaqua National Park. As Namaqualand Klipkoppe Shrubland is still largely intact, it has been classified as Least Threatened. Mucina & Rutherford (2006 and 2018) list 15 endemic species for this vegetation type. At a coarse level, it is sensitive largely in terms of offering a diverse habitat for fauna such as reptiles but relatively speaking does not have a high abundance of listed plant species. The extent of this vegetation unit at the site is very low and it can be easily avoided and does not pose a significant constraint on development.

The vegetation units mapped within the VegMap are generally quite coarse and in many instances, it is possible to discern a variety of different plant communities present within a site. Komas is no exception and at least three different major plant communities can be recognised at the site. These are described in detail below and are considered to represent a more realistic representation of the vegetation of the area.

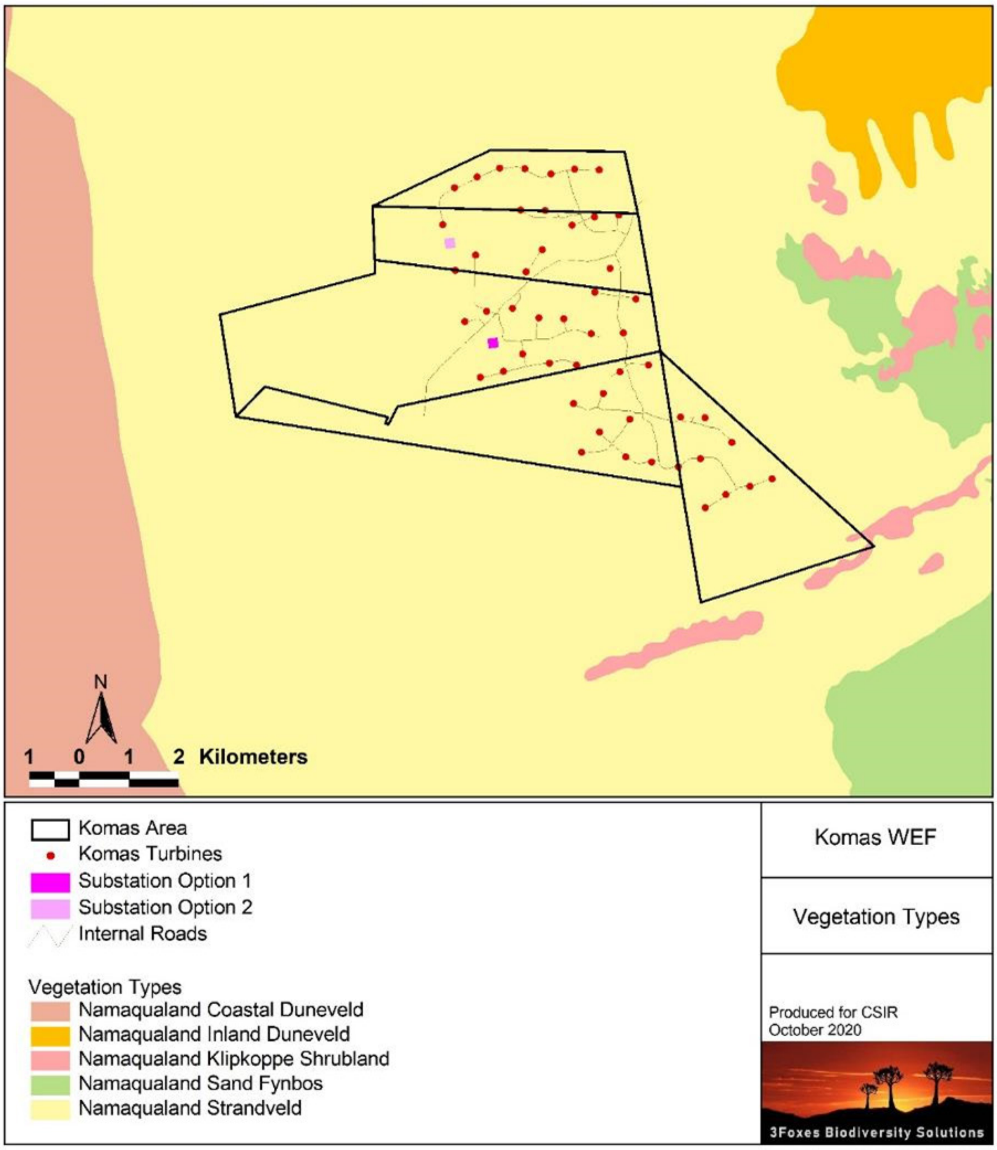


Figure B.18: Vegetation map (Mucina and Rutherford 2006 and 2018 Update) of the Komas study area and surrounding area.

B.7.3 Fine Scale Vegetation Description

The actual plant communities as observed at the site are detailed and described below. This information is considered to be of greater reliability and weight than the VegMap as it represents actual ground-truthed information from the site.

Community 1. Typical Namaqualand Strandveld

The majority of the site consists of typical Namaqualand Strandveld on flat to gently undulating plains. These areas are fairly homogenous but there are some shifts in the dominance of the different plant species present depending on soil texture, depth etc. Typical and dominant species include *Zygophyllum morgsana*, *Tripteris oppositifolia*, *Asparagus capensis*, *Othonna sedifolia*, *Hermannia sp.*, *Lebeckia spinescens*, *Eriocephalus racemosus*, *Searsia longispina*, *Leipoldtia sp.*, *Cladoraphis cyperoides*, *Salvia lanceolata*, *Anthospermum spathulatum*, *Tetragonia spicata*, *Ruschia sp.*, *Helichrysum hebelepis*, *Wahlenbergia asparagoides*, *Asparagus lignosus* and *Euphorbia burmannii*. This is the dominant habitat at the site and comprises more than half the study area. This is not considered to be a sensitive habitat and the majority of the development footprint should be accommodated within this habitat type.

Community 2. Namaqualand Dune Strandveld

There is a distinct plant community associated with the larger, more mobile dune fields of the site. These areas are more dynamic than the areas of flatter strandveld and have areas of alternating low cover associated with areas of greater sand movement and areas of taller vegetation occurring in the dune slacks and other more stable situations. Typical and dominant species include *Zygophyllum morgsana*, *Searsia longispina*, *Tripteris oppositifolia*, *Cladoraphis cyperoides*, *Othonna sedifolia*, *Conicosia pugioniformis*, *Asparagus lignosus*, *Hermannia sp.*, *Eriocephalus racemosus*, *Asparagus capensis*, *Lycium cinereum*, *Lebeckia spinescens*, *Tetragonia spicata* and *Diospyros ramulosa*. These areas are considered somewhat more sensitive than the typical surrounding Strandveld due to the large dunes which are vulnerable to disturbance. As this habitat is sensitive to disturbance, some avoidance of this habitat is recommended and additional mitigation to reduce wind erosion risk within these areas should be implemented.

Community 3. Low Strandveld on Calcareous Soils

The vegetation of the areas classified as Namaqualand Salt Pans under the 2012 VegMap have been reclassified as Namaqualand Strandveld under the 2018 VegMap. In reality, neither is correct and the vegetation of this area represents a short form of Strandveld that should be recognised as distinct from the typical surrounding Namaqualand Strandveld. Typical and dominant species include *Amphibolia rupis-arcuatae*, *Euphorbia brachiata*, *Othonna sedifolia*, *Asparagus capensis*, *Zygophyllum morgsana*, *Ruschia goodiae*, *Cheirodopsis denticulata*, *Aridaria nociflora*, *Othonna cylindrica* and *Ruschia sp.* As this is a habitat of limited extent and offers features that are not found elsewhere in the area, it is considered more sensitive than the surrounding Strandveld and the overall development footprint in this habitat should be kept low.

B.7.4 Terrestrial Plant Species: Listed and Protected Plant Species

More than 500 plant species have been recorded from the broader area from Komaggas in the east to Kleinsee in the west. This includes 25 SCC of which three can be confirmed present at the site. This includes, *Leucoptera nodosa* (NT), *Wahlenbergia asparagoides* (VU) and *Babiana hirsuta* (NT). However, the abundance of these species is low across most of the site and the local populations would not be compromised by the development. The site is not considered to hold locally or regionally important populations of these species. The low relative abundance of plant SCC at the site can be explained by the typical homogenous nature of the Strandveld on the site and the lack of habitats which usually have a high abundance of SCC such as Sand Fynbos or rocky ridges.

B.7.5 Faunal Communities

- ***Mammals***

Approximately 40 mammal species potentially occur in the area. Mammals captured by the camera traps include, in order of decreasing abundance, Steenbok, Cape Hare, Cape Fox, Bat-eared fox, Striped Polecat, Suricate, Cape Porcupine, Common Duiker, Honey Badger, Small Spotted Genet, Grey Mongoose, Caracal, Yellow Mongoose, African Wild Cat and Slender Mongoose (Figure B.19 and Figure B.20). More than half the observations are from Steenbok and Cape Hare, with Cape Fox, Bat-eared fox, Striped Polecat, Suricate and Cape Porcupine being moderately abundant and the remaining species uncommon. This represents a fairly typical mammalian community and is similar to that obtained at other sites along the West Coast. A notable absence is the Black-backed Jackal which occurs in the area but is likely absent as a result of persecution. Small mammals observed or caught in the area with Sherman traps include Hairy-footed Gerbil, Western Rock Elephant Shrew, Namaqua Rock Mouse, Four-striped Mouse, Karoo Bush Rats and Brants' Whistling Rat.

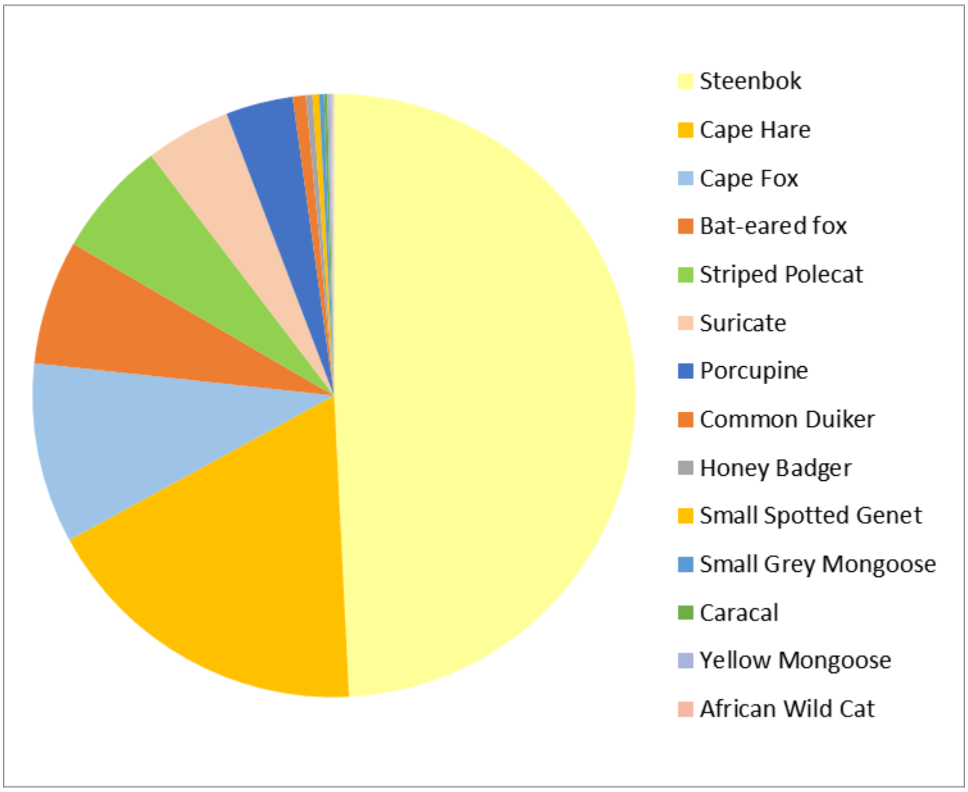


Figure B.19: Pie chart showing the relative abundance of mammals in the proposed Komas WEF site based on more than 1 100 camera trap observations.

Apart from the species that were observed and can be confirmed present at the site, four red-listed SCC are known from the wider area. This includes the Leopard *Panthera pardus* (Vulnerable), Littledale's Whistling Rat *Parotomys littledalei* (Near Threatened), African Clawless Otter *Aonyx capensis* (Near Threatened) and Grants' Golden Mole *Eremitalpa granti grant* (Vulnerable). It is not likely that either the Leopard or Otter are present at the site on account of human disturbance or lack of suitable habitat. Golden Moles are confirmed present at the site, but it is not clear if these are the more common Cape Golden Mole or Grants' Golden Mole. These subterranean animals 'swim' through the soft sand and hardened surfaces such as roads would pose a significant obstacle for movement. In addition, they also use subtle vibrations in the soil to detect their prey and it is possible that noise and vibration transferred from the turbines to the soil would have a negative impact on the local populations of golden moles. There have however been no studies to date on the impacts of vibration and noise on golden moles and so this remains an unknown.

The major impacts on mammals would occur during the construction phase when there would be significant noise and disturbance generated at the site. In the long-term, it is likely that the major impact of development on most mammals would be habitat loss equivalent to the footprint of the facility. Some species may however be wary of the turbines or negatively affected by the noise generated and may avoid them to the greater degree. It is however unlikely that the local or regional populations of any species would be compromised by the development and long-term impacts on mammals are likely to be of low to moderate significance after mitigation.

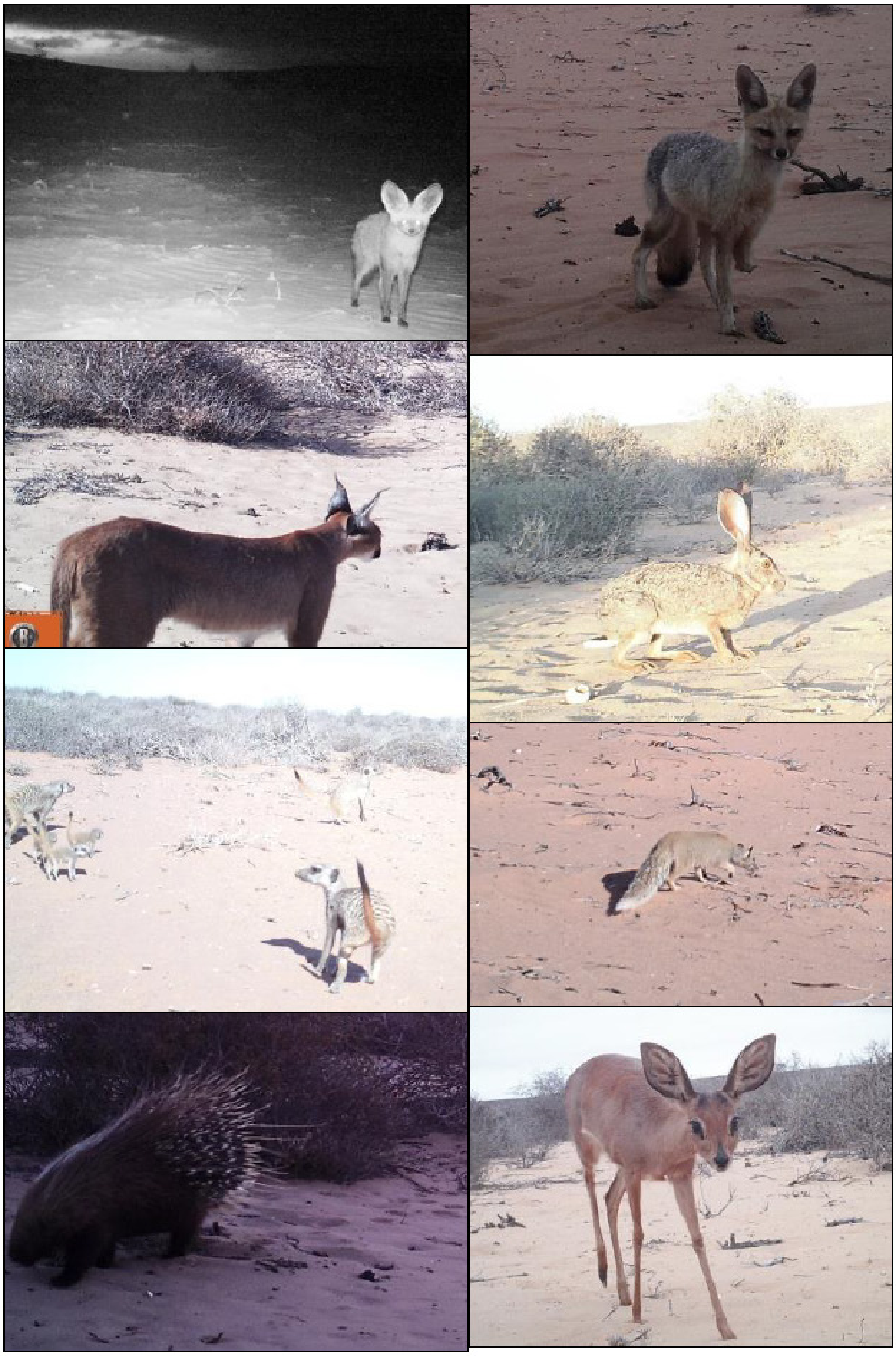


Figure B.20: Examples of camera trap images from the proposed Komas WEF site. Clockwise from bottom left, Cape Porcupine, Suricate, Caracal, Bat-eared Fox, Cape Fox, Cape Hare, Yellow Mongoose and Steenbok. The Cape Fox pictured top right has an amputated front leg, likely the result of being caught in a gin trap.

- ***Reptiles***

A list of Reptiles known from the vicinity of the Komas site, based on records from the ReptileMap database is provided in Appendix 3 of Terrestrial Biodiversity report and indicates that as many as 45 species are known to occur in the wider area. No SCC have however been recorded from the area although it is possible that the Speckled Padloper *Chersobius signatus* (Vulnerable) is present at the site as it is widespread in Namaqualand and the Namaqualand Klipkoppe Shrubland in the far southeast of the site potentially offers suitable habitat for this species. Namaqualand is known as a centre of endemism and diversity for reptiles and the wider area has a high diversity and abundance of local endemics. This appears to be generated at least partly through the high habitat diversity of the area, which includes rocky hills, heuweltjie veld on fine-textured firm soils, loose sands and dunes, stable and vegetated dunes, well vegetated drainage lines etc. Within the proposed Komas WEF site, habitat diversity is however low and restricted to various sandy substrates from firm sand lowlands to fairly loose dunes, with the result that species associated with rocky outcrops would be absent from the site.

Species observed at the site include Angulate Tortoise, Giant Desert Lizard, Common Giant Ground Gecko, Knox's Desert Lizard, Common Sand Lizard, Cape Skink, Coastal Dwarf Legless Skink, Namaqua Sand Lizard, Pink Blind Legless Skink, Dwarf Beaked Snake and Many-horned Adder. For most species, the major impact of the development would be loss of habitat equivalent to the footprint of the development. For most species this is not considered highly significant as there are large intact tracts of similar habitat available in the area. Subterranean species associated with sandy substrates may be vulnerable to habitat disruption due to the construction of roads which may fragment the continuity of the sandy substrate. However, overall, the impacts of the development on reptiles are likely to be of local significance only as there are no species with a very narrow distribution range or of high conservation concern present at the site which may be compromised by the development.

- ***Amphibians***

The site lies within the known distribution range of seven frog and toad species. However, as there is no perennial water in the area, many of these are not likely to occur at the site. A few species are however either largely independent of water (*Breviceps* spp) or well adapted to arid conditions (*Vandijkophrynus* spp.) and will occur at the site. The Desert Rain Frog *Breviceps macrops* occurs in Strandveld vegetation up to 10 km from the coastline and is listed as Vulnerable. As the proposed Komas WEF site is 16 km from the coast, it is unlikely that this species is present, but this cannot be entirely discounted as a possibility. The only species confirmed present in the area is the Namaqua Rain Frog, *Breviceps namaquensis* which is common on coastal sands along the whole West Coast. There are no areas within the site that appear to be of above-average significance for amphibians and it is not likely that the development of the site would have a significant long-term impact on local amphibian populations.

B.7.6 Namaqua National Park Expansion Footprint

Figure B.20(b) shows the overall administrative and biodiversity planning features relevant to the proposed development of the Komas WEF. The impacts on these planning frameworks were considered and assessed in the BA Report (especially within the Additional Biodiversity Offset Report (including proposed implementation (Botha, 2021, included in Appendix J.3(1) of this BA Report.

Analysis shows that around 32 ha of the NNP Expansion Footprint (>74 000 ha in this sector alone) will be lost to the proposed Komas WEF (Botha, 2021). There is a lack of clarity and guidance on the interpretation of this feature and potential loss. The Park Expansion Footprint cannot enjoy the same legal protection as the Park itself otherwise this would have been included in statute (Botha, 2021). This was confirmed and accepted by SANParks in their letter dated 15 Febuary 2021 included in Appendix D of this BA Report.

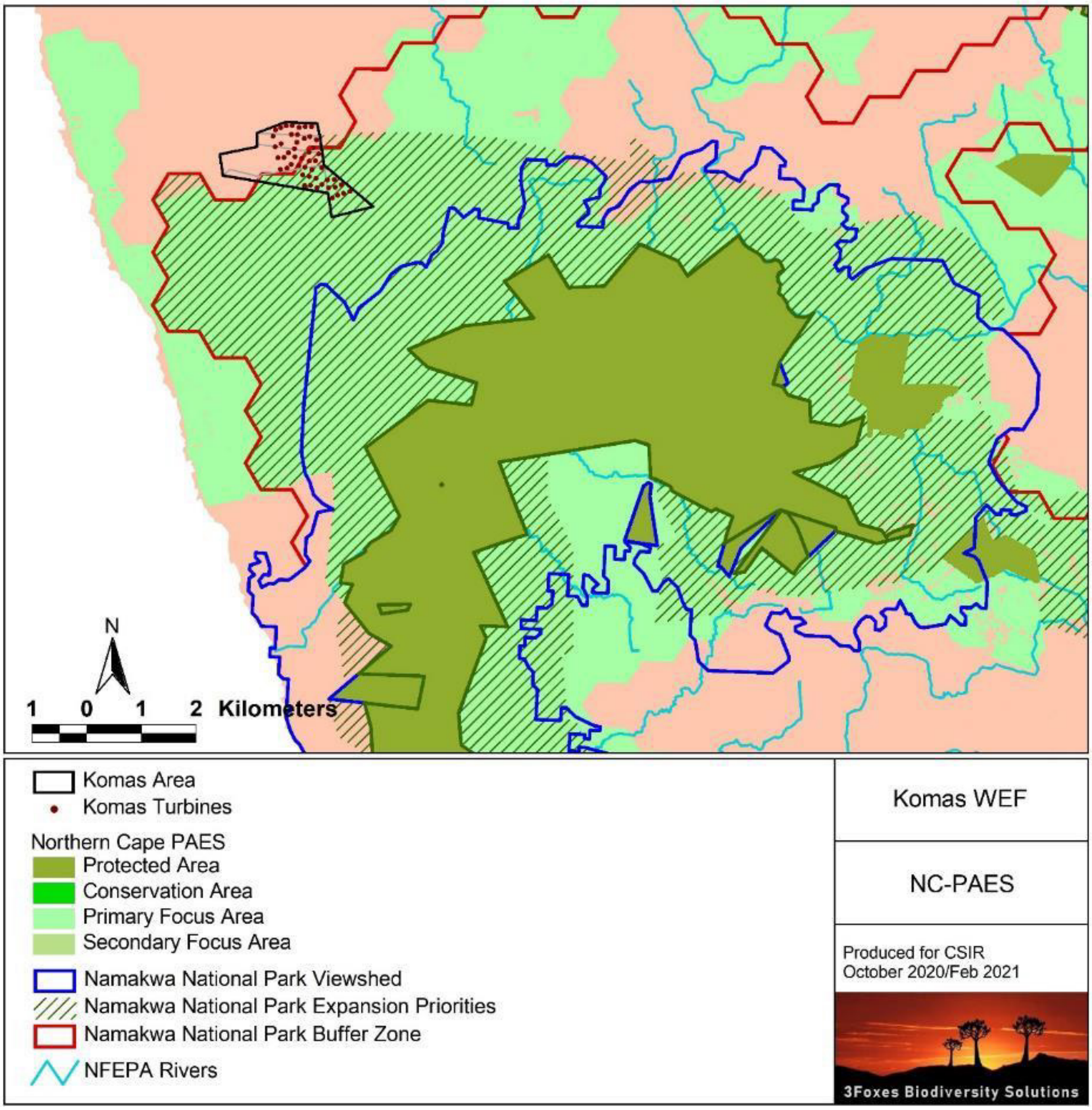


Figure B.20b: A map of the Komas WEF location in relation to Protected Area Expansion focus areas, National Park Buffer Zone, and the Namaqua National Park Expansion Footprint as approved by the Minister in the Park Management Plan (SANParks 2012). Reproduced from Todd (2021).

Not having access to the detailed rationale behind the designation of the Expansion Footprint areas, leads one to assume that it must have been selected to target the vegetation types found there (the numerous other objectives in the Park Management Plan are insufficiently spatially resolved to be of much help). The required additional area of Namaqualand Strandveld (<59 000 ha) and Namaqualand

Sand Fynbos (27 300 ha out of 110 000 ha remaining) to be protected to meet the vegetation target can be found in many other areas of the extent of those two vegetation types, including adjacent to the NNP further South (Botha, 2021).

It seems unlikely that the Expansion Footprint was designed to optimise park management efficiency or cater for new visitor infrastructure opportunities. As it was developed before (possibly as early as 2002 by Desmet et al (cited in SANParks (2012 p 23)) the other biodiversity planning features in this section (Holness & Oosthuysen 2016), it must also be assumed that it heavily influenced their selection and location (Botha, 2021).

The visual specialist (Ms Kerry Schwartz of SiVEST) indicated that although the future expansion of the NNP is acknowledged, it is very difficult to assess the potential visual impacts on receptors if the location of the planned tourism facilities is not known.

As the proposed Kap Vley WEF (closer to the NNP than the proposed Komas WEF) and adjacent proposed Namas WEF are already approved and Eskom will effectively bisect this region with the high voltage Kudu-Gromis-Juno power lines, it seems unlikely that any wilderness experience or tourism infrastructure will be located in this part of a future expanded park. Thus, the possible impacts on the sense-of-place, tourism and opportunity costs for the NNP from the proposed Komas WEF are very low (Botha, 2021).

Therefore, while it is trite to suggest that Park Expansion Footprint needs to be approached sensitively, it also cannot be treated at this stage as sacrosanct, or worthy of the same protection level (and thus offset ratio) as systematically and defensibly derived CBA1. Areas of Park Expansion Footprint that are not systematically and defensibly designated (in the approved Management Plan or in an accompanying PA expansion strategy adopted by regulators) can be lost, provided there are still readily available opportunities to conserve the biodiversity values and Park Management objectives elsewhere. This loss can be remedied through offset-type mitigation (Botha, 2021).

B.7.7 Namaqua National Park Buffer Zone

A Parks' buffer zone is the outermost boundary of the viewshed protection area and adjacent priority natural areas. The proposed Komas WEF falls partly within the NNP's buffer zone (Figure B.21). However, it falls outside of the Viewshed Protection component of the buffer zone. It therefore seems appropriate to treat this feature the same as the other PAES considerations.

It is also important to consider whether wind turbines generating clean energy should be automatically excluded from a vision of a National Park buffer zone, where the remaining biodiversity is protected and managed to the appropriate standard. Although this is common elsewhere in the world, it is less explored in South Africa. As no current policy exists on energy installations and Protected Areas (which the biodiversity specialist is aware of) it must be assumed that there is an exclusion of energy generation infrastructure from National Parks, but possibly not from their buffer zones - provided no explicit operational conflicts exist. These assumptions have not been tested sufficiently with authorities (Botha, 2021). It should be noted that five other WEFs have been approved in the immediate vicinity of the NNP.

B.7.8 Critical Biodiversity Areas

Based on the Northern Cape CBA map, the southern parts of the proposed Komas WEF site lie within a Tier 2 CBA with a small portion of Tier 1 CBA in the south-eastern corner of the site (Figure B.21). This indicates that the site occurs within an area of recognised biodiversity significance. Development within such areas can have negative impacts on biodiversity pattern and process and is generally considered undesirable. Although the total footprint (ca. 90 ha) of the development is not very large, it must be considered in context of the currently intact and relatively undisturbed receiving environment and the implications that the development may have for future land use options in the area.

As the primary purpose of CBAs is to try and secure the broad-scale ecological functioning and resilience of landscapes, it is important to consider the impact that the development may have on ecological processes. As the area is relatively homogenous, it is not likely that there are any specific directional movement corridors within the area that is classified as a CBA. At a broader level, there are also still extensive tracts of similar intact habitat east and west as well as north and south of the site with the result that it is not likely that the development would result in significant disruption of ecological processes. There are however several other WEFs in the immediate area including the approved Kap Vley WEF east of the site and the Namas and Zonnequa WEFs west and north of the site. This would increase cumulative impacts in the area and also cumulative impacts on CBAs since both the proposed Kap Vley and Namas WEFs have some or all of their approved turbines within CBAs. Due to the impact of the proposed Kap Vley WEF development on CBAs and plant SCC, a biodiversity conservation offset was implemented as part of that project. However, it is clear that the sensitivity of the proposed Kap Vley WEF site and the current Komas WEF project area are equivalent in this regard and the species and features of concern which characterise the Kap Vley WEF site are not present within the Komas WEF site, which is much more similar in nature to the proposed Namas and Zonnequa WEF development areas. As such, this represents typical Strandveld with a relatively low abundance of SCC and no specific features of high biodiversity or ecological value. The CBA 1 which clips the site, is a CBA based on the area being identified as being a Succulent Karoo Ecosystem Programme (SKEP) Expert Priority Area. The remainder of the CBA is earmarked for protected area expansion.

The major issue with development within the areas of CBA is the extent to which habitat loss would impact on ecological processes within the CBA and the potential irreplaceability of the affected area. As mentioned above, it is not likely that the affected area is irreplaceable as the site represents typical Strandveld that is relatively widely available in the area and is also fairly well represented within the Namaqua National Park. In terms of the footprint of the development, this is estimated as being approximately 27 ha within the ESA and 31 ha within the CBA 2. Under the final layout assessed, there are no turbines or other infrastructure within the CBA 1. The loss of 31 ha of habitat within the CBA 2 represents less than 2% of the area of CBA within the Komas study area only and significantly less of the whole affected CBA. As a result, this is highly unlikely to compromise the ecological functioning of the CBA, given that it has not been identified as being of particular significance for broad-scale ecological processes. Consequently, the overall impact of the development on CBAs and broader scale ecological processes is considered to be relatively low and no major impacts to dispersal ability or faunal movement patterns are likely to be generated by the development. As such, an offset to counter the potential impact of the development on the CBA 2 affected in the south of the site does not seem warranted as there is sufficient scope to reduce on-site impacts to an acceptable level and there are no features present in this area that are not widely available outside of the study area. However, it is important to note that this does not preclude the possibility of other impacts with high residual significance that may require offsetting. The additional Biodiversity Offset Report (including proposed implementation (Botha, 2021)) notes there are several other areas in which to meet the targets for which these CBAs on the proposed Komas WEF site were identified. It emphasises that the presence of CBAs is further confounded by the overlap of the REDZ with the CBAs delineated on the Komas sites. The Phase 1 REDZs, including the Springbok REDZ, were identified in 2015, before the Northern Cape CBA maps were updated and protected area expansion focus areas were prepared in 2017. Ideally, the provincial CBA delineation could have taken the existence of the REDZ into account and identified other areas in the landscape to meet the required targets and protect the various features.

The “reasons layer” in the Northern Cape CBA map was interrogated to verify if features driving the designation as a CBA2 are indeed present on the Komas site, and if so, whether the proposed development actually compromises those features, and if the spatial layout is indeed optimal given other constraints and recent developments. It appears that one of the strongest features determining the designation as CBA is the presence of the NNP Expansion Footprint, which has subsequently influenced the Northern Cape PAES, National PAES Focus Areas and CBA maps. But it does not follow that this is indeed the best place to conserve Namaqualand Strandveld in PAs. There is still >257 000 ha of this type extant, and the total Protected Area target is 82 000 ha, of which >22 000 ha is already protected. The other features driving the designation as CBA2 (apart from the NC PAES Focus Areas) are highly unlikely to be impacted by the presence of wind turbines, especially at the density proposed for the Komas WEF.

However, given that there will be a loss of around 31 - 33 ha of this CBA2 and that it is partially in a Park Expansion footprint, there is an argument to suggest that this is of national consideration, and significant mitigation is required. In the Northern Cape, with several options for meeting targets, it is argued that this mitigation is possible through an offset that secures the features and values for which the CBA is designated.

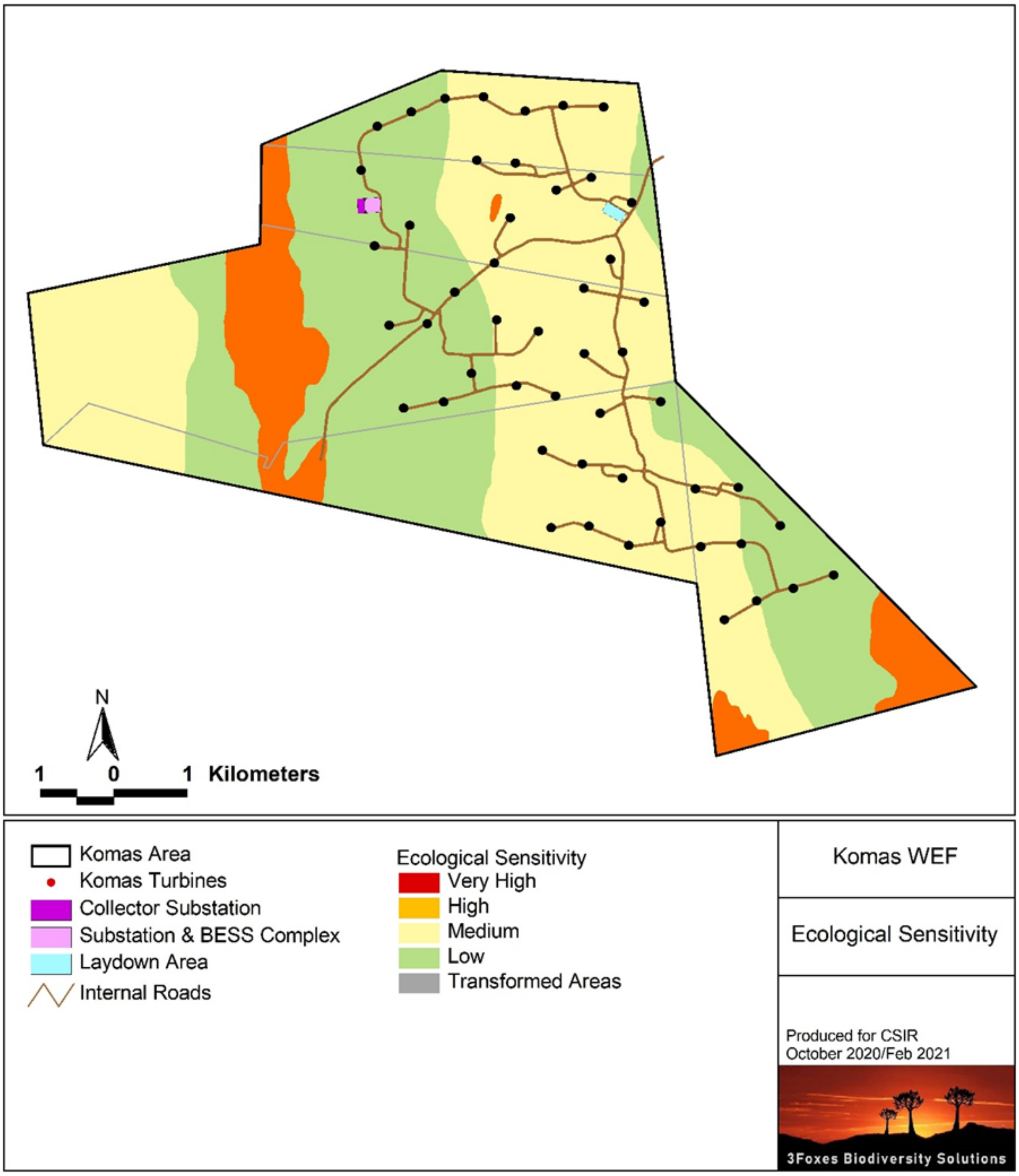


Figure B.21: Critical Biodiversity Areas map for the study area, showing that the site lies within a Tier 1 and Tier 2 CBA.

B.7.9 The Northern Cape and National PAES Priority Focus Areas

The southern half of the proposed Komas WEF site, including an area containing 18 turbines, falls within a NC-PAES Focus Area (2017) (Figure B.22). Development of the site would place some limitations on the future expansion of traditional formalised conservation into the affected area. In addition, assuming effective mitigation and avoidance, the site would retain significant biodiversity value and the development would not be likely to compromise the vast majority of biodiversity features and components represented by the site. The terrestrial footprint of the development would occupy a very small proportion of the landscape and the loss of 90 ha of direct habitat loss to the development and about 1 200 ha of indirect habitat loss (assuming a 500 m radius from each turbine has reduced biodiversity value for some but not all species) is not considered to represent significant loss to the affected NC-PAES Focus Area. The total area of the affected Focus Area is 377 266 ha and the loss of a maximum of 1 200 ha of this represents less than 0.32% of the Focus Area. As a result, this loss is, on its own not considered to represent a significant loss. There are however numerous other developments in the area and the impact of the current development on ecological processes as well as future conservation expansion should be considered in this context as well.

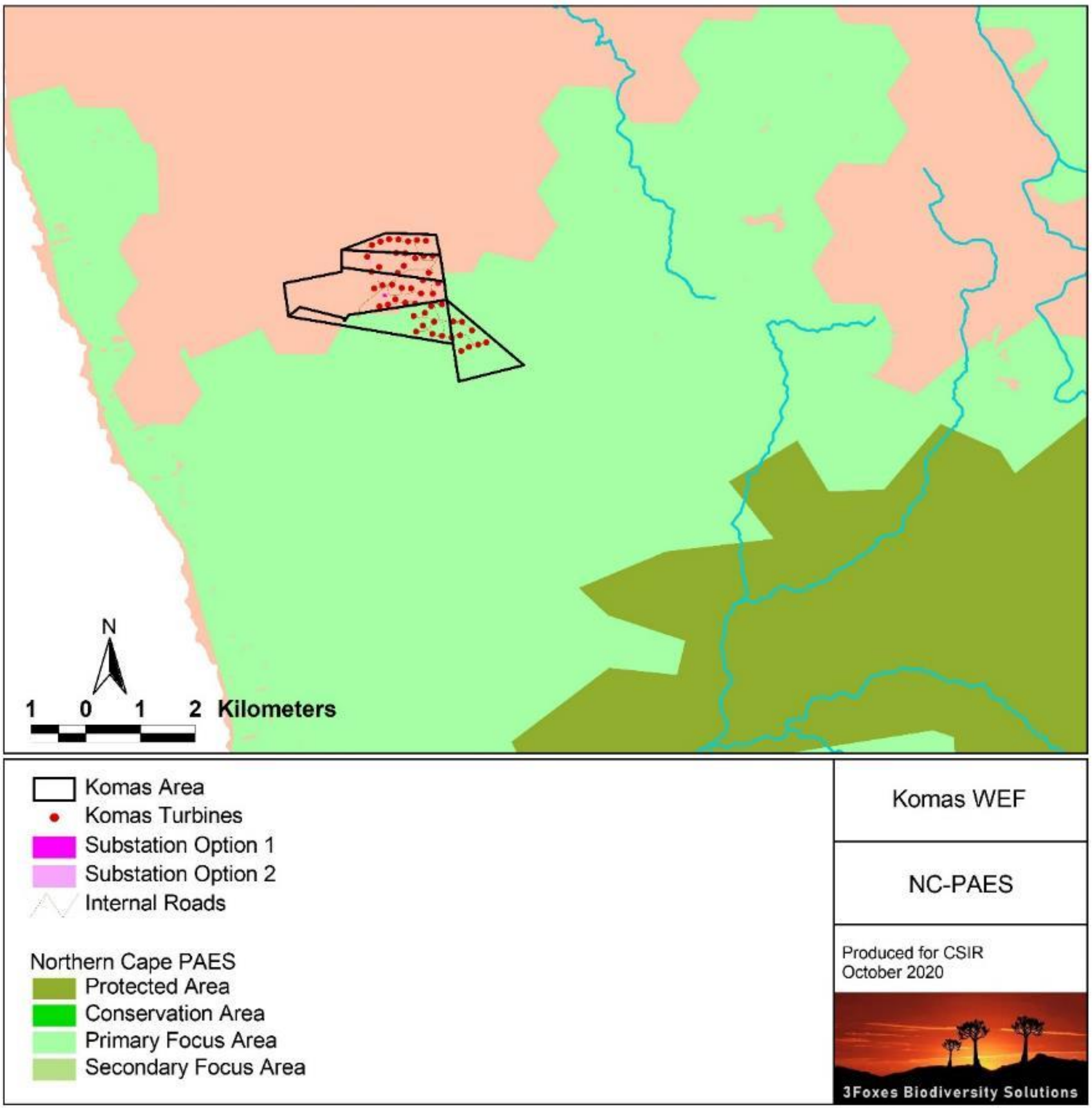


Figure B.22: Northern Cape Protected Area Expansion Strategy Focus Area map for the area around the proposed Komas WEF site, showing that the southern half of the Komas site falls within a Primary Focus Area.

The initial National PAES (DEAT 2008), and the subsequent Northern Cape Provincial PAES appear to have adopted substantially similar boundaries as the Namaqua National Park Expansion Footprint in this part of the region (although using slightly different planning units, so they do not fully align). These areas must be treated as rather notional due to the massive planning unit size, artificial boundaries, and obvious flexibility in the landscape in which to achieve their intended targets (Botha, 2021).

Concluding statement on the terrestrial biodiversity of the proposed Komas WEF site

Eighty-three (83) ha[7] of Namaqualand Strandveld will be lost, and there are few species of conservation concern in the impact areas. No unacceptable floral species impacts are likely (Todd 2020a). This vegetation type is extensive (>257 000 ha extant). It has around a quarter of its conservation target already met, (although is still listed as poorly protected in the National Biodiversity Assessment (Skowno et al 2018)). There are still significant opportunities to meet this conservation target elsewhere, outside of the REDZ and in areas not yet under Mining Right (Botha 2021).

Although the proposed Komas WEF impacts marginally on the NNP Buffer zone, the NNP Expansion Footprint, the National and Northern Cape PAES Focus Area, and a CBA2 in terms of the applicable provincial plan, these impacts have not been assessed to be of high or very high significance following mitigation. All these impacts have been assessed to be of **Moderate significance** before and after mitigation in the additional Biodiversity Offset Report, but prior to the implementation of a Biodiversity Offset. Should an offset be implemented, the impact has been assessed to be of low significance (Botha 2021).

The Additional Biodiversity Offset study (Botha, 2021), commissioned following SANParks comments received during the pre-application consultation, recommends that the implementation of a Biodiversity Offset is appropriate as the residual impact is **negative and of moderate significance**. This is based on the Draft Offset Policy (DEA, 2017). An offset of 810 ha, in Namaqualand Strandveld or an adjacent, related vegetation type in the PAES Focus Area is prudent (Botha, 2021). Please refer to Section D.2.1 for details on the proposed biodiversity offset (including the details on how the proposed offset was determined).

B.8 Aquatic Biodiversity

The information provided in this section on the aquatic environment is based on the Aquatic Biodiversity Compliance Statement (Appendix C.2 of this BA Report).

B.8.1 General Context

The study area is situated in the far western parts of the Northern Cape Province, within the NKLM, approximately 23 km to the south east of the coastal town of Kleinsee. The Northern Cape Province can be described as semi-arid in the east, to arid in the central region, to hyper-arid in the far western parts of Namaqualand (Northern Cape SDF, 2012).

[7] A footprint of approximately 90 ha has been considered as the worst case scenario to account for changes to the road layout and other infrastructure during the detailed design phase.

The study area falls within the Succulent Karoo Biodiversity Hotspot (Northern Cape SDF, 2012). The Succulent Karoo is the only arid ecosystem to be recognised as a global biodiversity hotspot. Nearly one-third of the floral species of the region are unique to the hotspot and the region boasts the richest variety of succulent flora in the world. The Succulent Karoo hotspot is under extreme pressure from human activities, including overgrazing, mining, illegal collection of wild plants and animals and the impact of climate change (Critical Ecosystem Partnership Fund (CEPF), 2003)).

The study area is located within the Western Coastal Belt Aquatic Ecoregion, within the Lower Orange Water Management Area (WMA) and within the Coastal Orange Sub-WMA. The quaternary catchment indicated for the study area is F40A, and the Wetland Bioregion associated with the area is the Namaqualand Sandveld (CSIR, 2018).

B.8.2 Freshwater Conservation context

According to the National Wetland Map 5 (CSIR, 2018), a large depression wetland is located within the western portion of the Komas WEF study area (Figure B.23). This depression has been indicated as an area of very high sensitivity in terms of Aquatic Biodiversity by the National Environmental Screening Tool (Figure B.24). However, upon investigation of this area during the field survey undertaken in January 2020 it was found that the area indicated as wetland habitat is in fact an extensive dune field. This dune field is a flat area located between two ridge lines and is characterised by fresh, wind-blown sand and dry terrestrial vegetation (Figure B.25). There is no indication that water accumulates within this area, and no wetland indicators as defined by the delineation guidelines (DWAF 2005, updated 2008) were encountered e.g. hydromorphic soils, wetland vegetation, signs of salt accumulation or hardened / cracked surface layers. Therefore, the site sensitivity verification disputes the rating of very high sensitivity assigned to this area in the National Web-Based Screening Tool in terms of Aquatic Biodiversity.

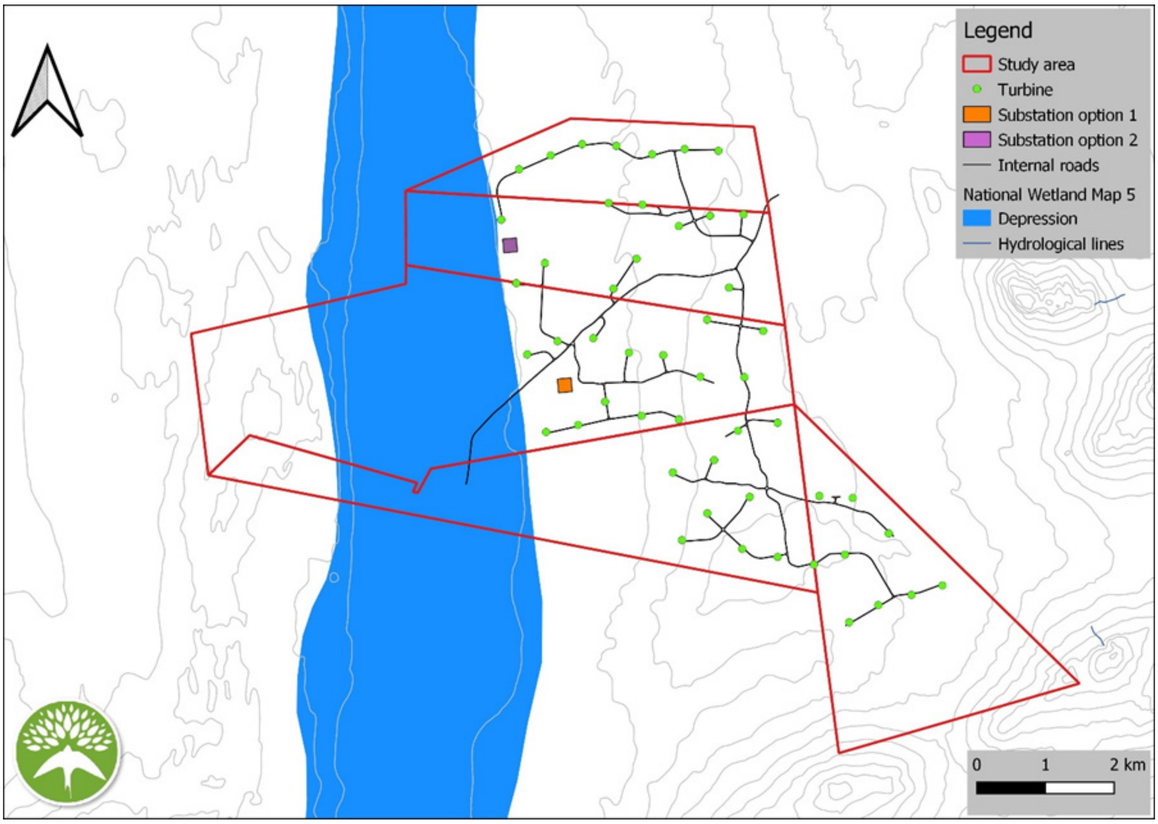


Figure B.23: Wetland indicated by the National Wetland Map 5 (CSIR, 2018)

Results of the Field Study

The low regional rainfall, semi-desert conditions and dominance of well drained, sandy soils within the study area is not conducive to the formation of wetland habitat. Furthermore, the relatively flat topography, the absence of ridges, and the lack of concentrated flow paths is not conducive to the formation of drainage lines. **No watercourses, as defined by the NWA, were therefore encountered within the study area, and no additional watercourses have been indicated within 500 m of the study area by desktop resources.**

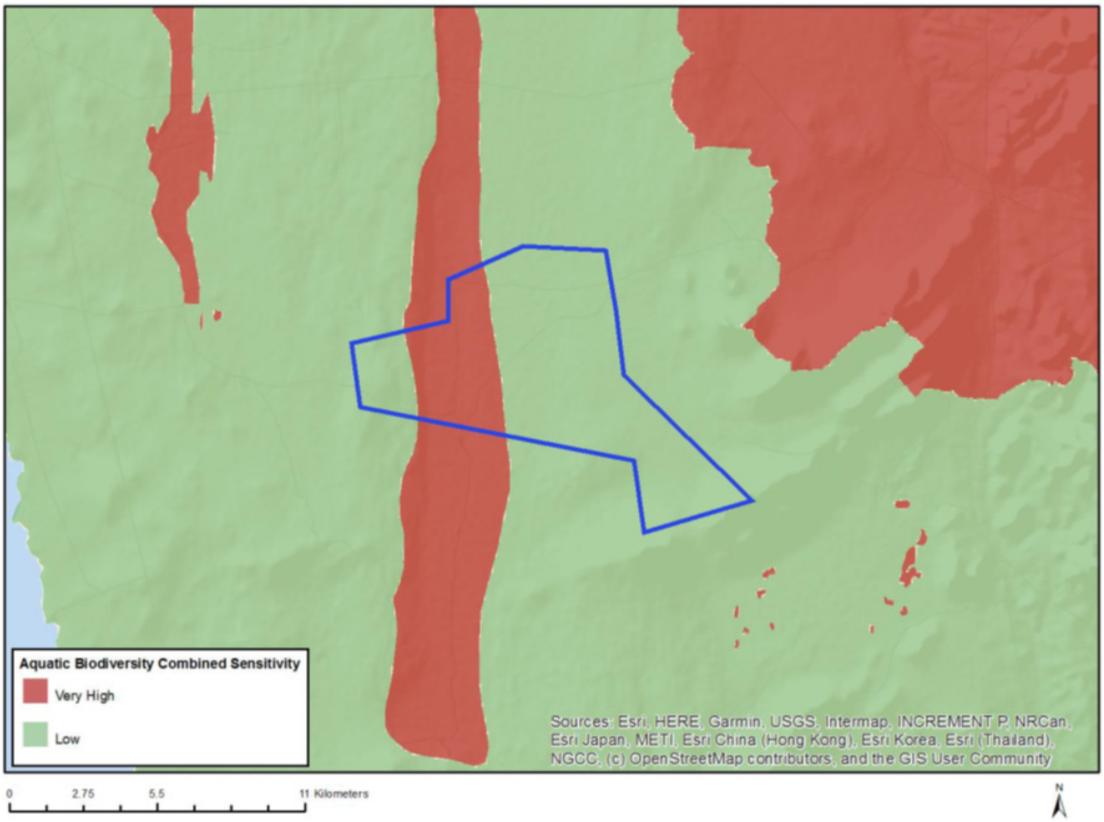


Figure B.24: Very high sensitivity aquatic biodiversity areas (as identified in the National Web-Based Screening Tool)

Figure B.25: Dry terrestrial vegetation dominating the area identified as a very high sensitivity aquatic biodiversity area

B.8.3 Screening Tool Description and Site Verification

No watercourses were encountered within the study area. It is therefore the opinion of the specialist that the study area is not considered to be important in terms of Aquatic Biodiversity and would fall within the low sensitivity category as defined by the National Web-Based Environmental Screening Tool. The proposed development will not have an impact on any aquatic features and a full Aquatic Biodiversity Specialist Assessment in terms of the Protocol gazetted in GN 320 on 20 March 2020 is therefore not required. A Compliance Statement has been prepared instead in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (GG 43110/ GN 320, dated 20 March 2020). It is the opinion of the Aquatic Biodiversity specialist that this Compliance Statement is sufficient as the aquatic sensitivity of the site was rated as very low and therefore the rating of very high significance as identified by the National Web-Based Environmental Screening Tool (Figure B.24) is disputed based on the evidence collected during the site visit and as motivated in the Aquatic Biodiversity Compliance Statement (Appendix C.2 of this BA Report).

B.9 Avifauna

The Avifauna Impact Assessment (Appendix C.3 of the BA Report) undertaken for the proposed project includes feedback on avifauna species encountered during the site monitoring. The information provided in this section is extracted from the Avifauna Impact Assessment (Appendix C.3 of the BA Report).

B.9.1 Species diversity

Over the course of 12 months the avifauna specialist on this project, Dr. Rob Simmons, recorded 58 avian species in the proposed Komas WEF site in four equally spaced site visits. More species (43 and 49 species) were present in spring and summer, following rains, and this brought in more priority (6 and 8 species) and more Red Data species (3 and 3 species) respectively. This is a typical total compared with other arid Karoo-like areas in the Northern and Western Cape that the specialist has sampled. Most were typical residents of the arid Karoo landscape including Chats, Prinias, Warblers, Flycatchers, Karoo Larks, long-billed Larks and sunbirds.

Small aerial species which may be affected by a new WEF included the occasional hirundines such as Rock Martin *Ptyonoprogne fuligula* and Namaqua Sandgrouse *Pteroclese namaqua* passing through the study site. Several collision-prone priority species were recorded and are discussed below.

B.9.2 Priority Collision-Prone Species

Eight collision-prone species were recorded from Vantage Point (VP) surveys within the proposed Komas WEF site, three of which were Red Data species classified as Vulnerable: Verreaux's Eagle *Aquila verreauxii*; Ludwig's Bustard *Neotis ludwigii* and Southern Black *Korhaan Afrotis afra*. The remaining five species recorded are of Least Concern and are shown in Table B.1.

Of these species, the Vulnerable Ludwig's Bustard (Taylor et al. 2015), ranked as the tenth-most collision-prone species in South Africa (Ralston-Paton et al. 2017), was recorded on every site visit except March 2019. This species was surprisingly the most frequently recorded of any species with a 70% likelihood of occurrence (Table B.1). At least four individual birds were regularly seen in the area particularly following rains in October and December 2019 (Photo 1). The Ludwig's Bustards were never seen to fly within the BSA in 155 observations (for 39 minutes of observation). The maximum heights recorded were 40-m, with the majority at 10-20-m, well below the lower tip height of 100-m.

Photo 1. For the more numerous Ludwig's Bustard no flights of the 155 focal samples were above 40-m, and most were between 10 and 20-m in height in the Komas wind farm site.

The next most commonly recorded species were chanting goshawks (60% likelihood of occurrence), Black-chested Snake Eagle (55%) and Booted Eagle (45%) (Photo 2). The Booted eagles flew almost 56% of the time in the blade-swept "Danger Zone" of 100m–300m. Data comprised 95 minutes of observation.

Photo 2. Pale (and dark) morph Booted Eagle were frequently seen in October and December 2019 soaring and wheeling over the veld. These are probably European migrants given their appearance in spring and summer.

The priority collision-prone species which were recorded by the Avifauna specialist at the proposed Komas WEF site are listed in Table B.1 below.

Table B.1: All eight priority collision-prone species, including Red Data species, recorded on the proposed Komas WEF site from March to December 2019. Their likelihood of occurrence (Reporting Rate) and their susceptibility to collision (rank) are given along with their susceptibility to disturbance.

	Susceptibility to:

Common name	Scientific name	Red-list status	Reporting Rate*	Collision (Rank**)	Disturbance
Verreaux's Eagle	*Aquila verreauxii*	**Vulnerable**	**2/20 = 10%**	**2**	**High**
Ludwig's Bustard	*Neotis ludwigii*	**Vulnerable**	**14/20 = 70%**	**10**	**Medium**
Southern Black Korhaan	*Afrotis afra*	**Vulnerable**	**6/20 = 30%**	**89**	**Low**
Jackal Buzzard	*Buteo rufofuscus*	-	**3/20 = 15%**	**44**	**Low**
Booted Eagle	*Aquila pennatus*	-	**9/20 = 45%**	**55**	**Medium**
Black-chested Snake Eagle	*Circaetus cinerescens*	-	**11/20 = 55%**	**56**	**Low**
Pale Chanting Goshawk	*Melierax canorus*	-	**12/20 = 60%**	**73**	**Low**
Greater Kestrel	*Falco rupicoloides*	-	**2/20 = 10%**	**97**	**Low**

**Reporting rate is a measure of the likelihood of occurrence, based on the number of days recorded/number of days in the field through the year (combining March + July + October + December = 20 days)*
*** Collision rank derived from Ralston et al. (2017). Lower numbers denote higher collision-risk.*

B.9.3 Passage Rates of Collision-Prone Species

One measure of the risk to priority birds occurring in the proposed Komas WEF site is the frequency with which they fly through it. These Passage Rates were sampled from five VPs throughout the year to cover the entire proposed Komas WEF site (Figure B.26), and 118 flights of eight collision-prone species were recorded in 300 hours of observation. This gives a medium Passage Rate of 0.39 priority birds/hour (Table B.2). Most of these flights were undertaken by Ludwig's Bustards (33) or Black-chested Snake Eagles (26), giving relatively high passage rates of 0.11 bustards/hour and 0.09 snake eagles/hour across the proposed Komas WEF site.

Verreaux's Eagles were much less frequent here (0.01 eagles/hour) than in the adjacent proposed Gromis WEF site (subject to a separate BA process) in similar habitat in the south.

The most frequently used area was VP1, the north-western most area of the proposed Komas site, with a medium-high 0.53 flights per hour (of five species). The flights here were dominated by Red Data Ludwig's Bustards, Snake eagles and Chanting Goshawks.

VP3 in the centre of the proposed Komas WEF site was the next most-used area with a medium passage rate of 0.38 flights (of four species). This was dominated by Least Concern Black-chested Snake Eagles.

VP4, just south of VP3, had the lowest passage rates of 0.3 birds/hour of six species.

In the single Control VP, the specialist recorded only 15 flights (of 5 priority species) in 54 hours, giving a lower Passage Rate of 0.28 priority birds/hour. The flights of the priority birds at the different VPs at the proposed Komas WEF site are shown in Figures B.26 - B.29. All flight tracks in the proposed Komas WEF site and in the Control areas are shown in Figure B.30.

Table B.2: A Summary of all Passage Rates of all collision-prone species recorded in the proposed Komas WEF area from March 2019 to December 2019. The three Red Data species recorded, are shown in red and the passage rate of all priority species was medium-high at 0.39 birds/hour. The Passage Rate of Red Data species alone was 0.15 birds/h.

Passage Rates: Summary by Species		VP1 + VP2 + VP3 + VP4 + VP5	
Species	TOTAL HOURS	Total birds	Passage Rate (birds/h)
Pale Chanting Goshawk	300	27	**0.09**
Southern Black Korhaan	300	8	**0.03**
Ludwig's Bustard	300	33	**0.11**
Booted Eagle	300	18	**0.06**
Black-chested Snake Eagle	300	26	**0.09**
Verreaux's Eagle	300	4	**0.01**
Greater Kestrel	300	2	**0.01**
TOTALS	**300**	118	**0.39 birds/h**
RED DATA SPECIES	**300**	45	**0.15 birds/h**

Table B.3: Passage Rates of collision-prone birds in the Control area from March 2019 to December 2019. Fewer priority species (5) and fewer Red Data species (2) were recorded here as in at the proposed Komas WEF site, and the Passage Rates were lower here than in the proposed Komas WEF site, at 0.28 birds/hour.

Passage Rates: Summary	Species: Control		
Species	TOTAL HOURS	Total birds	Passage Rate (Birds/h)
Pale Chanting Goshawk	54	5	**0.09**
Southern Black Korhaan	54	1	**0.02**
Ludwig's Bustard	54	3	**0.06**
Booted Eagle	54	3	**0.06**
Black-chest Snake Eagle	54	3	**0.06**
Verreaux's Eagle	54	0	**0.00**

Greater Kestrel	54	0	**0.00**
TOTALS	54	15	**0.28**
RED DATA SPECIES	54	4	**0.07**

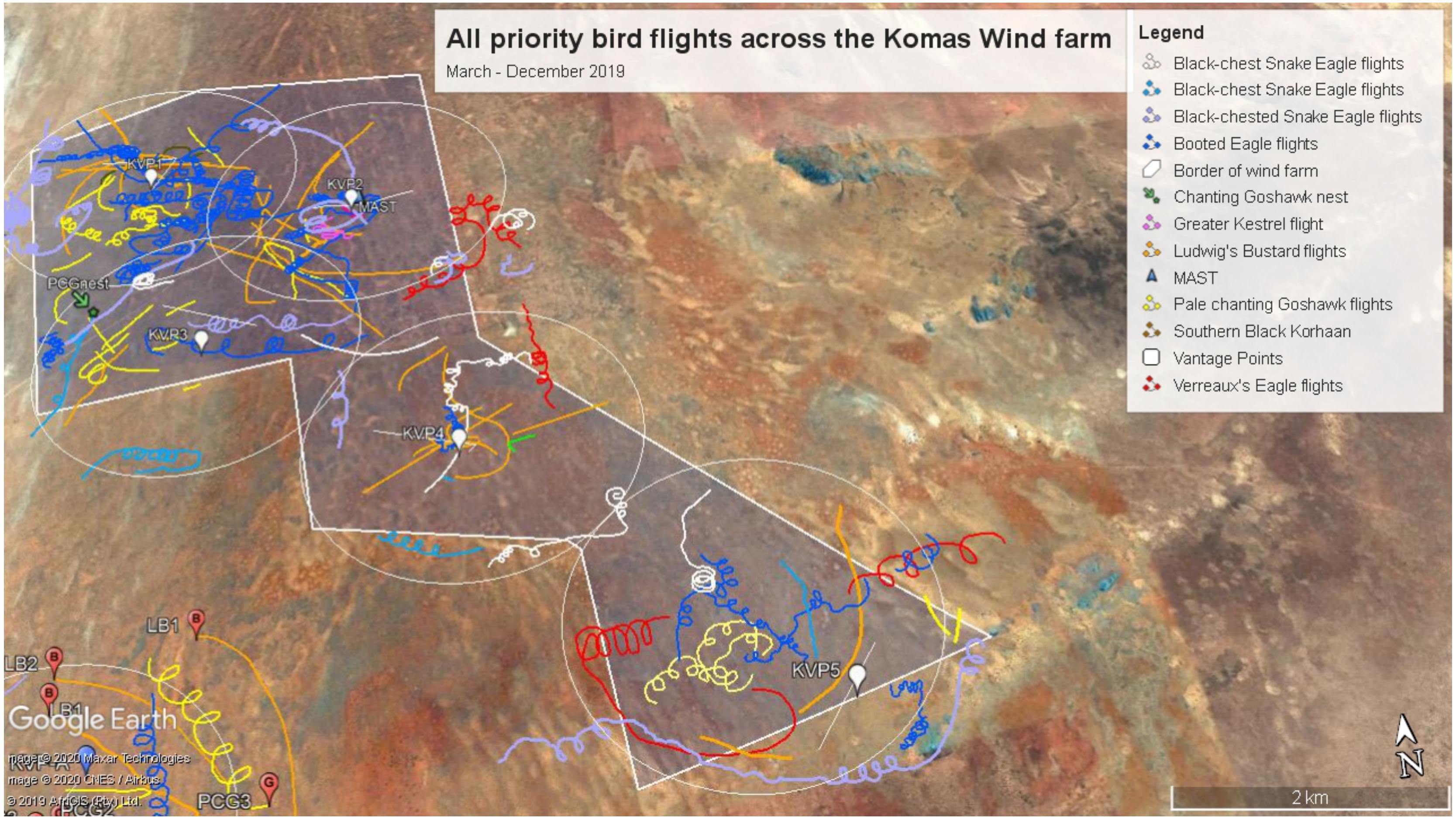


Figure B.26: The proposed Komas WEF site (white polygon) showing our VPs (KVP1-5 = white balloons). All Priority species flights are shown, and include Red Data Ludwig's Bustards (= orange lines), and *Least Concern* Pale chanting Goshawks (= yellow lines) as the most frequently recorded priority species, and snake eagles (= pale blue lines), Booted Eagle (= dark blue lines) and Red Data Verreaux's Eagles (= red lines) as the most frequently occurring additional priority species. The Control area (bottom left) is treated below.

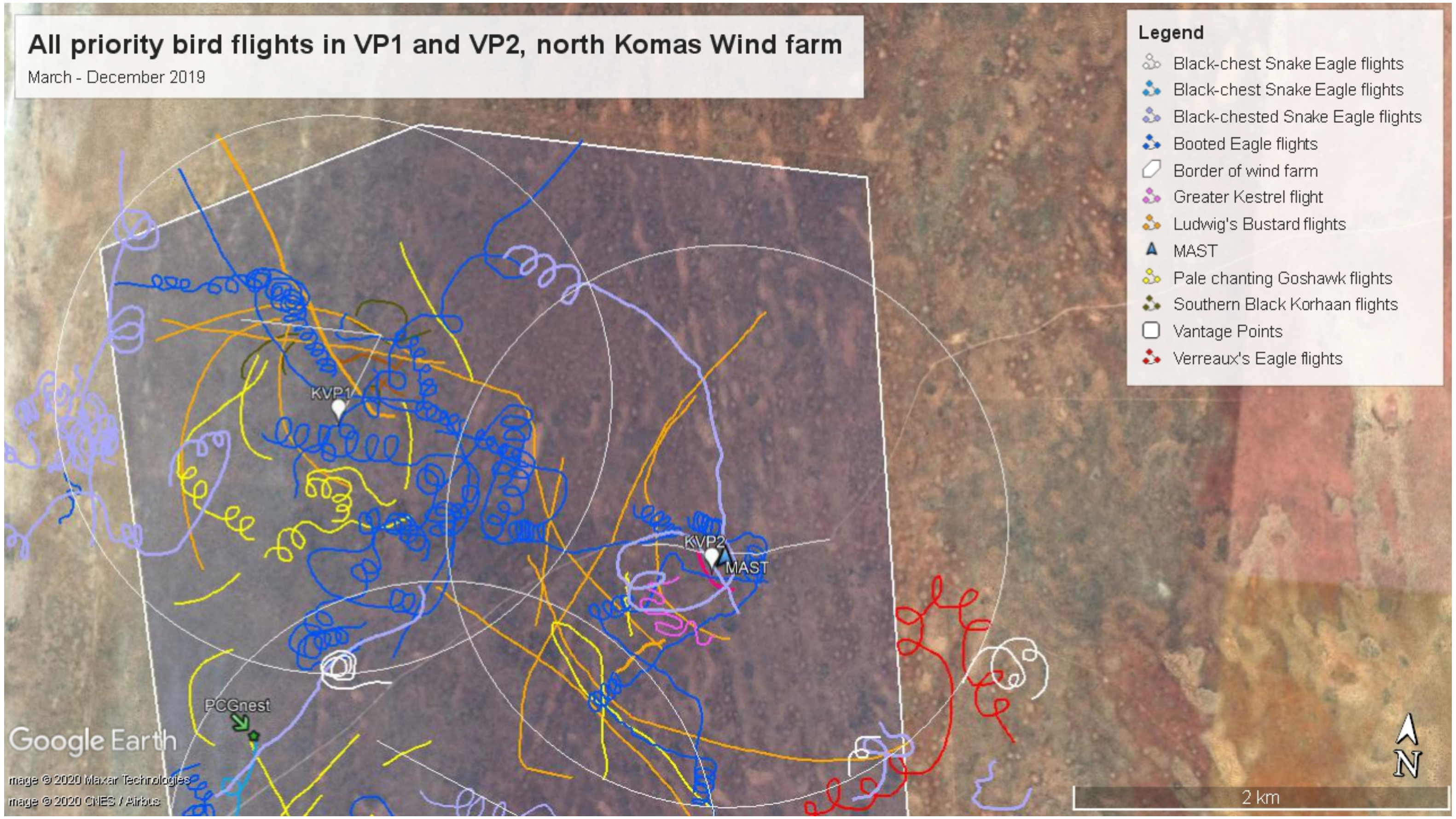


Figure B.27: All priority bird flights in VP1 and VP2 (white balloons) in the northern section of the proposed Komas WEF site. Priority species flights were dominated here by *Vulnerable* Ludwig's Bustards (= orange lines) and Least Concern snake eagles (= pale blue lines), Booted Eagles (= dark blue lines) and Pale Chanting Goshawks (= yellow lines). Red Data Southern Black Korhaans (= dark green lines) were additional priority species. Vulnerable Verreaux's Eagles (= red lines) ventured once into this area from the east. The overall Passage Rate of these species in VP1 was high at 0.72 birds per hour and in VP2 was medium-high at 0.35 birds/hour.

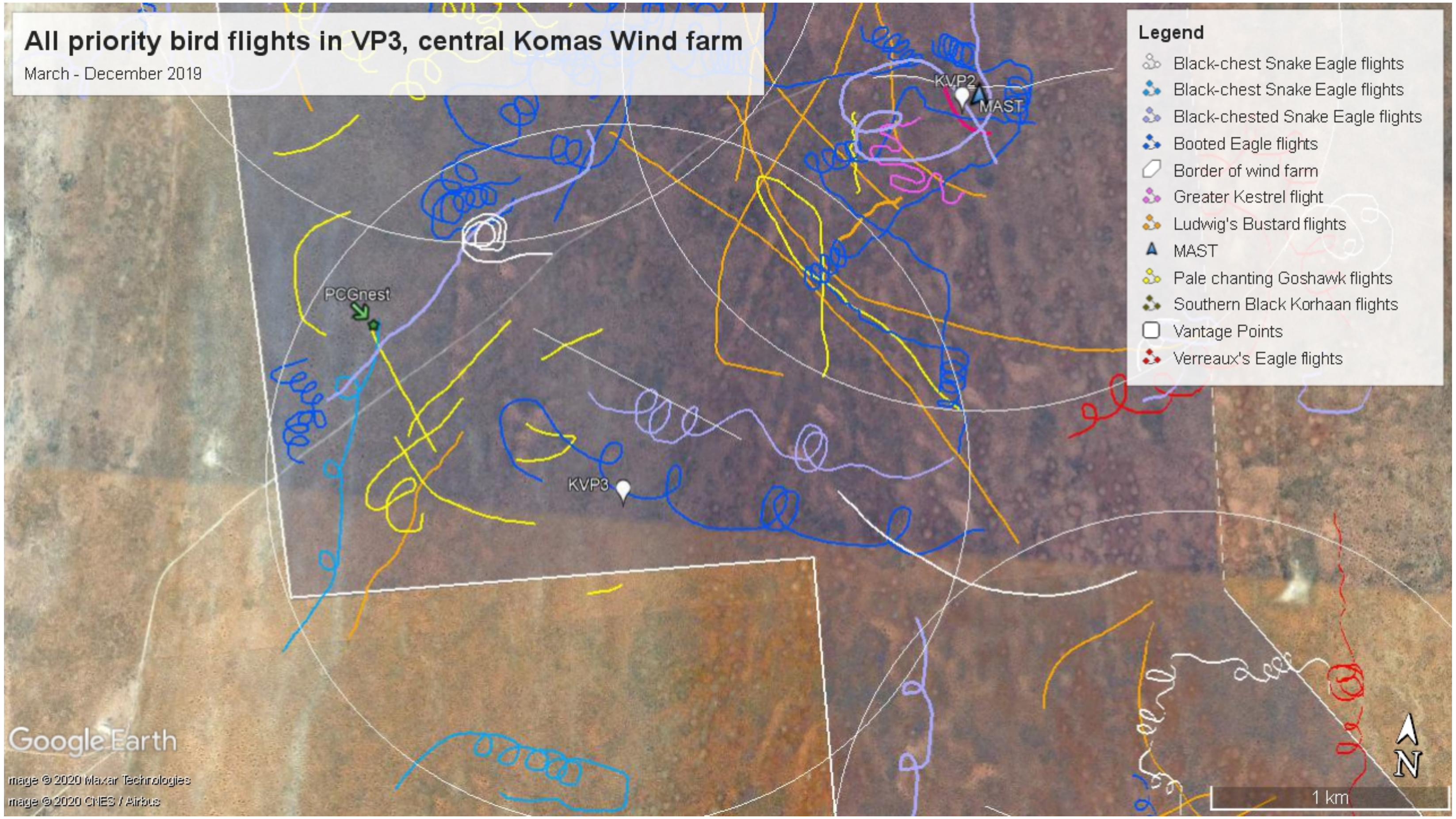


Figure B.28: All priority bird flights in VP3 (KVP3 = white balloon) in the central section of the proposed Komas WEF site. Priority species flights were dominated here by Vulnerable Ludwig's Bustards (= orange lines) and Least Concern snake eagles (= pale blue lines), Booted Eagles (= dark blue lines) and Pale Chanting Goshawks (= yellow lines), with an active Chanting Goshawk nest in the north-west of the 1.5 km view shed (= white circle). The overall Passage Rate of these species in VP3 was medium-high at 0.38 birds/hour.

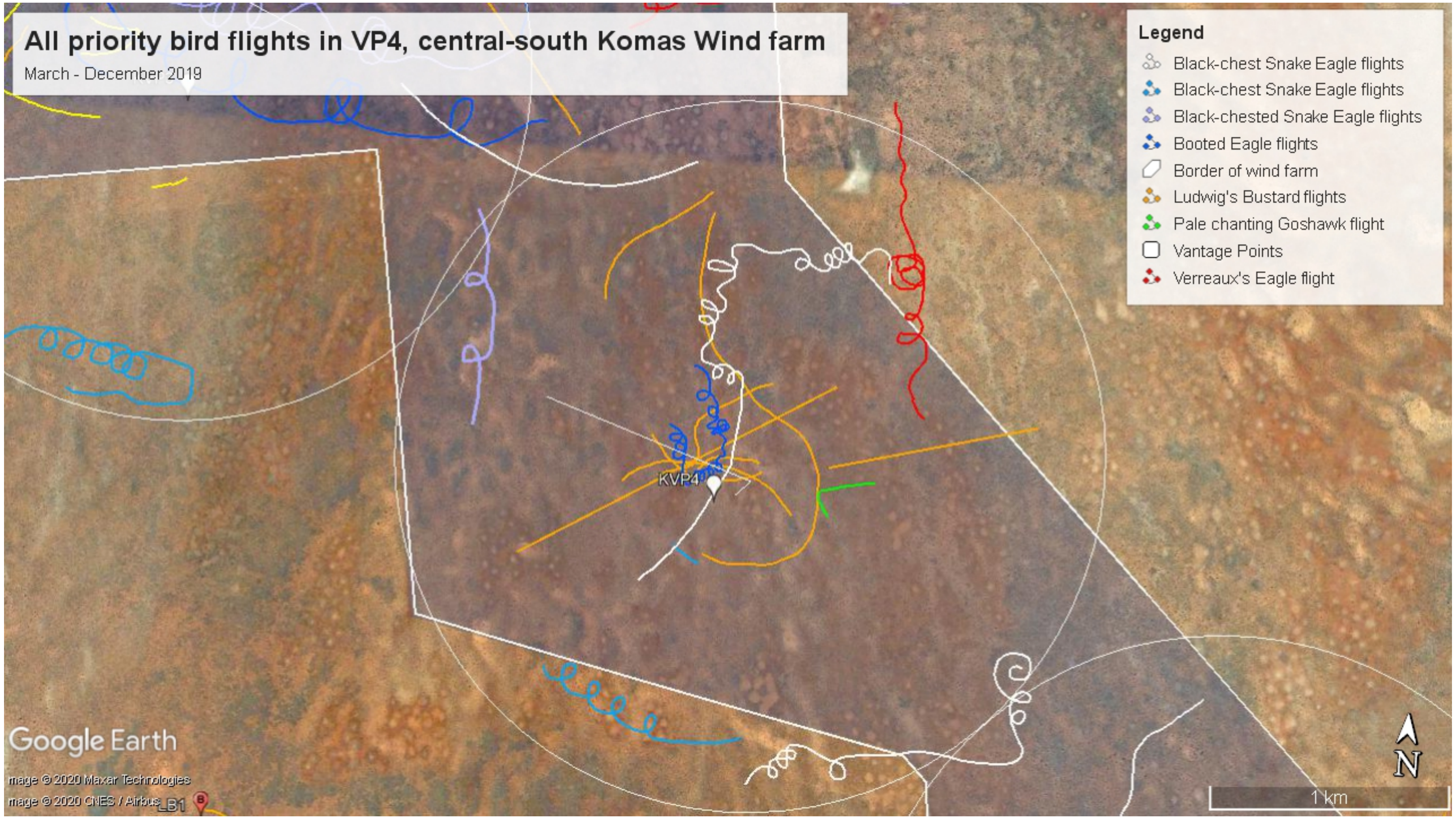


Figure B.29: All priority bird flights in VP4 (KVP4 = white balloon) in the central-south section of the proposed Komas WEF site. Our VP on high ground is shown. Priority species flights were again dominated by Vulnerable Ludwig's Bustards (= orange lines) and Least Concern Black-chested Snake Eagles (= pale blue and white lines). Vulnerable Verreaux's Eagles (= red lines) ventured once into this area. Pale Chanting Goshawks were infrequent visitors (= green line). The overall Passage Rate of these species was medium at 0.30 birds/hour and dominated by the bustards (0.17 birds/hour).

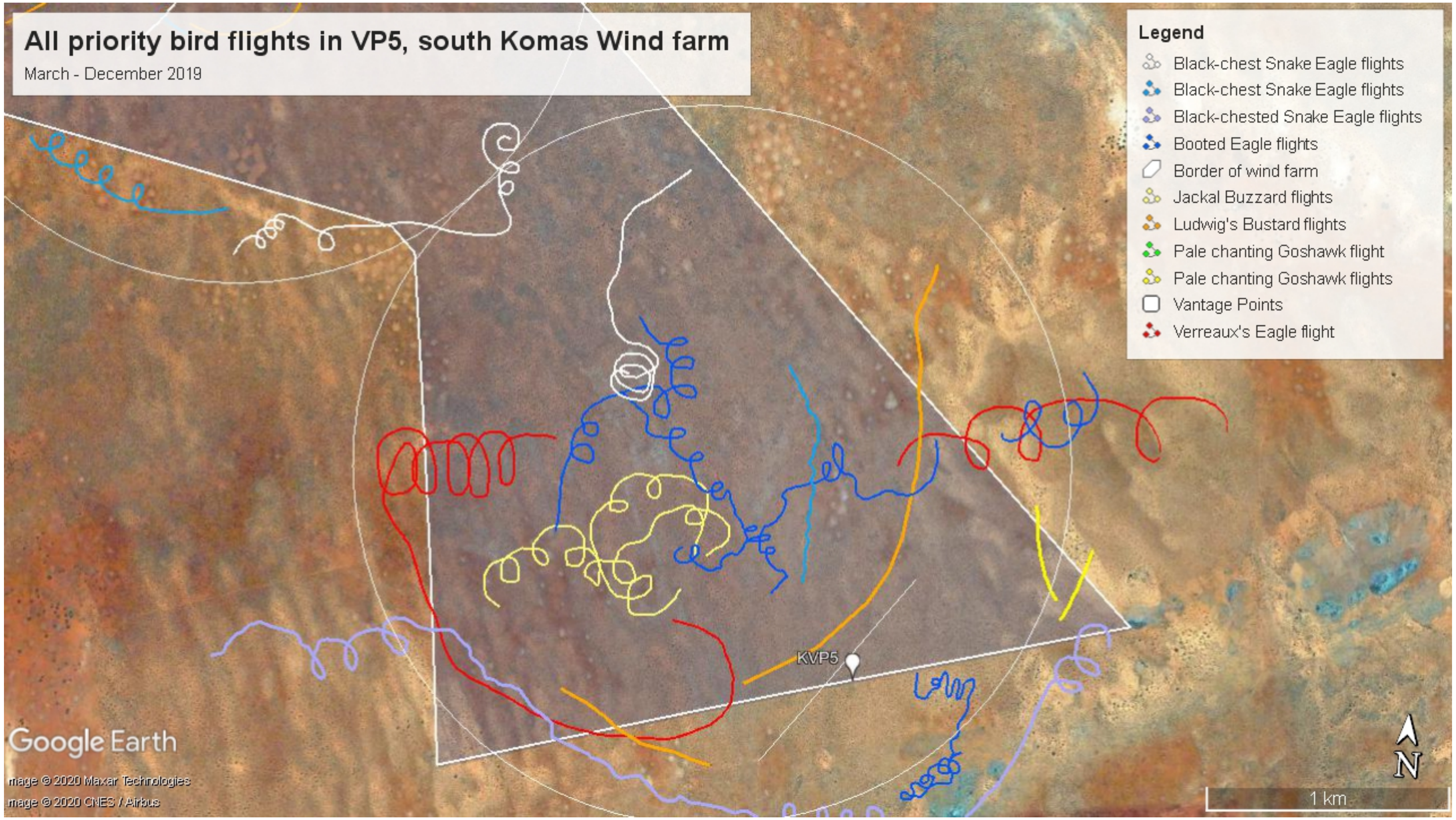


Figure B.30: All priority bird flights in VP5 in the most-southern section of the proposed Komas WEF site. Our VP on high ground is shown (KVP5 = white balloon). Priority species flights were dominated by Least Concern Black-chested Snake Eagles (= pale blue and white lines). Vulnerable Ludwig's Bustards (= orange lines) and Vulnerable Verreaux's Eagles (= red lines) were also present in this area together with Jackal Buzzards (= pale yellow line). The overall Passage Rate of these species was medium at 0.33 birds/hour with no species dominating.

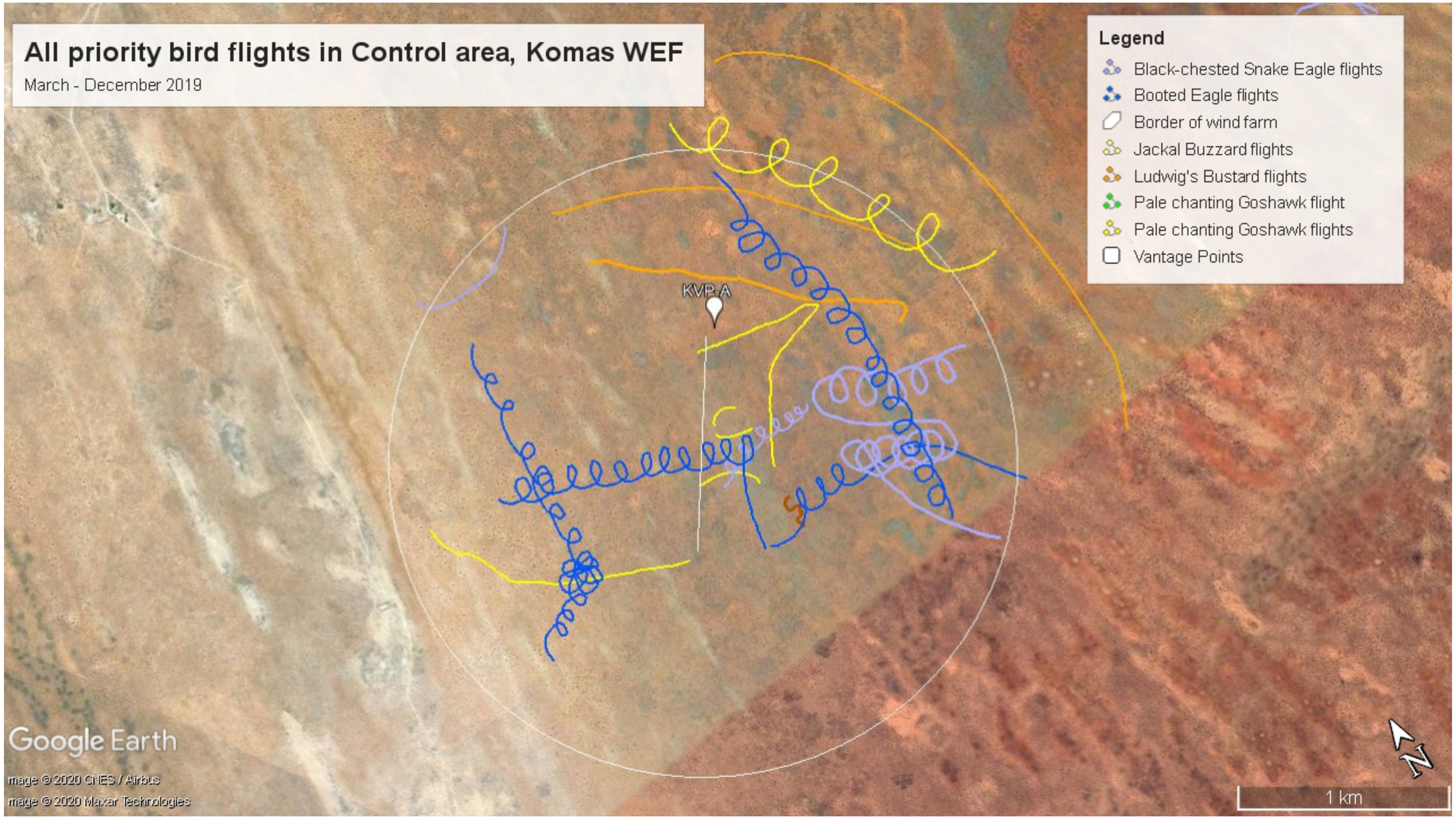


Figure B.31: All priority bird flights in the Control site south-west of the proposed Komas WEF site. The VP on high ground is shown (KVPA = white balloon). Priority species flights were dominated by Least Concern Black-chested Snake Eagles (= pale blue lines). Vulnerable Ludwig's Bustards (=orange lines) were also present in this area together with Jackal Buzzards (= pale yellow line). The overall Passage Rate of these species was medium at 0.28 birds/hour with no species dominating.

B.9.4 Flying Heights, Paths and Risks

Flying heights are possibly a better estimate than Passage Rates of the risk that the collision-prone species face on site (Whitfield & Madders 2006, Band et al. 2007). This arises because any species spending large proportions of time at the rotor-swept heights of 100 m to 300 m (200 m HH with 100 m blades) is more likely to be at risk of being hit by turbine blades, than those passing at low (or high) altitudes (Smallwood et al. 2009). By recording flight-height every 15-seconds for focal birds, we determined the proportion of time spent in the rotor-swept zone by all Red Data species, as a gauge of risk.

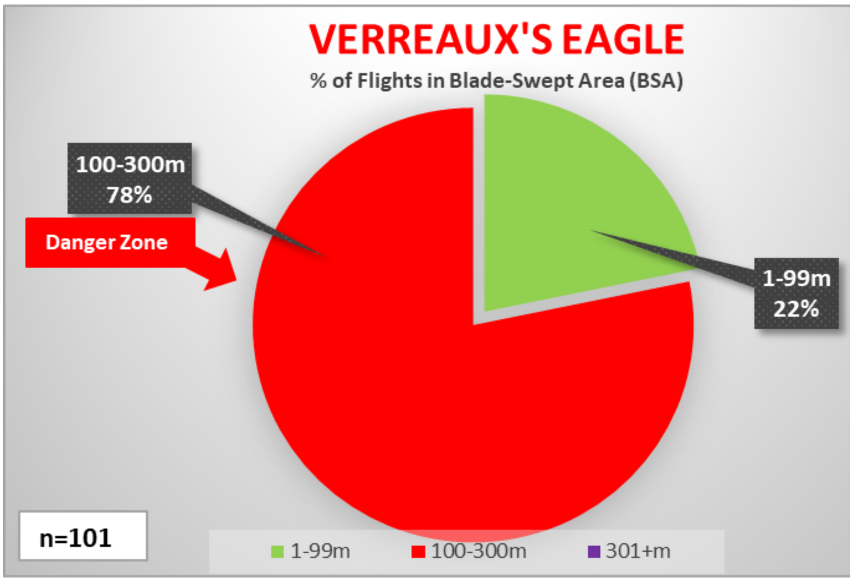


Figure B.32: Flying heights of the two main Red Data species (Verreaux's Eagle and Ludwig's Bustards) present in the proposed Komas WEF area.

The eagles flew for 78% of the time in the blade-swept area (BSA) "Danger Zone" of 100 m – 300 m for the turbines, with 200 m HH. Data were collected throughout the year from March to Dec 2019 – comprising 25 minutes of observation.

The flight heights recorded (Figures B.32) indicate that where Verreaux's Eagles occur in the wind farm site they are potentially at risk for 78% of their flights. No other Red Data species was at risk so often.

Vulnerable Ludwig's Bustards (Photo 1) were never seen to fly within the BSA in 155 observations (for 39 minutes of observation). The maximum heights recorded were 40 m, with the majority at 10 – 20 m, well below the lower tip height of 100 m.

This suggests that these Red Data species would not face the same dangers from tall turbines as the eagles and may be relatively immune from impacts with turbine blades.

For Black-chested Snake Eagles, flight risk was low at 40% (Figure B.33).

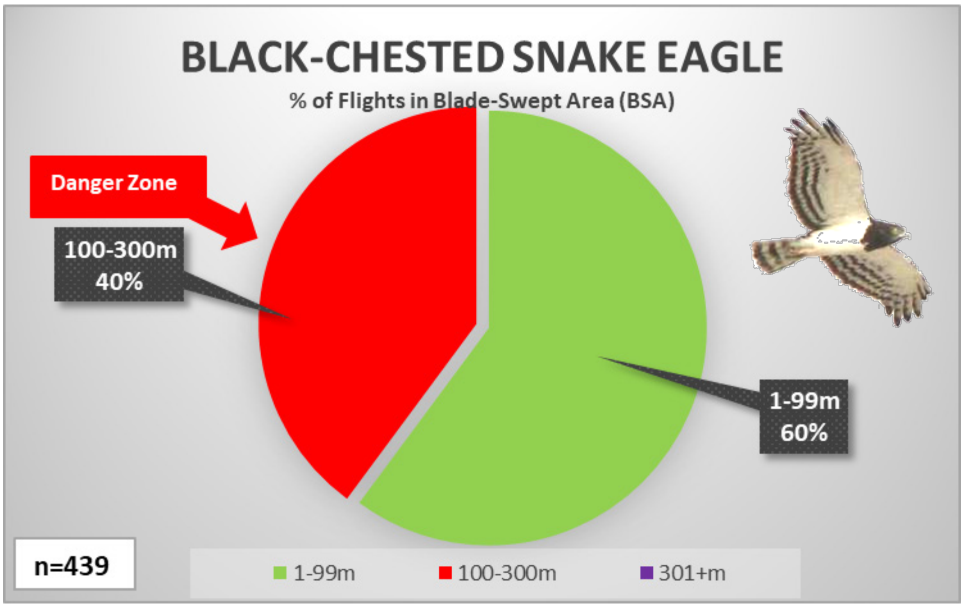


Figure B.33: Flying heights of the Black-chested Snake Eagle (left) present in the proposed Komas WEF area. The eagles flew in the blade-swept area "Danger Zone" of 100 m – 300 m, 40% of the time. Data were collected throughout the year – March to December 2019 comprising 110 minutes of observation.

Booted Eagles would also be at risk over 60% of the time when they are flying in the WEF (Figure B.34; Photo 2).

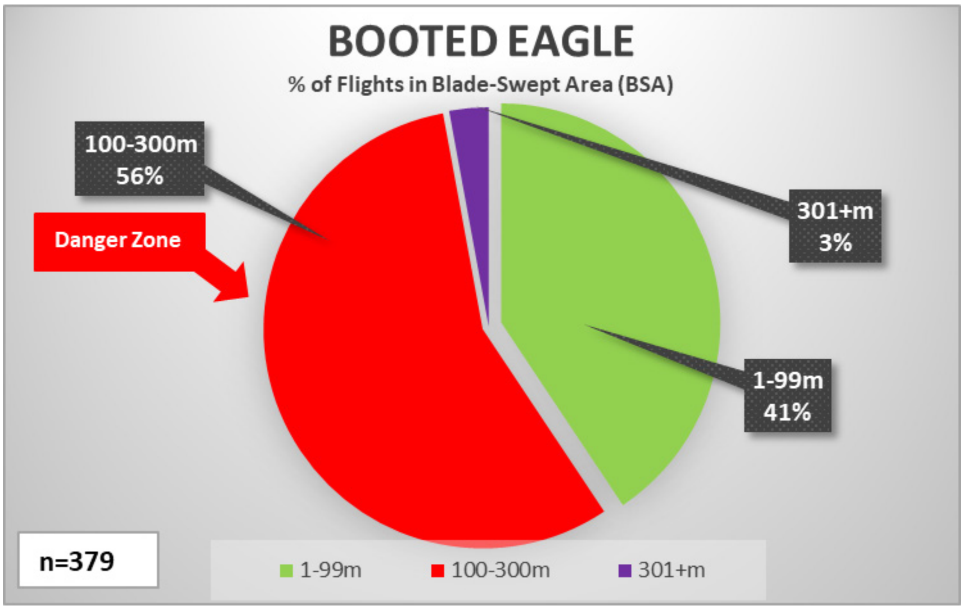
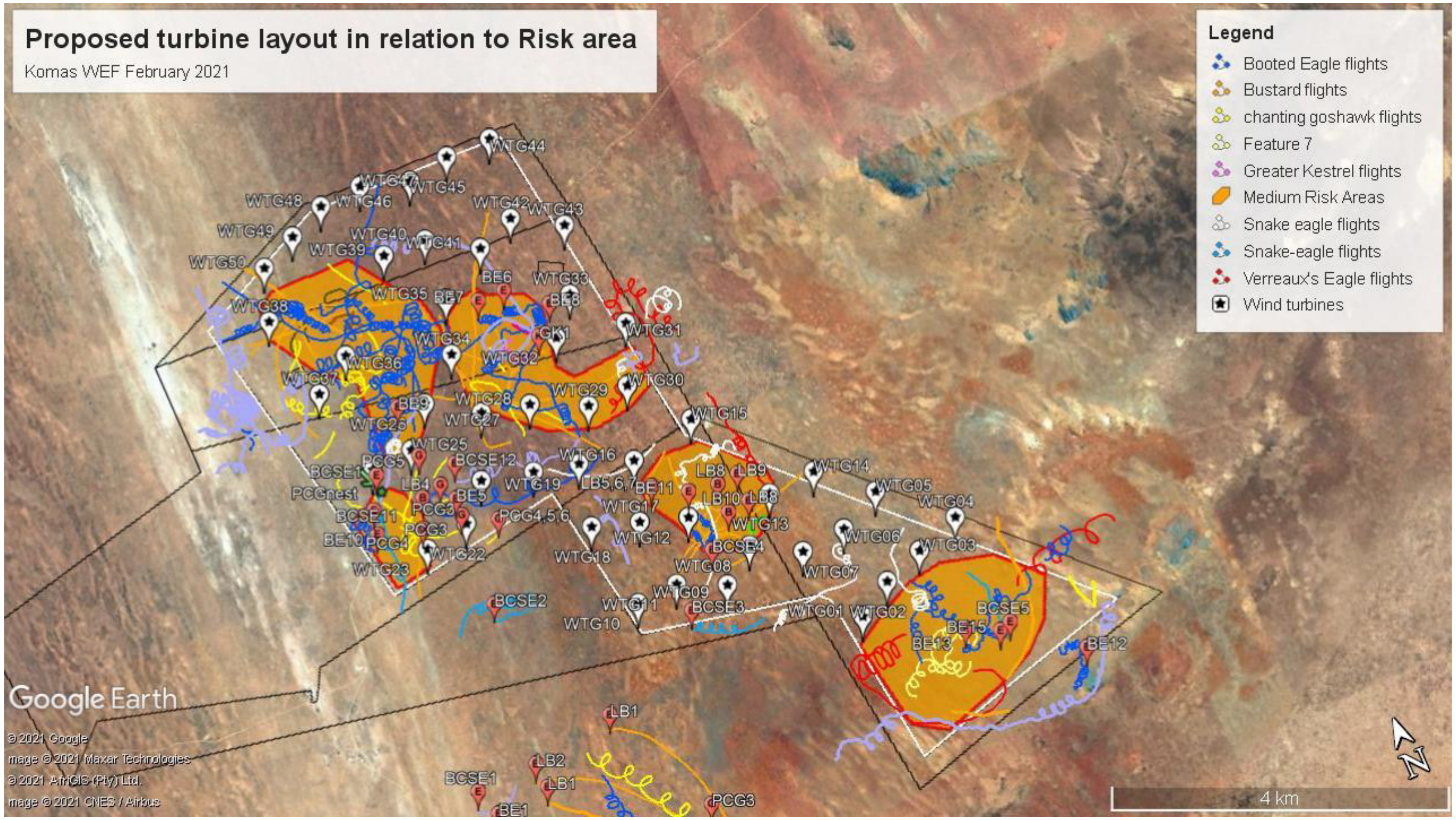


Figure B.34: Flying heights of the Booted Eagles present in the proposed Komas WEF area. The eagles flew almost 56% of the time in the blade-swept area "Danger Zone" of 100 m – 300 m. Data comprised 95 minutes of observation.

These two measures of risk within the proposed Komas WEF site allowed the specialist to determine high- and medium-risk areas based on the frequency of flights for the most at-risk species.

No high-risk areas were identified on the proposed Komas WEF site. The only avian risk area identified on site is the **medium risk area** (see Figure B.35).



FigureB.35: All medium-risk areas for birds in the proposed Komas WEF site. <u>Medium-risk</u> areas (= orange polygons) are areas of overlap of two or more non-threatened priority species (typically Snake eagles and Booted eagles). Some areas where Red Data Ludwig's Bustards (= orange lines) or Verreaux's Eagles (= red lines) occurred were also designated as medium-risk because either no flights occurred in the blade swept area (Ludwig's Bustards) or flights were infrequent (Verreaux's Eagle). The Passage Rates for all Priority species was highest in the top north-west corner at 0.72 birds/hour (of five priority species). All other areas supported Passage Rates of 0.30 to 0.38 birds/hour

B.10 Bats

The Bat Impact Assessment (Appendix C.4 of the BA Report) undertaken for the proposed project includes detailed feedback on bat species encountered during the pre-construction site monitoring. The information provided in this section is extracted from the Bat Impact Assessment (Appendix C.4 of the BA Report).

B.10.1Species Diversity on Site

The extent to which bats may be affected by the proposed wind farm will depend on the extent to which the proposed development area is used as a foraging site or as a flight path by local bats.

B.10.1.1 Bat Species Diversity of the Local Area

A summary of bat species distribution in the local area, their feeding behaviour, preferred roosting habitat, and conservation status are presented in Table B.4. The bats included in Table B.4 have distribution ranges covering the proposed Komas WEF development area and bats that had been confirmed up to now on the site itself or other wind farms in the area, are marked as such. The proposed Komas WEF falls within the distributional ranges of six bat families and approximately 12 bat species. Table B.4 follows the most recent distribution maps of Monadjem et al. (2010). It should be noted that this table will be adapted during post construction monitoring.

Of the 12 bat species which have distribution ranges overlapping with the proposed development area, four have a conservation status of Near Threatened in South Africa and one vulnerable, while three have a global conservation status of Near Threatened. *Eptesicus hottentotus* (the Long-tailed serotine) and *Cistugo seabrae* (the Angolan wing-gland bat) are endemic to Southern Africa, mainly due to agricultural activities and have limited remaining suitable habitat (Monadjem, 2010). Note that *Cistugo seabrae* had been observed just north east of Kleinsee by the bat specialist, which confirms its presence in the wider area.

According to the likelihood of fatality risk, as indicated by the latest Pre-Construction Bat Guidelines (Sowler, et al. 2017), two species, namely *Tadarida aegyptiaca* (Egyptian free-tailed) and *Sauromy petrophilus* (Roberts's flat-headed bat), have a high risk of fatality due to its foraging habitat at high altitudes. Five more species, *Miniopterus natalensis* (Natal long-fingered bat), *Neoromicia capensis* (Cape serotine) and *Myotis tricolor* (*Temminck's myotis* bat), and the two fruit bat species, *Eidolon helvum* (African straw-coloured fruit bat) and *Rousettus aegyptiacus* (Egyptian rousette), have a medium to high risk of fatality. Fruit bats were not considered a risk in the dry Kleinsee area, but due to the droppings found at the dwelling at Rooivlei Farm, have now become a risk species in the area.

Table B.4: Potential bat species occurrence at the proposed Komas WEF site (Monadjem, et al. 2010; IUCN, 2017). Highlighted yellow cells indicate confirmed presence of bat species at the proposed Komas development site. The likelihood of fatality risk is indicated by the Pre-Construction Guidelines (Sowler, et al. 2017).

Family	Species	Common Name	SA conservation status	Global conservation status (IUCN)	Roosting habitat	Functional group (type of forager)	Migratory behaviour	Likelihood of fatality risk*	Bats confirmed on site or close vicinity
PTEROPODIDAE	*Eidolon helvum*	African straw-coloured fruit bat	Not evaluated	Least Concern	Little known about roosting behavior.	Broad wings adapted for clutter. Studies outside of South Africa list fruit and flowers in its diet.	Migrater. Recorded migration up to 2 518 km in 149 days, and 370 km in one night.	Medium-High	✓Most likely the bat droppings found at Zonnekwa farm dwelling
	Rousettus aegyptiacus	Egyptian rousette	Least Concern	Least Concern	Caves	Broad wings adapted for clutter. Fruit, known for eating Ficus species.	Seasonal migration up to 500 km recorded. Daily migration of 24 km recorded.	Medium-High	
MINIOPTERIDAE	*Miniopterus natalensis*	Natal long-fingered bat	Near Threatened	Near Threatened	Caves	Clutter-edge, insectivorous	Seasonal, up to 150 km	Medium-High	✓
NYCTERIDAE	*Nycteris thebaica*	Egyptian flit-faced bat	Least Concern	Least Concern	Cave, Aardvark burrows, road culverts, hollow trees. Known to make use of night roosts.	Clutter, insectivorous, avoid open grassland, but might be found in drainage lines	Not known	Low	✓

Family	Species	Common Name	SA conservation status	Global conservation status (IUCN)	Roosting habitat	Functional group (type of forager)	Migratory behaviour	Likelihood of fatality risk*	Bats confirmed on site or close vicinity
MOLISSIDAE	*Tadarida aegyptiaca*	Egyptian free-tailed bat	Least Concern	Least Concern	Roofs of houses, caves, rock crevices, under exfoliating rocks, hollow trees.	Open-air, insectivorous	Not known	High	✓
	Sauromys petrophilus	Robert's Flat-faced	Least Concern	Least Concern	Narrow cracks, under exfoliating of rocks, crevices.	Open-air, insectivorous		High	✓
On RHINOLOPHIDAE	*Rhinolophus capensis*	Cape horseshoe bat (endemic)	Near Threatened	Near Threatened	Caves, old mines. Night roosts used	Clutter, insectivorous	Not known	Low	
	Rhinolophus clivosus	Geoffroy's horseshoe bat	Near Threatened	Least Concern	Caves, old mines. Night roosts used.	Clutter, insectivorous		Low	✓
VESPERTILIONIDAE	*Neoromicia capensis**	Cape serotine	Least Concern	Least Concern	Roofs of houses, under bark of trees, at basis of aloes.	Clutter-edge, insectivorous	Not known	Medium-High	✓

Family	Species	Common Name	SA conservation status	Global conservation status (IUCN)	Roosting habitat	Functional group (type of forager)	Migratory behaviour	Likelihood of fatality risk*	Bats confirmed on site or close vicinity
	Myotis tricolor	Temminck's myotis	Near Threatened	Least Concern	Roosts in caves, but also in crevices in rock faces, culverts and manmade hollows.	Limited information available	Not known	Medium-High	
	Eptesicus hottentotus	Long-tailed serotine (endemic)	Least Concern	Least Concern	Caves, rock crevices, rocky outcrops.	Clutter-edge, insectivorous	Not known	Medium	✓
	Cistugo seabrae	Angolan wing-gland bat (endemic)	Vulnerable	Near Threatened	Possibly buildings, but no further information.	Clutter-edge, insectivorous	Not known	Low	

*Note that there has been a re-classification of *Neoromicia capensis,* but for the purpose of this study, the species is still classified within the *Vespertilionidae* family.

B.10.1.2 Features conducive for bats at the proposed Komas WEF site

Bats are dependent on suitable roosting sites provided mainly by human structures, vegetation, exfoliating rock, rocky outcrops, derelict mines, aardvark holes and caves (Monadjem *et al*. 2010). The foraging potential of a site is further determined by the availability of water and food. Thus, the vegetation, geomorphology and geology of an area are important predictors of bat species diversity and activity levels.

B.10.1.3 Roosting opportunities

a) Vegetation

Although some bush cover occurs at the proposed Komas WEF development terrain, hardly any trees are growing at the site. For those bats that might prefer roosting in vegetation or under the bark of trees, the sparse trees and dense bushes could provide roosting opportunities, see Figure B.36.

Figure B.36: Sparsely situated trees at the southern border of the proposed Komas WEF site.

b) Rock formations and rock faces

Large parts of the development terrain are covered by sandy soils, but boulders and rock formations along Byneskop in the south, provide ample roosting space for bats. Figure B.37 depicts these rock formations with bat rests found at some of the crevices.

Figure B.37: Byeneskop at the southern border: Left, boulders at the rocky outcrops, and right, bat droppings found at some crevices in the rock formations.

c) Human dwellings

Where roofs are not sealed off, human dwellings could provide roosting space for some bat species. The Zonnekwa farmhouse, where more than one bat roost was found, is situated approximately 1,77 km from the closest proposed Komas WEF site border and there is a likelihood of daily migration between the house and the proposed Komas WEF site. Due to the bat conducive features, such as water and trees, at the farm dwelling, a point source was installed during the night of 25 October 2019. 157 bat passes were recorded, with most calls like *Neoromicia capensis (92%), Tadarida aegyptiaca* (6%), *Eptesicus hottentotus* (2%) and *Miniopterus Natalensis*, see Figure B.38. These are all medium-high risk species, with *T. aegyptiaca* as a high-risk species. As depicted by data from the monitoring stations at the proposed Komas WEF site, bats were mostly active four hours after sunset, see Figure B.39. This is the period when they emerge from their roost to drink water and forage. The point source was not situated at the proposed Komas WEF site itself, and it is interesting that the majority of bat calls are similar to that of *N. capensis*. Limited activity of this species was recorded on site, although the Bat Impact Assessment that was undertaken as part of the EIA for the proposed Kap Vley WEF indicates that *N. capensis* was the predominant species during the bat monitoring that was undertaken by the bat specialist for that EIA (CSIR, 2018).

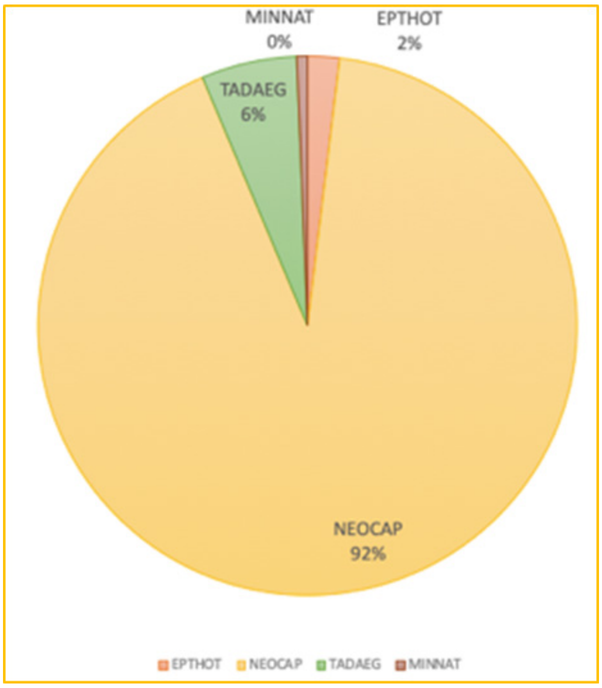


Figure B.38: Bat species recorded at the point source at Zonnekwa farm dwelling

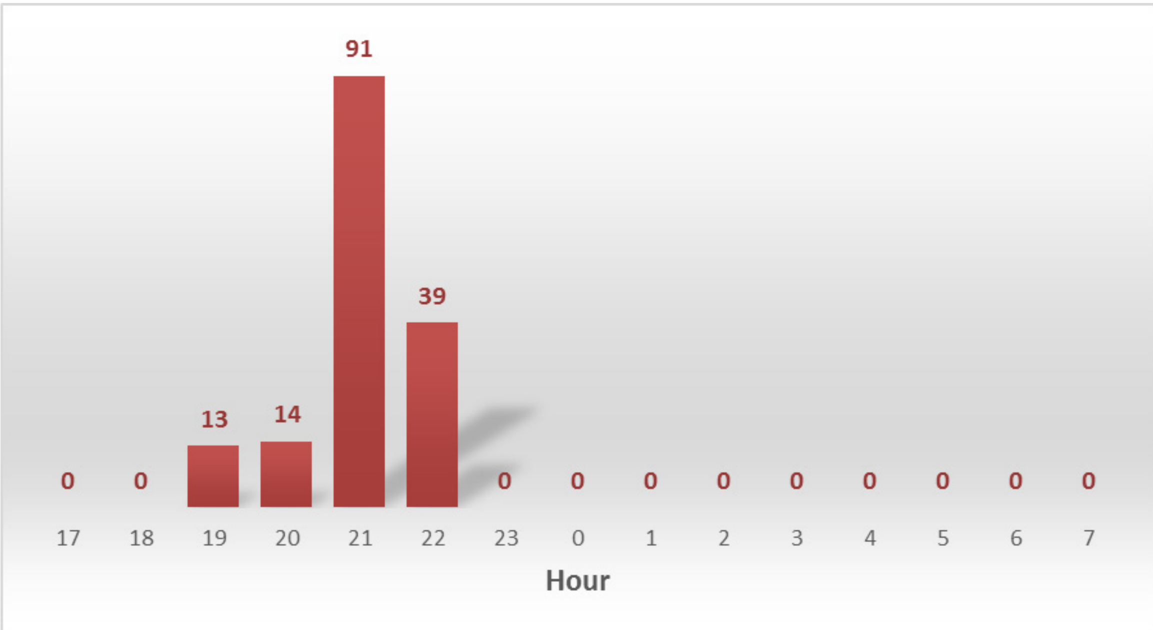


Figure B.39: Hourly bat passes at Zonnekwa farm dwelling on 25 October 2019

Clear evidence of the presence of insectivorous bats had been found at the Rooivlei farm dwelling, situated 1,45 km from the nearest border of the proposed Komas WEF site. Up to now no day roosts could be established, but bats use the dwellings as night roosts.

Surprisingly, fresh fruit bat droppings were found at one of the buildings at the Zonnekwa farm dwelling, see Figure B.40. This indicates that fruit bats either migrate through the area or that there is a fruit bat roost somewhere in the vicinity of the proposed Komas WEF site. The Rooivlei farm dwelling does not contain any fruit trees within the farm area, and as a result the bats are likely to feed on wild fruit and flowers in the veld. The bats may potentially be migrating through the area. The most likely species that might occur in the area is *Eidolon helvum*. *Rousettus aegyptiaca* is also modeled to occur in the area, but has not been found in the proposed Komas WEF vicinity up to now.

Figure B.40: Fruit bat droppings found at the Zonnekwa farm dwelling

d) Open Water Sources

Water troughs for the livestock and associated open cement reservoirs provide permanent, open water sources for bats through-out the year.

e) Food Sources

During few spells of rain, stagnant water that usually collects in small pans and dry ditches could serve as breeding ground for insects which could serve as food for bats. High insect activity could result in higher bat presence after sporadic rainy periods. Livestock is also an attraction to flies, which in turn could serve as a food source for bats.

B.11 Visual Aspects and Sensitive Receptors

The VIA is included in Appendix C.5 of the BA Report, and includes details on landscape and sensitive receptors. The information provided in this section is extracted from the VIA (Appendix C.5 of the BA Report).

The VIA provides information on landscape, geology, and vegetation, as described above, as well as other aspects such as land use and sensitive visual receptors.

Although the study area has a largely natural, untransformed visual character with some elements of rural / pastoral infrastructure, it is not typically valued or utilised for its tourism significance. The study area has however seen very limited transformation or disturbance and is considered largely natural. As such the proposed Komas WEF development is expected to alter the visual character of the area and contrast significantly with the typical land use and / or pattern and form of human elements present.

A broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low to moderate visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

Preliminary desktop assessment of the study area found no tourism or nature-based facilities within the study area. The nearest nature-based facility is the Namaqua National Park to the south-east of the study area, some 16 kms from nearest turbine placement on the Komas WEF development site. It has been noted that although the WEF is outside the Viewshed Protection Area as defined in the Namaqua National Park Management Plan, the proposed development is partially within the National Park Buffer and the proposed Park Expansion Footprint. It is not possible to assess the visual impacts of the proposed Komas WEF on the proposed expansion area without more detailed information regarding the proposed use zones within this area. Considering the fact however that the approved Kap Vley WEF project is partially located within this expansion area, the construction of this WEF will introduce a more industrial character into the area, thus altering the inherent sense of place within the expansion area and reducing the significance of visual impacts resulting from the proposed Komas WEF.

The VIA identified thirteen potentially sensitive receptors in the study area, all of which are farmsteads. These farmsteads are regarded as potentially sensitive visual receptors as they are located within a mostly natural setting and the proposed Komas WEF development will likely alter natural vistas experienced from these dwellings. The VIA determined that the proposed development will have a high level of impact on three (3) of these receptors. Four of these receptors are farmsteads located in relatively close proximity to the proposed Komas WEF development area and this factor, in conjunction with the relatively flat terrain in the area and the lack of screening vegetation, gives rise to a high impact rating. None of these receptors are tourism-related facilities however, and as such they are not considered to be Sensitive Receptors. In addition, it should be noted that three of these receptors, namely R12, R14 and R15, are located on the application site for the proposed Kap Vley WEF and as such it is possible that residents at these locations may not perceive the proposed Komas WEF in a negative light. The potentially sensitive receptor locations are shown in Figure B.41 and the photomontage viewpoints are shown in Figure B.42.

Seven (7) of the remaining receptor locations would be subjected to moderate levels of visual impact as a result of the proposed development and the remaining three (3) receptors would only experience negligible levels of visual impact.

Several renewable energy developments are being proposed within a 50 km radius of the proposed Komas WEF application site. These renewable energy developments have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other, could significantly alter the sense of place and visual character in the broader region. It was however determined, that only five of these would have any significant impact on the landscape within the study area, these being; the proposed Gromis WEF which is subject to a separate BA process which is also currently being undertaken, the proposed Kleinzee WEF and the proposed Kap Vley, Namas and Zonnequa WEFs which have received EAs on 25 October 2018, 18 February 2019 and 25 February 2019 respectively. All of these projects are in close proximity to one another and to the proposed Komas WEF development area and it is anticipated that this concentration of WEFs will alter the inherent sense of place and introduce an increasingly industrial character into a largely rural area. This will result in significant cumulative impacts, rated as having negative impacts of moderate significance during both construction and operation phases of the project. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists.

It should be noted that the study area is located within the Springbok REDZ (REDZ 8), and thus the relevant authorities support the concentration of renewable energy developments in this area. In addition, it is possible that the three WEFs in close proximity to each other could be seen as one large WEF rather than three separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

MAP 8: Potentially Sensitive Receptor Locations

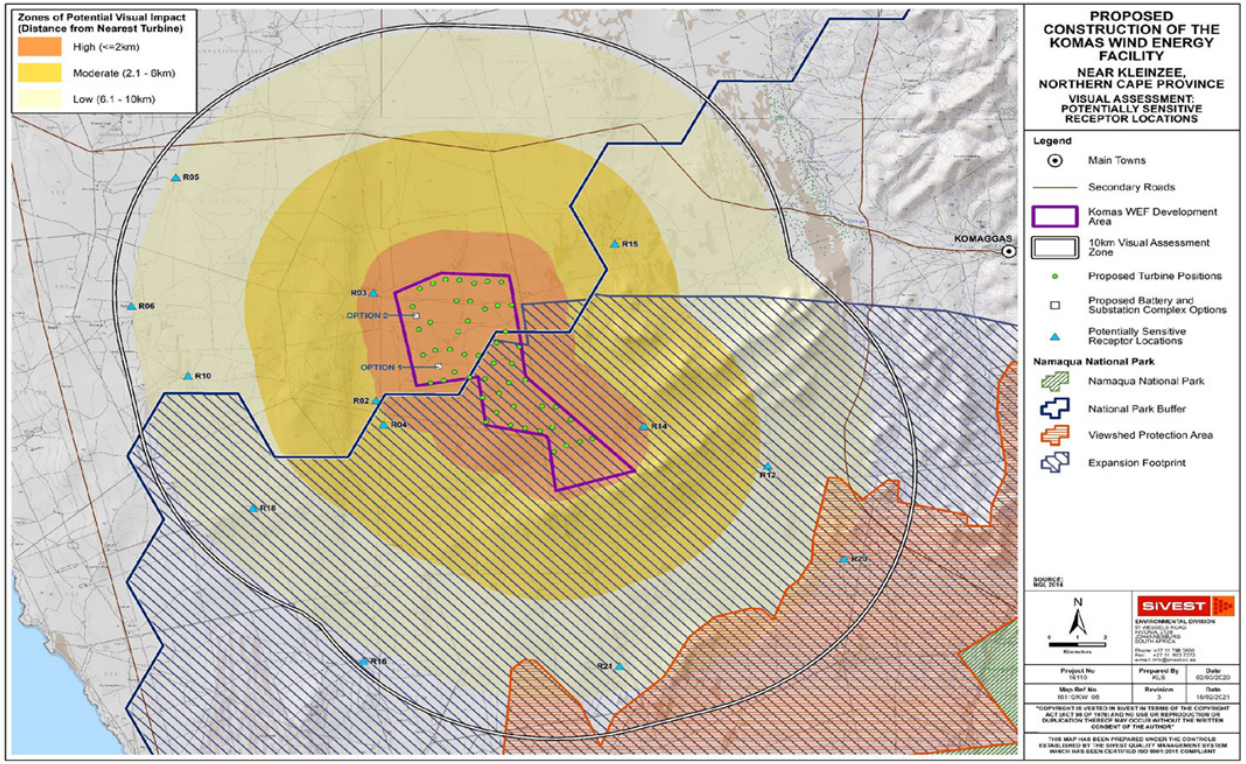


Figure B.41: Potentially sensitive receptor locations within the proposed Komas WEF study area

MAP 11: Photomontage View Points

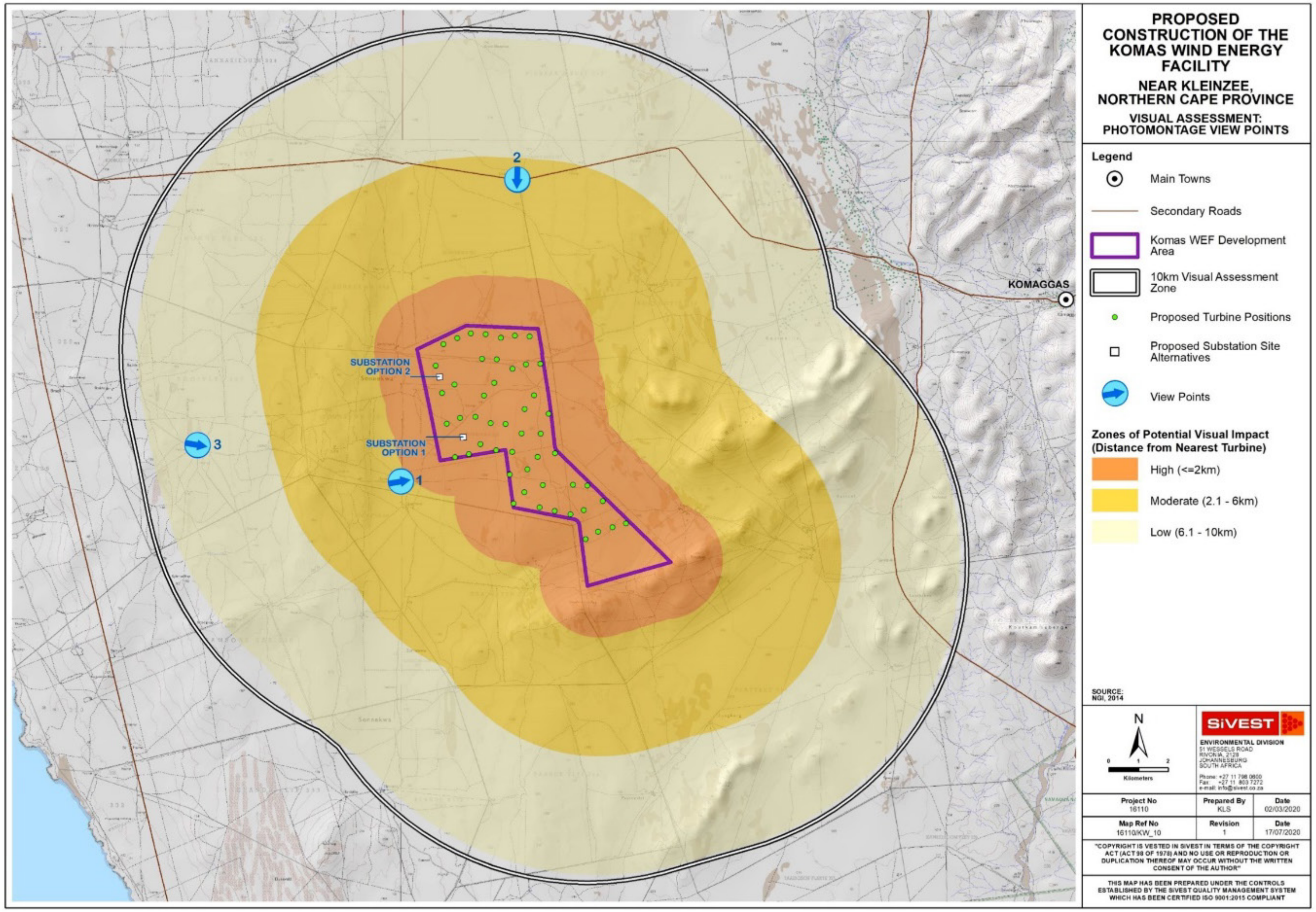


Figure B.42: Photomontage view points at the proposed Komas WEF study area.

B.12 Heritage: Archaeology and Cultural Landscape

A detailed description of the archaeological features and cultural landscape within the proposed Komas WEF study area is included in the HIA (Archaeology, Cultural Landscape and Palaeontology), which is included in Appendix C.6 of this BA Report. The information presented in this section is extracted from the HIA.

B.12.1 Site context

The site is in a rural area and is serviced only by gravel roads and infrastructure aside from farm buildings and occasional power lines is lacking (Figure B.16). The main land use in the area is small stock grazing, but along the coast to the west and northwest and along the Buffels River to the north mining for diamonds has occurred for nearly a century. The Komaggas Communal Reserve lies a short distance to the east of the study area.

B.12.2 Site description

The study area is largely an undulating sandy plain – the Namaqualand Sandveld – but has several distinct dune ridges that run south to north, especially in the western part of the site. The dunes are covered in vegetation, but many open spaces and some deflation hollows are present. An elongated low-lying area, referred to here as the Zonnekwa Valley, runs between two of these dune ridges through the western part of the overall site but just outside the western edge of the study area. The extreme south-eastern edge of the site and study area just encroach on the (at this point) low ridge of Byneskop and Graafwater se Kop. This ridge extends north-eastwards away from the study area to eventually join the far taller Brandberg, a rocky hill that has been surmounted by wind-blown dune sand. Figures B.43 to B.48 show views of the proposed Komas WEF study area, highlighting its features.

Figure B.43: View towards the south across the northern part of the study area showing the undulating sandy plain with a deflated area in the foreground.

Figure B.44: View towards the southeast showing an example of a dune that has a deflation hollow on its crest.

Figure B.45: View towards the southeast through the eastern part of the study area. The Graafwater se Kop ridge forms part of the skyline with the more distant Langberg rising behind it in mid-picture.

Figure B.46: View towards the east showing a prominent dune with a deflation hollow on its crest. Byneskop rises in the background to the left (outside the study area).

Figure B.47: View towards the northeast from a deflation hollow on the slopes of Graafwater se Kop. Byneskop and Brandberg lie in the distance.

Figure B.48: View towards the west in the northern part of the study area showing a large dune cordon west of the site (skyline). The shallow calcrete-floored valley (arrowed) lies just below this ridge.

B.12.3 Findings of the Heritage Study

This section describes the heritage resources recorded in the study area during the course of the assessment.

B.12.3.1 Archaeology

B.12.3.1.1 Desktop study

Early Stone Age (ESA) materials in Namaqualand have mostly been found fairly close to the coastline and are often found in the same contexts as Middle Stone Age (MSA) artefacts. Halkett (2002) reported a large scatter of ESA artefacts from Kleinsee, while Orton and Webley (2012b) found ESA and MSA artefacts associated with fossil bones on the high ground to the north of the Buffels River, northeast of Kleinsee. Much further south, in the Western Cape, Hart and Halkett (1994) excavated an ESA sample adjacent to a quarried silcrete outcrop, while not far away Orton (2017) found extensive scatters of ESA material – including abundant handaxes – at the interface of the dorbank and aeolian cover sands. Some 20 km north of Kleinsee, Orton and Halkett (2006) described an extensive silcrete outcrop that displayed evidence of quarrying. There were scatters of ESA and MSA artefacts located across the outcrop. Further inland, to the southeast of the present study area, Morris and Webley (2004) reported scatters of ESA artefacts, including handaxes, amongst sand dunes on the coastal plain and around pans.

Middle Stone Age material is generally more commonly reported, but further inland, probably only because the landscape is less eroded and deflated there, it tends to occur as isolated artefacts or as very ephemeral scatters. To the northwest of Komaggas Dreyer (2002) reported MSA artefacts on quartzite and hornfels associated with river gravel about 1 km from the Buffels River. Van Pletzen-Vos and Rust (2011) found MSA quartz artefacts on the western and northern outskirts of Komaggas. In the Kamiesberg Mountains, Howieson’s Poort-type implements belonging to the MSA were found in Keurbos Cave some 15 km north-east of Garies (Webley 1992), while MSA implements were found in excavations at a small rock shelter called Wolfkraal close to Kharkams (Webley 1984). Near Garies in central Namaqualand, Webley and Halkett (2010) reported on an MSA factory site on Swartkop, an outcrop of dark, fine-grained rock which appears to have been targeted by prehistoric populations. Closer to the coast Orton and Halkett (2005) found some Howieson’s Poort bifacial points associated with shell in a dunefield to the southwest of the present study area, but the relationship between the shell and artefacts might be spurious. Halkett and Hart (1997) and Jerardino et al. (1992) reported scatters of MSA artefacts north of Kleinsee and at the Groen River Mouth respectively.

Later Stone Age material is regularly found throughout Namaqualand. The coastal and near-coastal areas, however, have by far the greatest number of reported sites (Dewar 2008; Orton 2012). Many thousands of shell middens and scatters occur along the coast, some of them preserving rich assemblages of cultural materials and food remains. While these focus on the area within about 2 km to 3 km of the coast, shell scatters have been found along the Buffels River up to 10 km inland (Orton & Webley 2012b) as well as immediately to the west of the present study area and some 12 km from the coastline (Orton 2019). Almost all sites are open sites with just one coastal rock shelter known to contain LSA deposits (Webley 1992. 2002). Other sites on the coastal plain are often deflation hollows of varying size (Orton 2019a, 2019b, 2019c, 2019d). Orton (own data) has observed many sites in the white dunefield known as Witduin located 5 km east of the south-eastern corner of the study area. Inland the best sites tend to be rock shelters with the majority of other sites being relatively ephemeral open artefact scatters. Most work in the inland region has been done by Webley (1986, 1992, 2007) with a focus on rock shelters. Although not common, rock art has been recorded at various locations in the central part of Namaqualand (Orton 2013; Morris & Webley 2004). Orton (2013) ascribes the geometric rock art designs to Khoekhoe herders. Southeast of the present study area, in the Namaqualand National Park, both representational and geometric rock art sites were recorded (Morris & Webley 2004).

The last 2000 years are especially important for archaeological research in Namaqualand. Archaeological sites from this period with pottery are reported from a number of sites and are believed to be associated with the introduction of herding and/or pastoralism to the region some 2000 years ago. The region is known to be important in terms of the beginnings of herding, but the details of how it happened are still highly contested (Orton 2015). The archaeology supports the historic information that pastoralist groups (the ancestors of the Little Namaqua Khoekhoen) were occupying this area at and before the time of colonial contact.

Several other surveys have been conducted away from the coastline and in close proximity to the present study area. Magoma's (2016) linear survey passing the western edge of the study area yielded only isolated artefacts, while further to the west and closer to the coast Orton and Webley (2012a) found large numbers of LSA sites spread across the landscape. To the east of the present study area, Orton (2018) found a number of LSA sites on the ridges of the inselberg formed by Brandberg, Byneskop and Graafwater se Kop. The sites consisted only of stone artefacts. Finally, Orton's (2019c, 2019d) surveys just north and west of the study area yielded many small LSA sites with their size, density and shell content generally reducing towards the east. The sites were strongly focused on dune ridges. Figure B.49 shows the distribution of archaeological sites known to the author in the vicinity of the wind farm site.

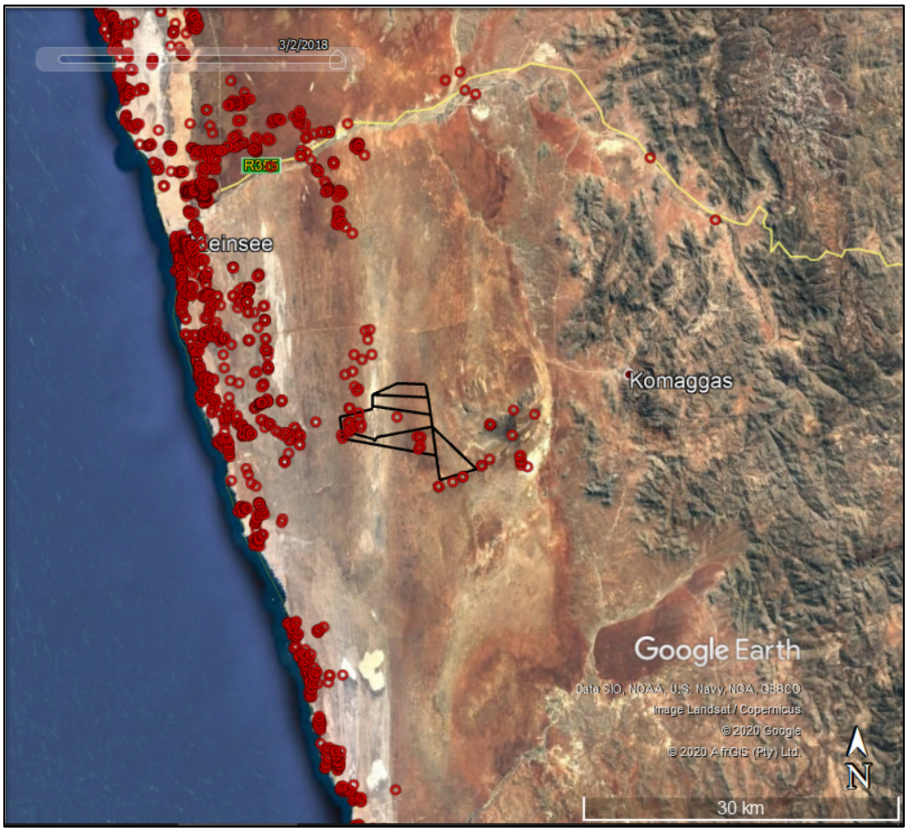


Figure B.49: Map showing the distribution of local archaeological sites known to the heritage specialist (Dr. Jayson Orton). The proposed Komas WEF site is shown by the black polygon.

B.12.4 Site visit

A site visit was undertaken by the heritage specialist, Dr. Orton, in January 2020. The survey revealed many archaeological sites scattered throughout the study area but clearly located in some areas and absent from others (Figure B.50). The low-lying Zonnekwa Valley lacks sites, but a few deflation hollows due occur in dunes along its eastern periphery. The vast majority of sites were located in deflation hollows or deflating areas on the crests of dunes. Table B.5 lists the sites and descriptions, and illustrations of some of the sites follow.

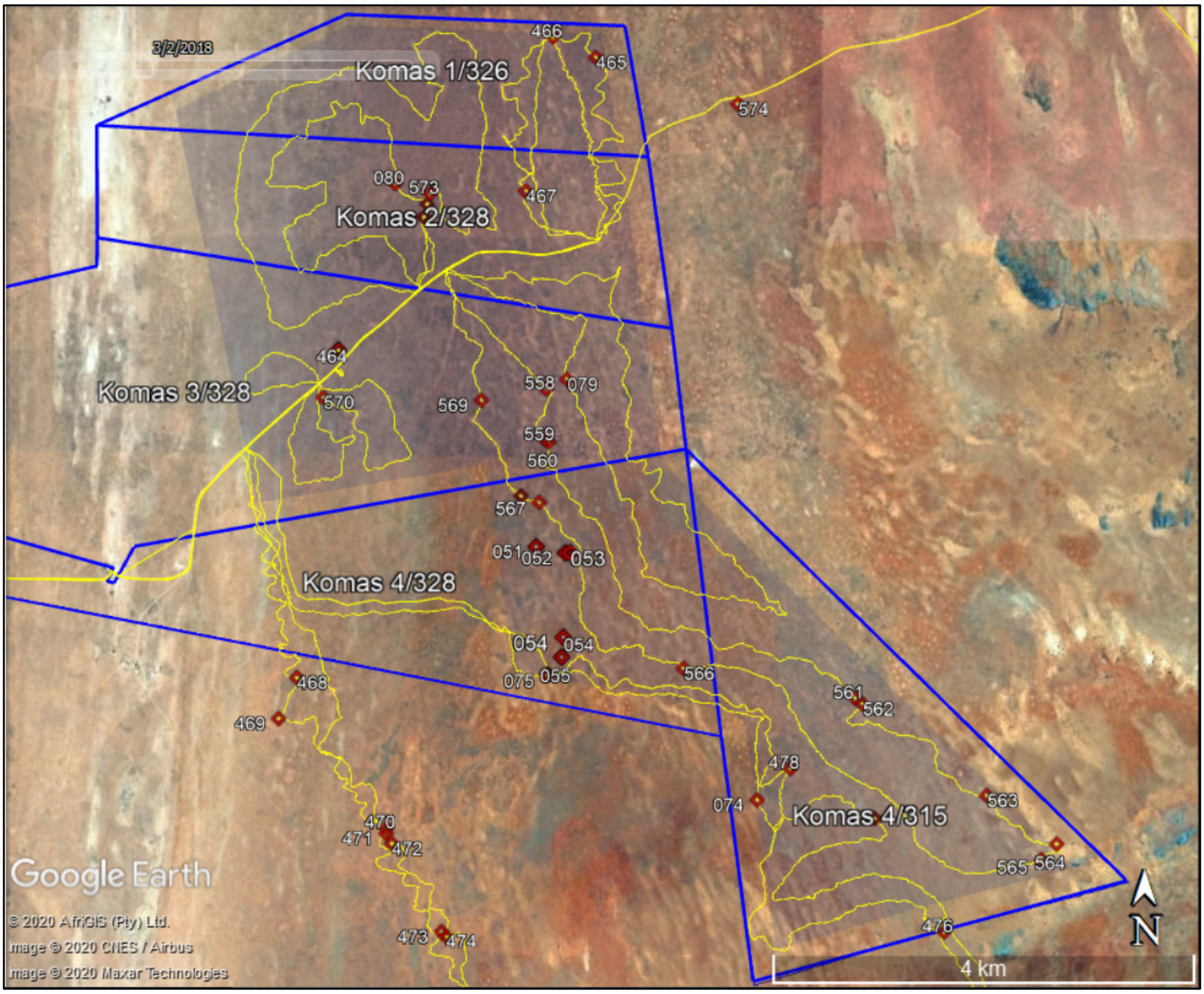


Figure B. 50: Aerial view of the proposed Komas WEF study area showing all sites recorded during the survey (numbered red symbols). A few sites from earlier work by the specialist (Dr. Orton) are also included where these fall within the present study area. The blue shaded area denotes the proposed Komas WEF study area, while the blue polygons are the farm portion boundaries. The yellow lines are the survey tracks.

Table B.5: List of archaeological sites recorded during the survey (includes some sites from earlier work). General Protection' (GP) and rated as GPA (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GPC (low significance, requires no further action).

Way point	Site name	GPS co-ordinates	Description	Significance / Grade	Mitigation requirement
051	ZN2018/014	S29 51 04.2 E17 17 28.4	A deflation hollow with a light artefact scatter in the eastern side and only very ephemeral artefacts over the rest. It has quartz and CCS artefacts. Recorded (but not reported) in 2018.	Low-medium GPB	2 hours
052	ZN2018/015	S29 51 06.1 E17 17 38.8	A deflation hollow with a light artefact scatter over most of its floor but one moderate density patch. It includes artefacts in quartz and CCS and also a quartzite anvil. Recorded (but not reported) in 2018.	Low-medium GPB	2 hours
053	ZN2018/016	S29 51 06.0 E17 17 40.5	A deflation hollow with a light artefact of quartz, CCS and quartzite as well as a grooved lower grindstone. Also some glass present. Recorded (but not reported) in 2018.	Low-medium GPB	2 hours
054	ZN2018/017	S29 51 32.1 E17 17 38.1	A deflation hollow with a light quartz scatter over most of its floor but with one moderate density path in the eastern side. Recorded (but not reported) in 2018.	Low-medium GPB	2 hours
055	ZN2018/018	S29 51 38.2 E17 17 37.5	A small deflation hollow with an ephemeral quartz scatter in it. Recorded (but not reported) in 2018.	Low GPC	---
074	KAP2020/00 1	S29 52 22.1 E17 18 47.1	Deflation hollow of 15 x 40 m. Light scatter of quartz flaked artefacts and quartzite manuports. Recorded (but not reported) in 2018.	Very low GPC	---
075	ZN2018/019	S29 51 43.5 E17 17 33.2	Deflation hollow of 50 x 70m. Light scatter of quartz, CCS, quartzite, 'other' faked artefacts and some quartzite manuports. There is a grooved lower grindstone with two very short grooves on one face and one very short groove on the back. Also a hammerstone/single platform core. Recorded (but not reported) in 2018.	Low-Medium GPB	4 hours
079	ZN2020/001	S29 50 12.5 E17 17 39.2	Deflation hollow of 15 x 20 m. Scatter of quartz and CCS flaked artefacts, ostrich eggshell and some glass.	Low GPC	---
080	ZN2020/002	S29 49 11.9 E17 16 37.8	A deflating area on a dune top with a scatter of quartz flaked artefacts and some quartzite manuports. Also a shotgun cartridge.	Very low GPC	---

Way point	Site name	GPS co-ordinates	Description	Significance / Grade	Mitigation requirement
464	ZN2018/013	S29 50 03.4 E17 16 17.6	Deflation hollow of 15 x 30 m. Scatter with LSA and historical materials including quartz and CCS flaked artefacts, some Cymbula granatina shell (minimal), ostrich eggshell, granite manuports, glass, wire, bullet cartridges and bone.	Low-Medium GPB	4 hours
465	ZK2020/001	S29 48 33.1 E17 17 49.4	Deflated area of 10 x 15 m on a dune ridge. Scatter of quartz and CCS flaked artefacts, quartzite manuports, ostrich eggshell and Aulacomya ater shell (looks quite fresh, probably just one shell and located at north end of the site). There is a brown Talana bottle on the ridge about 10 m off the site.	Low-Medium GPB	2 hours
466	ZK2020/002	S29 48 26.7 E17 17 34.2	Deflation hollow of 30 x 40 m. Scatter of quartz, CCS (x1), silcrete (x1) flaked artefacts, a quartzite hammerstone/upper grindstone and some quartzite manuports.	Low-Medium GPB	2 hours
467	ZN2020/003	S29 49 14.4 E17 17 24.5	Deflation hollow of 25 x 40 m. Light scatter of quartz, quartzite (x1) and CCS (x5) flaked artefacts. There are two subscatters: quartz in the west of the hollow and quartz and CCS in the southeast.	Low GPC	---
477	KAP2020/004	S29 52 27.1 E17 19 28.3	Two isolated potsherds on a low dune ridge.	Very low GPC	---
478	KAP2020/005	S29 52 12.1 E17 18 58.8	Small scatter of historical wine bottle fragments (x5).	Very low GPC	---
558	ZN2020/004	S29 50 15.4 E17 17 31.9	Deflation hollow of 20 x 40 m. Scatter of quartz and CCS flaked artefacts as well as quartzite manuports and ostrich eggshell fragments over a wide area.	Low-Medium GPB	4 hours
559	ZN2020/005	S29 50 31.2 E17 17 31.7	A light ostrich eggshell scatter but one fragment is burnt showing anthropogenic involvement (i.e. a camp fire).	Very low GPC	---
560	ZN2020/006	S29 50 31.9 E17 17 32.9	Deflation hollow of 20 x 40 m. Scatter of quartz and CCS flaked artefacts as well as quartzite manuports, a hammer stone/upper grindstone and plenty of ostrich eggshell fragments.	Low-Medium GPB	6 hours
561	KAP2020/006	S29 51 50.4 E17 19 21.5	Deflation hollow of 15 x 20 m. Scatter of quartz and CCS flaked artefacts as well as quartzite manuports.	Low-Medium GPB	6 hours

Way point	Site name	GPS co-ordinates	Description	Significance / Grade	Mitigation requirement
562	KAP2020/007	S29 51 52.1 E17 19 24.1	Deflation hollow of 15 x 25 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---
563	KAP2020/008	S29 52 19.6 E17 20 07.4	Deflation hollow of 20 x 25 m. Scatter of quartz and CCS flaked artefacts as well as quartzite manuports.	Low-Medium GPB	2 hours
564	KAP2020/009	S29 52 34.1 E17 20 31.5	Deflation hollow of 40 x 80 m. Scatter of quartz and CCS flaked artefacts as well as quartzite manuports. There are three clusters in the northern end of the deflation hollow with minimal artefacts in the southern end.	Low-Medium GPB	2 hours
565	KAP2020/010	S29 52 38.9 E17 20 26.2	Deflation hollow of 10 x 15 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---
566	ZN2020/007	S29 51 41.5 E17 18 20.8	Deflation hollow of 30 x 40 m. Scatter of quartz and CCS flaked artefacts as well as quartzite manuports.	Low-Medium GPB	8 hours
567	ZN2020/008	S29 50 50.5 E17 17 29.5	Deflation hollow of 15 x 15 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---
568	ZN2020/009	S29 50 48.4 E17 17 23.0	Deflation hollow of 25 x 40 m. Ephemeral scatter of quartz and CCS flaked artefacts. There are two quartzite manuports, one silcrete flake and one pot sherd just over the northern crest of the deflation hollow.	Very low GPC	---
569	ZN2020/010	S29 50 18.9 E17 17 08.8	Deflation hollow of 25 x 40 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---
570	ZN2020/011	S29 50 18.1 E17 16 12.1	Deflation hollow of 8 x 30 m. Ephemeral scatter of quartz and CCS flaked artefacts.	Very low GPC	---
571	ZN2020/012	S29 49 22.3 E17 16 48.1	Deflation hollow of 30 x 100 m. Light quartz flaked artefact scatter throughout the southern part of the deflation hollow. Also a hammer stone/upper grindstone, a lower grindstone with a groove on both sides and a piece of 'fishing club' quartzite (outcrop known to occur at the Kleinsee Angling Club). The middle part of the deflation hollow has a scatter of quartz, CCS and silcrete flaked stone	Low-Medium GPB	8 hours

Way point	Site name	GPS co-ordinates	Description	Significance / Grade	Mitigation requirement
			artefacts.		
572	ZN2020/013	S29 49 18.3 E17 16 49.2	The northern end of the above deflation hollow has a scatter of quartz and CCS flaked stone artefacts, two quartzite lower grindstones with hollows on both sides (one on a sub-rounded block, one on a beach cobble), a hammer stone ('sausage-shaped stone') and some ostrich eggshell fragments.		
573	ZN2020/014	S29 49 15.0 E17 16 50.4	Deflation hollow of 10 x 15 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---
574	KOU2020/001	S29 48 47.7 E17 18 39.9	Deflation hollow of 15 x 10 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---

All the sites consisted of scatters of stone artefacts, sometimes with a few other items as well. The vast majority were LSA occurrences in deflation hollows. Figures B.51 to B.62 show examples of these deflation hollow sites and some of the finds they contain. None of the hollows were especially dense (compared to deflation hollows in other areas). Aside from stone artefacts, some sites contained ostrich eggshell fragments in variable quantities. Pottery, bone and marine shells were very rare, each being recorded in only one or two instances. In places there were also some historical items such as ceramics, glass and pieces of metal (Figures B.61 and B.62). All of these were no older than the late 19th century and some were likely early 20th century in age and likely relate to shepherds using the landscape.

Figure B.51: A large deflation hollow at ZK2020/002 (waypoint 466) in the far north.

Figure B.52: Marine shell fragments on the surface of ZN2018/013 (waypoint 464).

Figure B.53: View of the dune top on which the deflation hollow at ZN2020/004 (waypoint 558) lies.

Figure B.54: The surface of the ZN2020/004 (waypoint 558) deflation showing flaked stone artefacts and ostrich eggshell fragments.

Figure B.55: The deflation hollow at ZN2020/006 (waypoint 560).

Figure B.56: A hammerstone/upper grindstone with very heavily worn ends from ZN2020/006 (waypoint 560). Scale in cm.

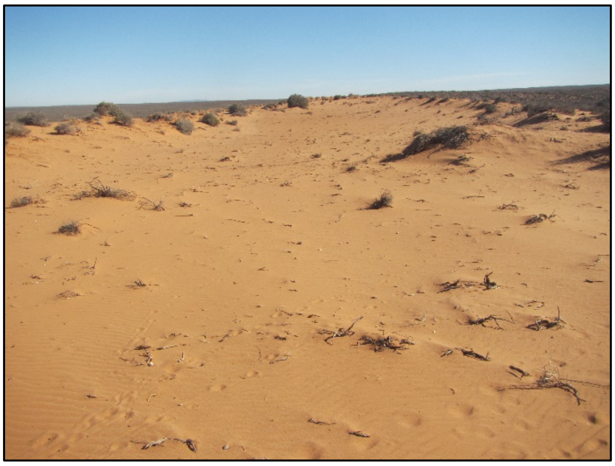


Figure B.57: The deflation hollow at ZN2020/012 (waypoint 571) which contained multiple components.

Figure B.58: One face of a broken lower grindstone with a prominent groove on it. The reverse face has a shallower groove. Scale in cm.

Figure B.59: Lower grindstone with two grooves on one face and another on the opposite face from ZN2018/019 (waypoint 075).

Figure B.60: Two small pot sherds from KAP2020/004 (waypoint 477). Scale in cm.

Figure B.61: Historical wine bottle fragments from KAP2020/005 (waypoint 478). Scale in cm.

Figure B.62: Isolated glass medicine bottle from the southern part of the study area.

B.12.5 Graves

No graves were seen anywhere in the study area but a single modern grave is known to occur just outside the study area near its north-western corner. It is not a heritage resource. Unmarked precolonial graves can occur almost anywhere and their locations cannot be predicted.

B.13 Palaeontology

Pether (2020:i) notes that "the affected surficial formations include Holocene dunes of the Hardevlei Formation and earlier late Quaternary coversands of the Koekenaap Formation. Beneath these unconsolidated sands are compact, pedogenically-altered aeolianites termed the Dorbank Formation which are fossil dune plumes of later mid-Quaternary age." Between two large dune ridges in the western part of the site (but just outside the study area) is a low-lying, calcrete-floored non-depositional area – referred to as the Zonnekwa Valley. The bedrocks (only exposed in the extreme southeast of the study area) are very altered ancient quartzites and schists of the Springbok Formation and are entirely unfossiliferous.

The aeolian formations (Hardevlei and Koekenaap) are assumed to contain the typical fossil content seen in similar deposits elsewhere. The most common fossils are related to the ambient fossil content of dune sands, i.e. land snails, tortoise shells and mole bones. The bones of larger animals (e.g. antelopes, zebra, rhinos) are sparse, but occur more often on the palaeosurfaces between the major formations where they are enclosed in palaeosols and pedocretes. They can also occur on less easily visible palaeosurfaces within formations and particularly within the dorbank. The calcrete-floored Zonnekwa Valley likely hosted pans during wetter periods and some pan deposits – or fossil bones eroded from such deposits – may still be present in places. Large caches of bones can be found in old burrows and were collected by hyaenas (Pether 2020).

Although Pether (2020) considers fossil finds to be unlikely, he does note that any finds made could be scientifically significant in the interpretation of the local geological stratigraphy.

B.14 Historical aspects and the Built environment

B.14.1 Desktop study

Namaqualand is quite remote, poorly watered and relatively unproductive from an agricultural point of view. As a result, it does not have as deep a history as many other parts of South Africa. Although the little settlement of Grootmis just inland of Kleinsee and the mission station at Komaggas date back into the 19th century, the larger towns of Kleinsee and Koingnaas – both originally developed as 'company towns' – relate to 20th century diamond mining.

Grootmis was historically important because it had water. An annotation on a 1907 British Military map states that Grootmis had an unlimited water supply (Source: Pietermaritzburg Archives). The very large number of shell scatters found in the area by Orton and Webley (2012b) suggests that this water source had been available for some time. It probably stopped yielding water when De Beers dammed the river and commenced with the abstraction of water.

Komaggas (Camaggas) is first mentioned by Gordon in 1779. Komaggas (the farm is spelled Kamaggas, a form that also appears on some early maps) received a Certificate of Occupation on 9 November 1843, granting the Cloete family the right of occupation on the land.

There are various oral accounts of the relationship between Ryk Jasper Cloete and the Nama kaptein kXurib who used the Komaggas Fountain as his main water source. Bregman (2010) suggests that Cloete acquired the land through his marriage to the kaptein's daughter. Jasper Cloete utilised land up to the Orange River to graze his stock. A mission station of the London Missionary Society (LMS) was set up at Komaggas in 1829 and the farm was surveyed in 1831. It became a station of the Rhenish Missionary Society in 1843 and then the N.G. Church from 1936 (Raper n.d.).

Bregman (2010) provides a list of the farms surrounding and in the vicinity of Komaggas, including the date that they were first registered. Farms to the west of Komaggas were granted to colonists under quitrent title only after 1855. Mining companies were seeking land in the area because of the commencement of copper mining. Closer to the coast, the dry plains between the Swartlintjies and Buffels Rivers were left open as Crown Land – this is the zone in which the present study area lies. Despite the increasing private ownership of farms in the area over time, herders from Komaggas were still able to access grazing lands outside of the reserve because the farms were not completely fenced and access was gained at certain places. However, they had no formal title to the land.

In 1925 diamonds were discovered on the farm Oubeep, south of Port Nolloth, and in 1926 at Kleyne Zee, both by Jack Carstens. Mining commenced at the latter in 1927 and the town of Kleinsee was soon established (Rebelo 2003). Much of the coastline was then bought up for diamond mining and access for grazing was closed.

B.14.2 Site visit

The site visit undertaken by the heritage specialist, Dr. Orton, in January 2020 showed the site to be in a very remote area with little infrastructure. The study area lacks any sign of development aside from the gravel road passing through its northern part, although some recent/historical materials (see above) did betray a historical presence on the land. Four farmsteads occur in the vicinity, but none are within the study area. One lies just outside the site (700 m from the edge of the study area) to the northwest, two lie to the west of the study area (1.5 and 1.9 km from the study area) with one of these being inside the site and the last is east of the site some 1.5 km outside the study area. They have been considered during other assessments and, while some structures have been found from aerial photography to be greater than 60 years of age, it is clear that none of them are of much heritage significance (Orton 2019c, 2019d). Two are shown in Figures B.63 and B.64.

Figure B.63: Farm house on Farm 128/4 to the west of the site (photographed in 2018).

Figure B.64: One of the houses on Farm 326/0 to the northwest of the site (photographed in 2018).

About 9 km and more to the east of the site, many small stock posts occur in the Komaggas Reserve. They generally have temporary structures, and sometimes caravans, as well as wire stock pens. Although these sites are modern, they are reminders of an important historical way of life practised by local Nama herders for at least the last two centuries since missionaries encouraged settlement. This effectively makes the Komaggas Reserve a living heritage site. Prior to this, the people would have been far more mobile and would likely have moved over greater distances.

B.15 Cultural landscapes and scenic routes

The site is situated in a remote location and, being only very minimally developed, the cultural landscape is largely considered a natural landscape rather than a rural one. The exception, of course, is the mining landscape located along the coast where the human imprint is far greater. Natural heritage also requires consideration because of the visual amenity provided by aesthetically pleasing landscapes. Aside from rare structures, the only other anthropogenic features on the landscape are farm tracks/roads and fences, along with occasional borrows pits alongside the larger gravel roads. The landscape conveys a sense of remoteness and inhospitability that is a result of the very frequent strong winds, the low scrubby vegetation and seemingly endless sand flats and dunes. While most of the broader landscape is fairly flat with the tallest anthropogenic features being wind pumps (aside from the mine dumps further afield), inselbergs occur to the east and southeast of the site forming a long ridge (the southern limit of the project will be about 1.8 km from this ridge). Another prominent inselberg (Langberg) lies several kilometres to the southeast. The escarpment edge lies further to the east with these inselbergs effectively being outlying hills at the base of the escarpment.

The archaeological cultural landscape should also be considered, although it is not typically visible to the lay person. This cultural landscape consists of a multitude of individual archaeological sites classifiable as a Type 3 precolonial cultural landscape (Orton 2016). Figure B.65 shows another view of Figure B.49, but with the newly reported sites (identified during the site visit) added onto it. It is clear that with wider survey this landscape would be shown to host many more sites, although densities would naturally reduce away from the sea. The obvious exception here is Witduin 6 km to the east which, because of its water supply, contains an extremely high density of archaeological sites.

It is important to note that the study area lies within a REDZ and that REFs are therefore expected to be focused in this area. A number of REFs are proposed and authorised within 50 km of the proposed Komas WEF site (see the list of projects in Table D.1 and Figure D.1 of the cumulative impact section in Section D) and with construction, would add a new 'layer' to the cultural landscape which will intensify the presence of industry and infrastructure development in the area. Also, the 400 kV Eskom power line has been authorised and will be constructed in the near future.

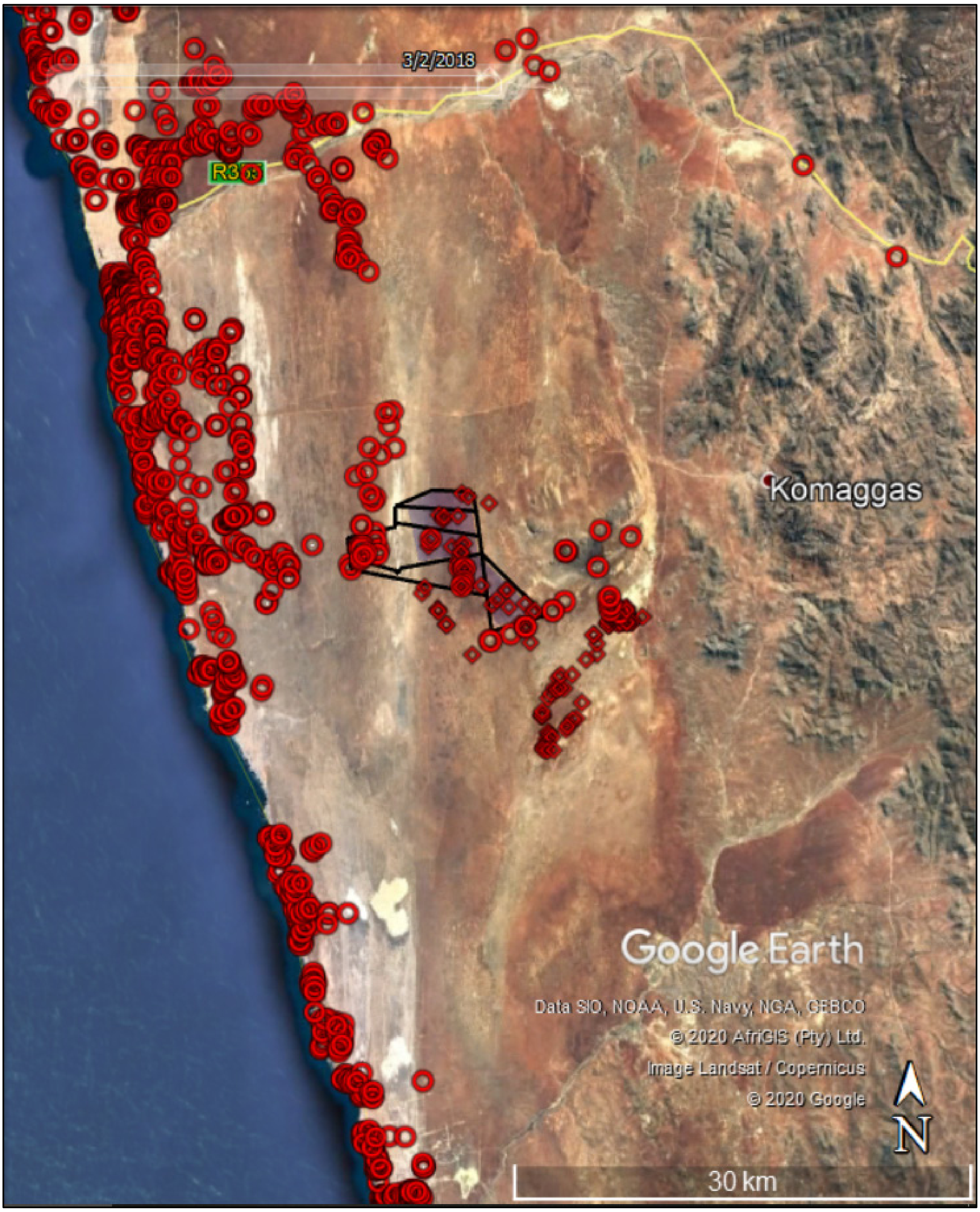


Figure B.65: Aerial view of the study area and wider surroundings showing previously known archaeological resources (red circles) as well as those discovered during the survey (including finds in another wind farm site and the power line corridor which will be reported on separately).

B.16 Screening Tool Description and Site Verification (Archaeology and Cultural Landscape)

Figure B.66 indicates the archaeological and heritage sensitivity as captured on the Screening Tool. The archaeological survey and the site sensitivity verification showed that archaeological sites were located in very specific locations which meant that the site sensitivity is restricted to very small pockets (effectively the buffers around the culturally significant sites). While medium sensitivity is appropriate, this rating only applies to these small areas and they are spread more widely than the single patch of medium sensitivity than indicated by the Screening Tool. The Screening Tool sensitivity is thus largely correct (i.e. mostly low) but is inaccurate in the central part of the site where many small areas of sensitivity occur along a dune cordon. The data supporting this conclusion are presented in Section 5 of the HIA (Appendix C.6 of this BA Report).

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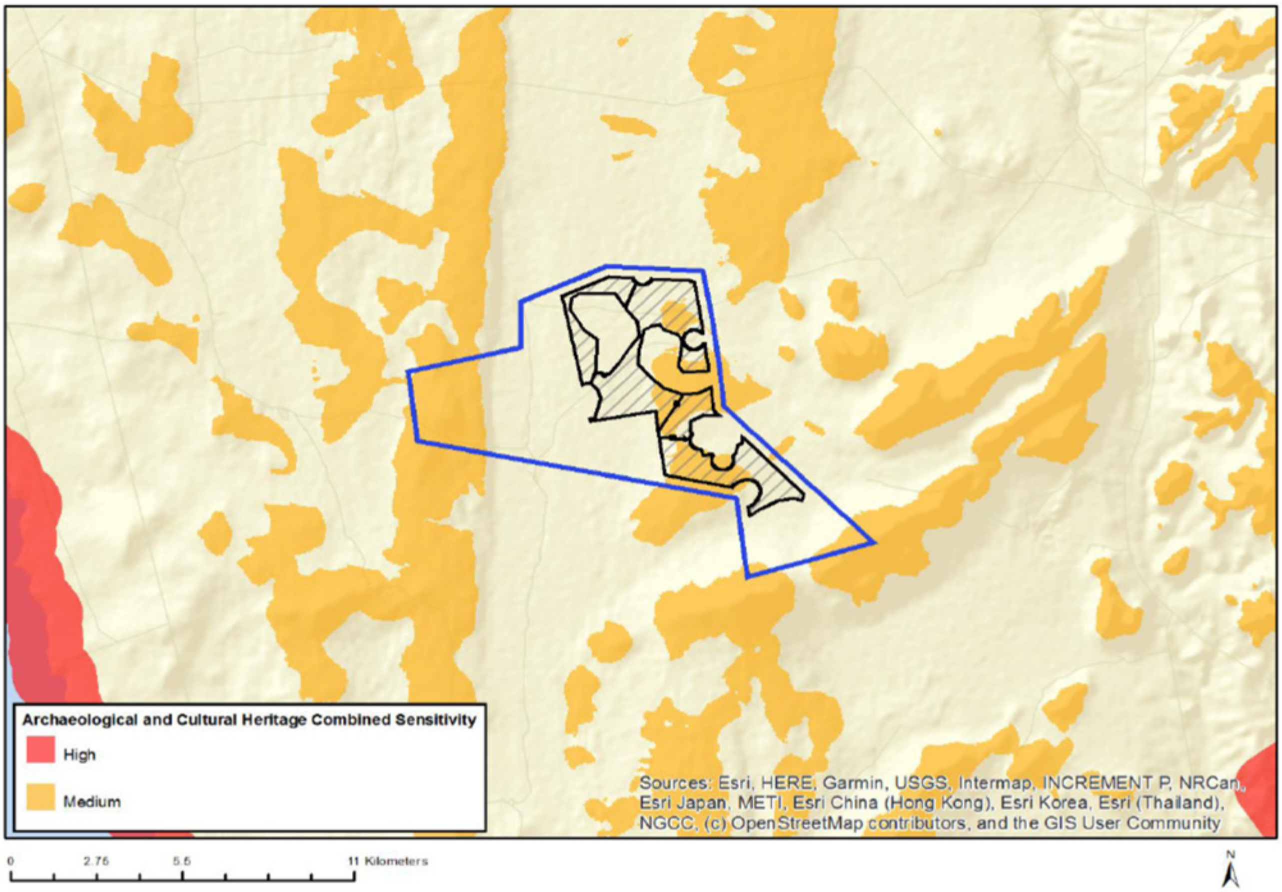


Figure B.66. Screening Tool map showing the site to be of medium to low 'archaeological and cultural heritage' sensitivity.

B.17 Palaeontology

A detailed description of the palaeontological features within the study area is included in the Palaeontology Impact Assessment, which is included in Appendix 4 of the HIA (Appendix C.6 of this BA Report). The information presented in this section is extracted from the Palaeontology Assessment.

Pether (2020:i) notes that "the affected surficial formations include Holocene dunes of the Hardevlei Formation and earlier late Quaternary coversands of the Koekenaap Formation. Beneath these unconsolidated sands are compact, pedogenically-altered aeolianites termed the Dorbank Formation which are fossil dune plumes of later mid-Quaternary age." Between two large dune ridges in the western part of the site (but just outside the study area) is a low-lying, calcrete-floored non-depositional area – referred to as the Zonnekwa Valley. The bedrocks (only exposed in the extreme southeast of the study area) are very altered ancient quartzites and schists of the Springbok Formation and are entirely unfossiliferous.

The aeolian formations (Hardevlei and Koekenaap) are assumed to contain the typical fossil content seen in similar deposits elsewhere. The most common fossils are related to the ambient fossil content of dune sands, i.e. land snails, tortoise shells and mole bones. The bones of larger animals (e.g. antelopes, zebra, rhinos) are sparse, but occur more often on the palaeosurfaces between the major formations where they are enclosed in palaeosols and pedocretes. They can also occur on less easily visible palaeosurfaces within formations and particularly within the dorbank. The calcrete-floored Zonnekwa Valley likely hosted pans during wetter periods and some pan deposits – or fossil bones eroded from such deposits – may still be present in places. Large caches of bones can be found in old burrows and were collected by hyaenas (Pether 2020).

Although Pether (2020) considers fossil finds to be unlikely, he does note that any finds made could be scientifically significant in the interpretation of the local geological stratigraphy.

Affected Formations

The affected surficial formations include Holocene dunes of the **Hardevlei Formation** and earlier late Quaternary coversands of the **Koekenaap Formation**. Beneath these unconsolidated sands are compact, pedogenically-altered aeolianites termed the **Dorbank Formation** which are fossil dune plumes of later mid-Quaternary age. Between the fossil dune plume ridges is a non-depositional area (Zonnekwa Valley) which is closely underlain by pale calcrete pedocrete which is likely to have formed within the upper part of an older aeolianite formation such as correlates of the Olifantsrivier or Graauw Duinen formations.

Palaeontological Resources

The fossil content of the aeolian formations is presumed to be typical of that observed in correlative formations in the wider area. Fossil material most commonly seen is the ambient fossil content of dune sands: land snails, tortoise shells and mole bones. The bones of larger animals (*e.g.* antelopes, zebra, rhinos) are sparse, but are more persistently present along palaeosurfaces which separate the major aeolianite formations where they are enclosed in palaeosols and pedocretes, and also occur on cryptic palaeosurfaces within formations. Rare large caches of bones in large burrows are due to the bone-collecting behaviour of hyaenas (Figure B.67).

Anticipated Impact

The primary palaeontological concern is the fossil bones that are sparsely distributed in these aeolian deposits. In the Hardevlei and Koekenaap formations the fossil bone and marine shell material that may occur is likely to be in an archaeological context. Both artefacts and fossil bones are most often found on the compact palaeosurface of the Dorbank Formation beneath the surficial sands. The fossil bone material would be of late Quaternary age and comprised mainly of extant species (modern fauna), but could include species that did not historically occur in the region.

The fossil bone finds in the Dorbank Formation are generally the scattered, disarticulated and sometimes fragmented larger limb bones of antelopes and zebra. Pans and vleis/seep deposits, with greater fossil potential, may occur along buried drainage lines within the Dorbank Formation. Most finds have been at lower elevations in diamond-mine pits and little is known of this formation and its fossils at higher elevations and in this region of the coastal plain. Fossil finds could prove to be a scientifically significant addition to the poorly-known later mid-Quaternary fossil fauna of Namaqualand.

The calcrete-floored Zonnekwa Valley has very likely hosted pans during wetter climate spells in the past. It is possible that some pan deposits may remain, or fossils that have been eroded from them by wind deflation. The calcrete is assumed to have formed within the upper part of an older aeolianite formation. As the capping calcrete has formed along a persistent palaeosurface, fossil bones are more prevalent within it and are expected to be of earlier Quaternary age.

Although Pether (2020) considers fossil finds to be unlikely, he does note that any finds made could be scientifically significant in the interpretation of the local geological stratigraphy.

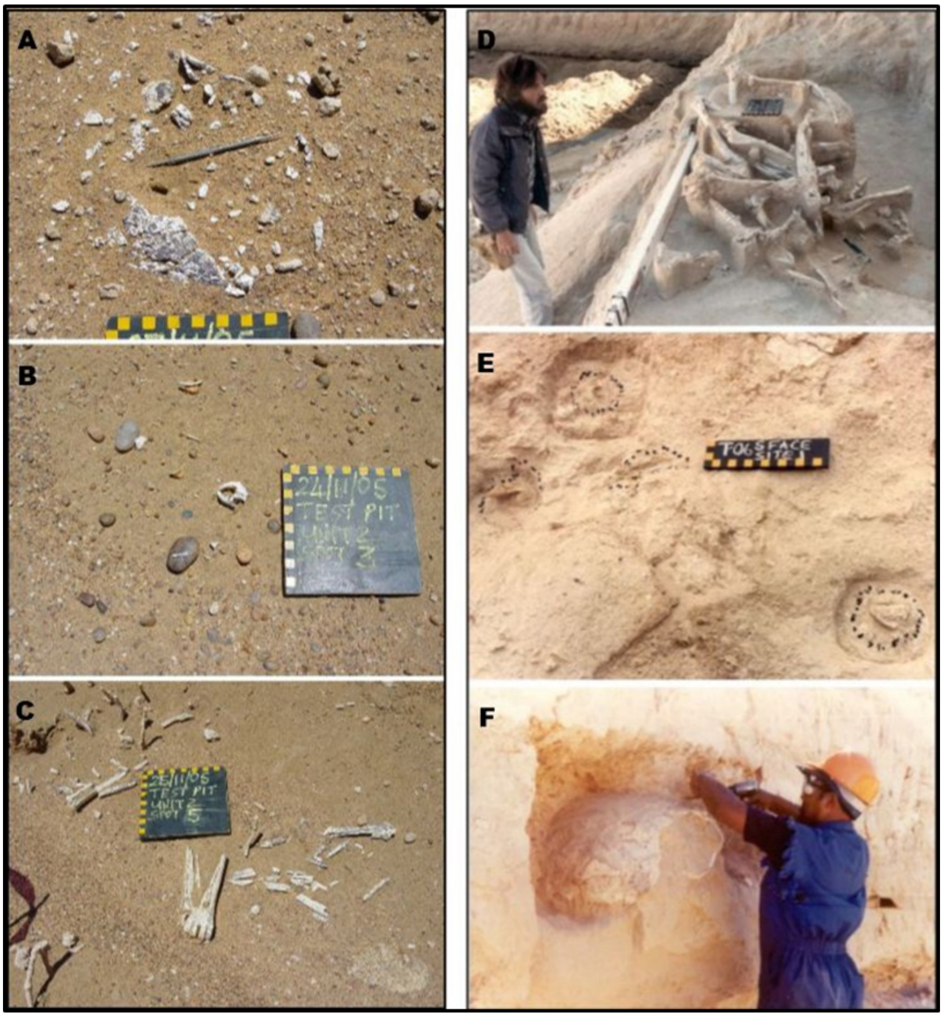


Figure B.67: Examples of *in situ* fossil finds in aeolianites. A & B – ambient fossils in aeolianites, tortoise (A) and rodent (B). C – bovid (antelope) limb bone. D – hyaena bone stash in a burrow. E – poorly visible bones in pedocrete. F – giant tortoise.

B.17.1Screening Tool Description and Site Verification-Palaeontology

A palaeontological specialist was subcontracted to provide a specialist palaeontological study which is included as Appendix 4 in the HIA (Appendix C.6 of this BA Report). There were no other relevant sources of information used for the site sensitivity verification.

The palaeontological desktop study found the study area to be of generally low sensitivity which largely confirms the screening tool map (Figure B.68).

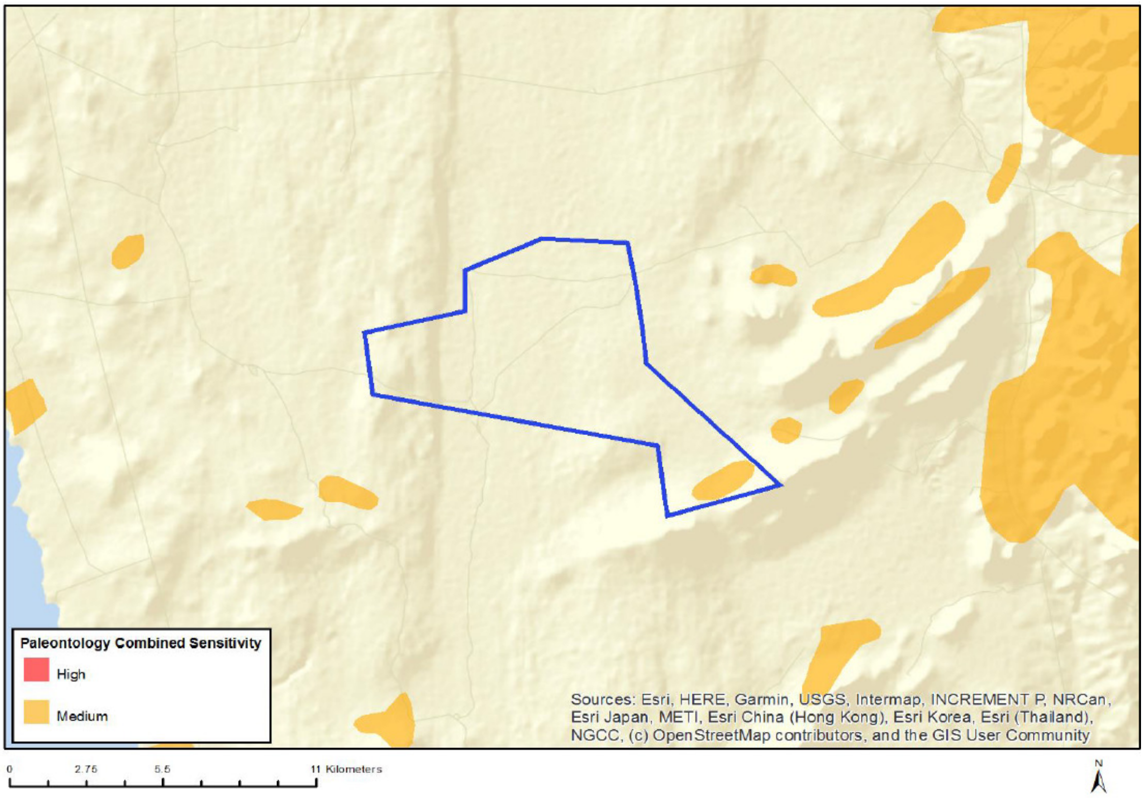


Figure B.68: The Screening Tool map showing the site to be of medium to low 'palaeontological' sensitivity.

B.18 Agriculture and Soils

The Agriculture Compliance Statement (Appendix C.7 of the BA Report) notes that the farms are located within a sheep farming agricultural region and land use for the farms and surrounding area is grazing only. Soils are predominantly deep to moderately deep, very sandy soils on underlying hardpan carbonate and sometimes clay. The major limitations to agriculture are the severely limited climatic moisture availability and the sandy soils with low water holding capacity. As a result of these limitations, the agricultural use of the study area is limited to low intensity grazing only. There is no cultivation or any history of cultivation on the farm. Apart from fences, there is no agricultural infrastructure on the site. There are no buildings on the site.

The Screening Tool classifies agricultural sensitivity according to two criteria i.e. the cultivation status and the land capability. All cultivated land is classified as high sensitivity (or very high sensitivity). This is because there is a scarcity of arable production land in South Africa, in terms of how much is required for food security.

Uncultivated land is classified by the Screening Tool in terms of the land capability. Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability classes are suitable as arable land for the production of cultivated crops, while the lower suitability classes are only suitable as non-arable grazing land, or at the lowest extreme, not even suitable for grazing. In 2017, the then DAFF released updated and refined land capability mapping across the whole of South Africa; which has greatly improved the accuracy of the land capability rating for any particular piece of land anywhere in the country. The new land capability mapping divides land capability into 15 different categories with 1 being the lowest and 15 being the highest. Values of below 8 are generally not suitable for production of cultivated crops. This land capability data is used by the Screening Tool.

The proposed project area is classified with a predominant land capability evaluation value of 5, although it varies from 4 to 6 across the site. Agricultural limitations that result in the low land capability classification are predominantly due to the very limited climatic moisture availability, with sandy soils as an additional factor. These factors render the site unsuitable for any kind of cultivation and limit it to low density grazing only.

The long-term grazing capacity of the site is low at 45 hectares per large stock unit.

B.18.1 Screening Tool Description and Site Verification

The proposed site is identified by the Screening Tool as being of predominantly low agricultural sensitivity, with only very limited patches of medium sensitivity, and with no higher sensitivity than moderate. A map of the proposed study area overlaid on the Screening Tool sensitivity is shown in Figure B.69 below.

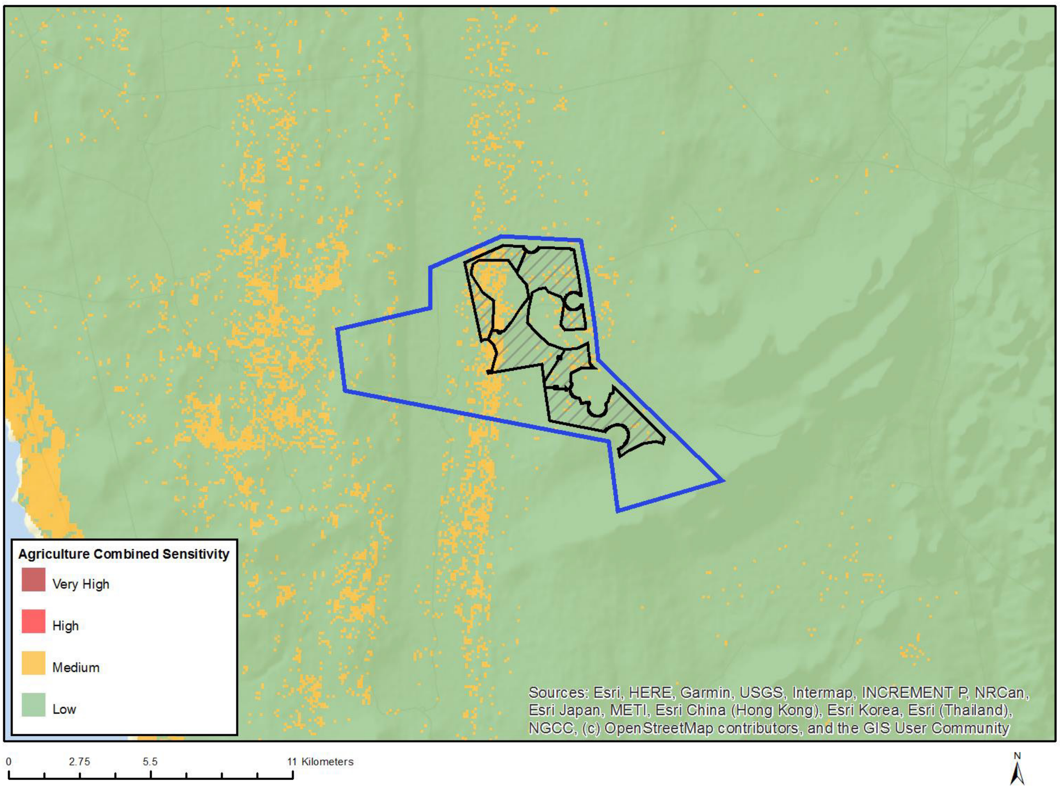


Figure B.69: The project study area for the proposed Komas WEF (outlined in blue) overlaid on agricultural sensitivity as identified by the Screening Tool (low = green; medium = yellow; red = high).

The agricultural sensitivity, as identified by the Screening Tool, is confirmed by the Agriculture Compliance Statement (Appendix C.7 of the BA Report). The motivation for confirming the sensitivity is predominantly that the climate data (low rainfall and high evaporation) proves the area to be arid, and therefore of limited land capability. In addition, the land type data shows the dominant soils to be deep to moderately deep, very sandy soils on underlying hardpan carbonate and sometimes clay. The land of the study area, therefore, without doubt, corresponds to the definitions of the different Screening Tool sensitivity categories in terms of its land capability and cultivation status.

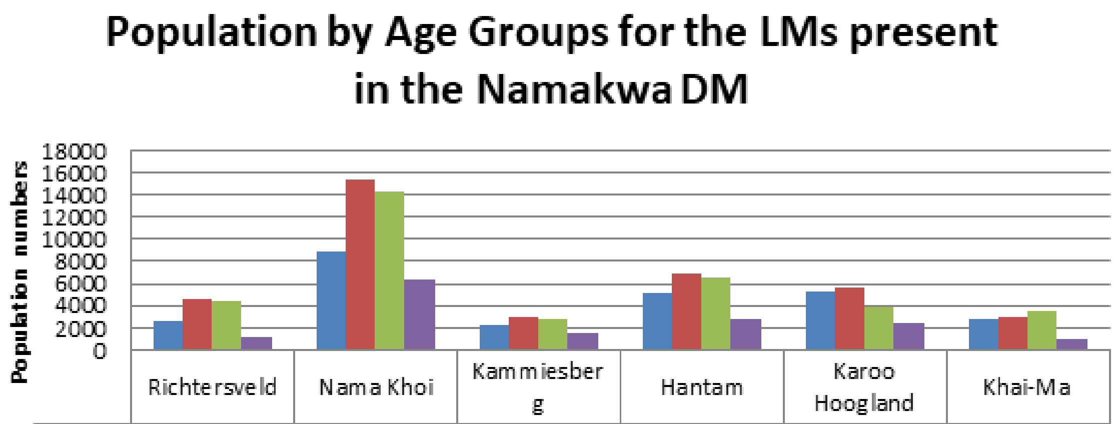
Refer to the Agriculture Compliance Statement (Appendix C.7 of the BA Report) for additional information.

B.19 Socio-Economic Character

The section below provides information on the Socio-Economic context of the study area. Please refer to the Socio-Economic Impact Assessment included in Appendix C.8 for more information on the Socio-Economic context of the study area.

Demographic and Economic Profile

The NKLM is part of the six local municipalities within the NDM within the Northern Cape Province. This municipality is the least populated within the Province according to the NDM's IDP (2017-2022). Figure B.70 shows the age group distribution of the population present within the NDM, shown via the representative of each Local Municipality. In addition, the NKLM has the highest population group within the 15-54 and 54-64 age groups. The overall dominant age group within the NDM is the 15-54 age group, which, according to the Namakwa DM's IDP, shows that within the DM there is need for job creation and new employment opportunities.



	Richtersveld	Nama Khoi	Kammiesberg	Hantam	Karoo Hoogland	Khai-Ma
0-14	2548	8864	2225	5125	5254	2834
15-54	4578	15457	2880	7006	5677	3049
54-64	4336	14252	2852	6560	3875	3557
65+	1225	6328	1540	2855	2362	1053

Figure B.70. Population age by age groups for the LMs present within the Namakwa DM (NKLM IDP, 2019/20)

Within the NDM, several sectors contribute to the municipality's economy and the Gross Domestic Product (GDP). These sectors include agriculture, mining, electricity, construction and trade. From 2004 to 2014, most of these sectors have seen growth and the NKLM remains the largest contributor to the economy in the District (Figure B.71).

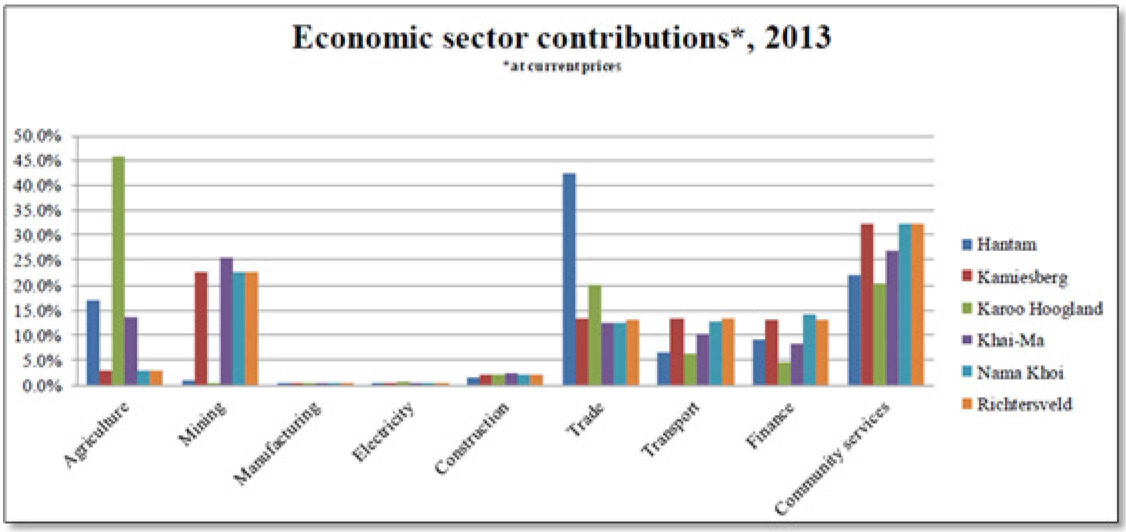


Figure B.71. Sectors contributing to the LM's local economies in 2013

Kleinzee

According to a Mail and Guardian article in 2011, Kleinzee was established as a mining town in 1926. The town was supported by the mining company, De Beers, through the supply of free services such as water and electricity as well as 25 recreational clubs including a golf course, tennis courts and a swimming pool. At the peak of the mine, it was estimated that a million carats of diamonds were mined in the area per year. In the 1980's it was estimated that 3 000 people were employed in Kleinzee and the population was close to 6 000 people. In 2007, De Beers significantly scaled down their operations in the town and linked to this, residents lost their jobs and moved away. De Beers has subsequently sold their Namaqualand Mines to Transhex in 2011 and only a small amount of mining is still occurring in the area, approximately 100 000 carats a year. Rehabilitation efforts by Transhex are however still providing jobs to a limited number of residents. Within the town, most of the houses are empty and limited services are still available (Stilwell, 2011). The Cape Times noted in 2013 that only 10 children were enrolled at the town's preprimary school and 50 children in the primary school. Kleinzee does not have a high school or hospital (Dolley, 2012). According to the census data of 2011, Kleinzee had a total population of 728, with an average household size of 1,9 (StatsSA, 2013).

Komaggas

Komaggas is named after a tributary of the Buffelsrivier. Historically the area was established as a station of the London Missionary Society in 1829. According to the census data of 2011, Komaggas has a population size of 3 116 with an average household size of 3,7 (StatsSA, 2013). According to the Nama Khoi SDF, because of the low population threshold and isolation of Komaggas, development strategies should be focused on developing human capital. For instance, it would not be feasible to develop schools and hospitals in Komaggas and as such mobile services such as clinics and libraries should be the main focus for investment. Learners should be transported to Springbok's schools.

Based on the demographic profiles of Kleinsee and Komaggas, the following comparisons can be made (as shown in the figures below). The majority of the residents in both towns are coloured (Figure B.72). As shown in Figure B.73, the majority of the people living in Kleinsee are in the age group between 45-49, with the second largest group of age 20 - 24. Compared to Kleinsee, the majority of the Komaggas population is aged between 0 – 29 years which shows a much younger population group. The lowest percentage of people in Komaggas is in the 35 – 39 age group (Figure B.73). In terms of the highest education level reached by individuals within Kleinsee and Komaggas; the majority of the population in Kleinsee has completed secondary school, while the majority of residents in Komaggas has some secondary school grades completed (Figure B.74) (Laurie, 2018).

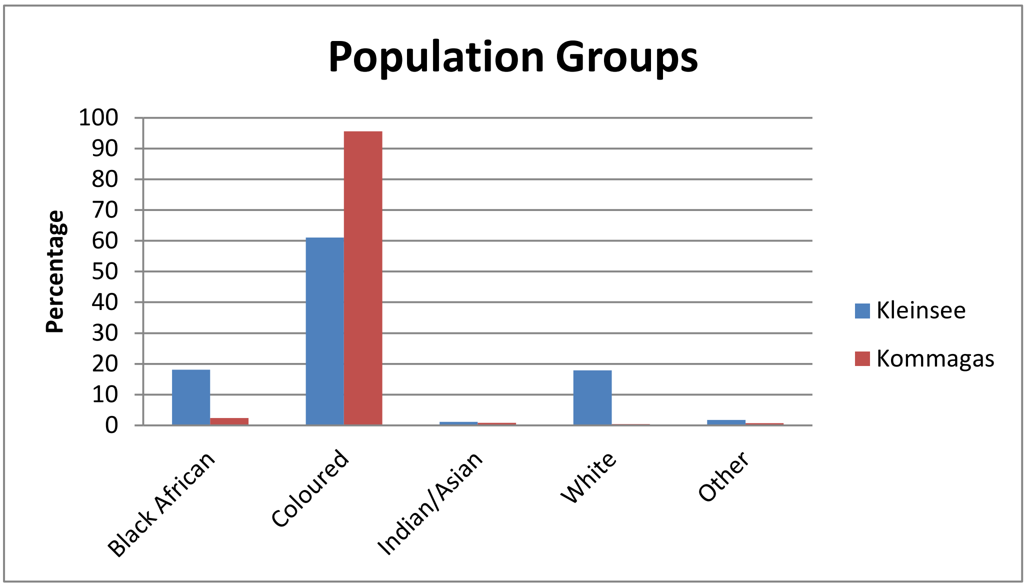
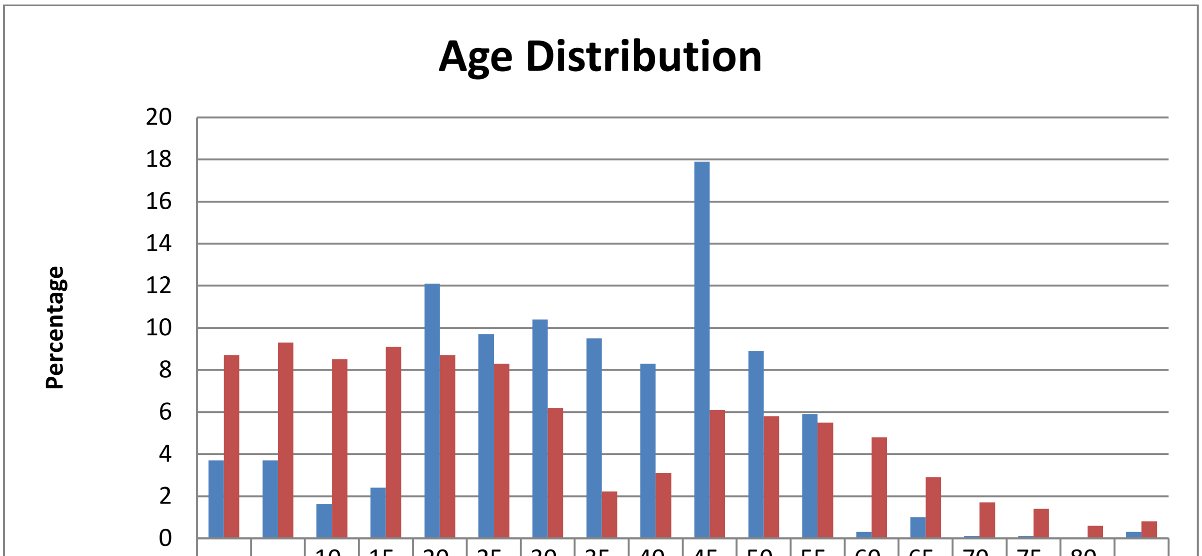


Figure B.72. Population groups residing within Kleinsee and Komaggas (2011) (StatsSA, 2013).



	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Kleinzee	3.7	3.7	1.63	2.4	12.1	9.7	10.4	9.5	8.3	17.9	8.9	5.9	0.31	1	0.1	0.1	0	0.3
Komaggas	8.7	9.3	8.5	9.1	8.7	8.3	6.2	2.23	3.11	6.1	5.8	5.5	4.8	2.9	1.7	1.4	0.6	0.8

Figure B.73. Age distribution within Kleinzee and Komaggas (2011) (StatsSA, 2013).

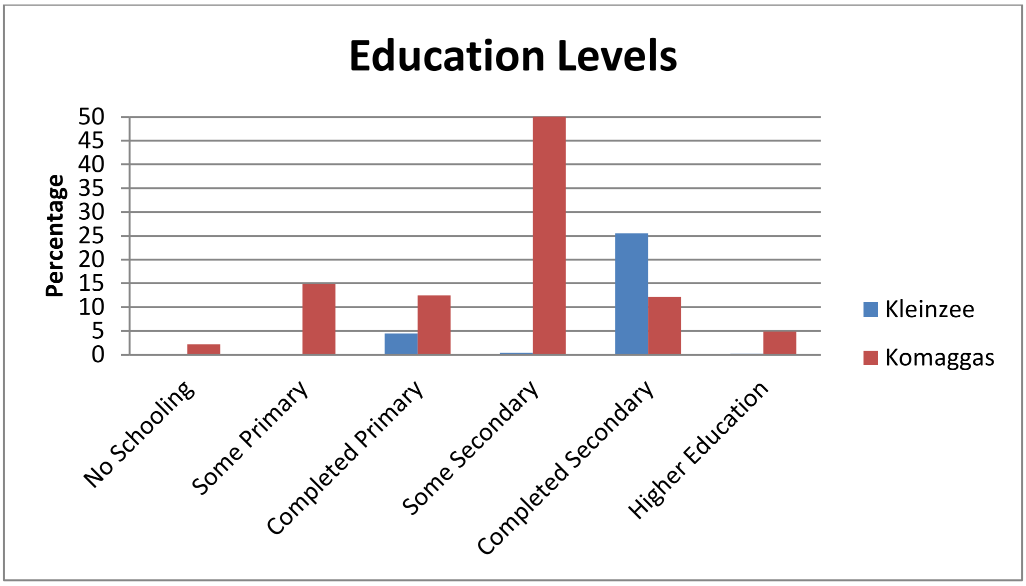


Figure B.74. Highest education levels achieved by population in Kleinzee and Komaggas (2011) (StatsSA, 2013).

According to the Community Survey (2007) included in the Nama Khoi IDP in 2001, the unemployment rate in Kleinzee was 5% and 41% for Komaggas. The Labour Participation Rate, which refers to the measure of the economy's labour force who is either employed or actively looking for work, was 89% and 68% for Kleinzee and Komaggas, respectively (StatsSA, 2008).

B.20 Civil Aviation and Defence

As required by GN 320, Civil Aviation and Defence Site Sensitivity Verifications were compiled. These are included in Appendices C.12 and C.13 respectively of this BA Report. Overall, the proposed project area falls within a low sensitivity area from a Civil Aviation and Defence perspective.

Civil Aviation

The site visit undertaken by the EAP on 29 September 2020 confirmed that the proposed project site is dominated by natural vegetation and that there are no areas of cultivation present on site. There are a few farmsteads on site. No civil aviation installations were found within the proposed project assessed area and footprint for the Komas WEF. According to the VIA, much of the area is characterised by natural vegetation which is dominated by Karoo and Fynbos shrubland.

The Air Traffic and Navigation Services SOC Limited (ATNS) data has confirmed that the Kleinsee Licenced Aerodome is located about 21 km from the closest point of the WEF, towards the north west. The ATNS data further notes that Area Navigation Routes intersect with the 30 km radius of the project area, however none intersect with the actual Komas WEF project site. In terms of airspaces, the area overlaps the Johannesburg Area West airspace. The proposed wind turbines will have a maximum HH of 200 m from the ground and the wind measurement monitoring mast extends approximately 120 m in height from ground level.

The Screening Tool also shows the Kleinsee Aerodome, with a high sensitivity within 8 km from the aerodome, and medium sensitivity allocated to the area extending between 8 and 15 km from the aerodome. These sensitivities do not intersect with the proposed Komas WEF assessed area.

Most of the features noted above are in line with the findings of the Phase 1 and Phase 2 Wind and Solar SEA Reports.

Figure B.75 indicates the location of the civil aviation features noted above, which informed this Site Sensitivity Verification.

The proposed project site was determined and verified to be of low sensitivity (as it relates to civil aviation). This confirms to the findings of the Screening Tool which indicates the area to be of low sensitivity in terms of civil aviation (Figure B.76).

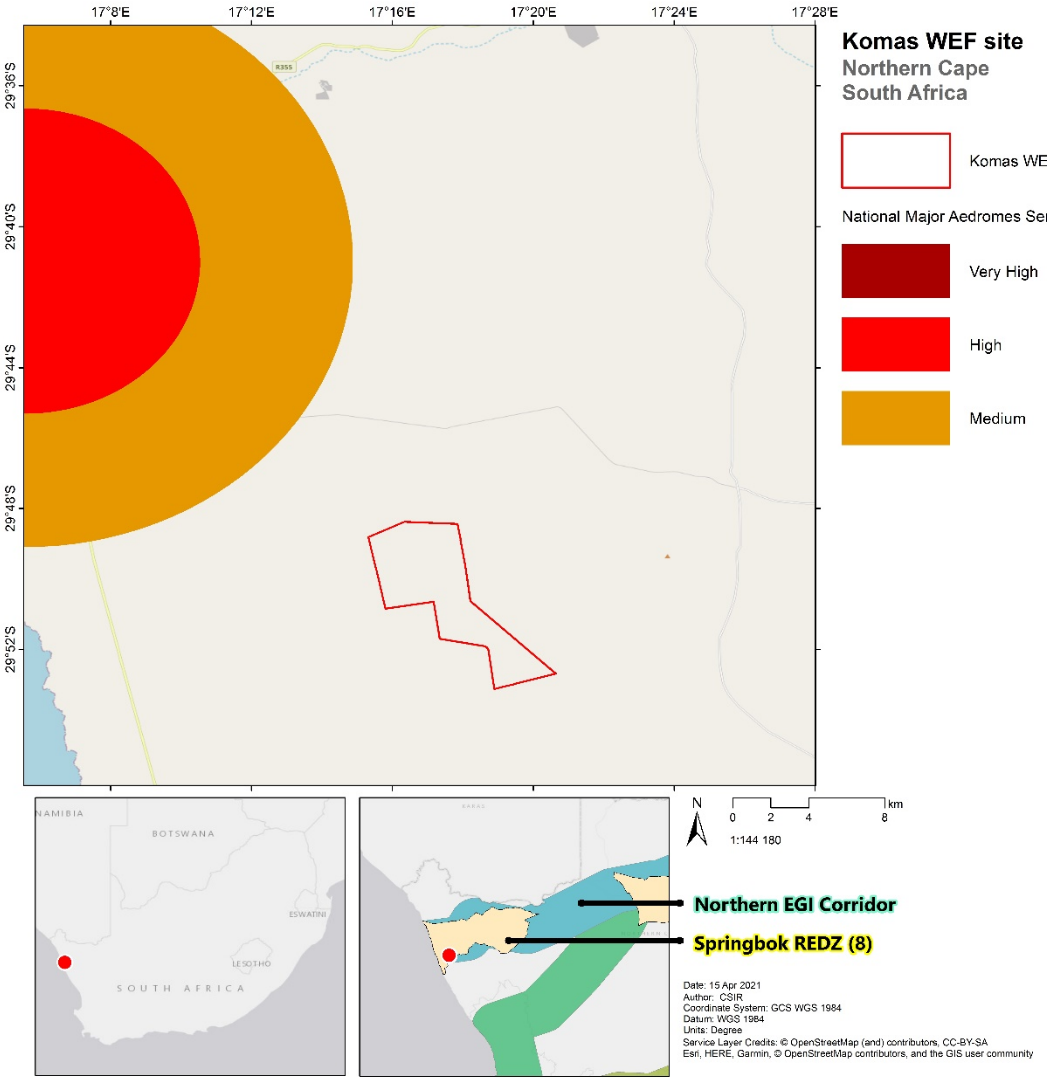


Figure B.75: Civil Aviation Features relative to the proposed project site based on the site visit undertaken by the EAP on 29 September 2020 and existing databases.

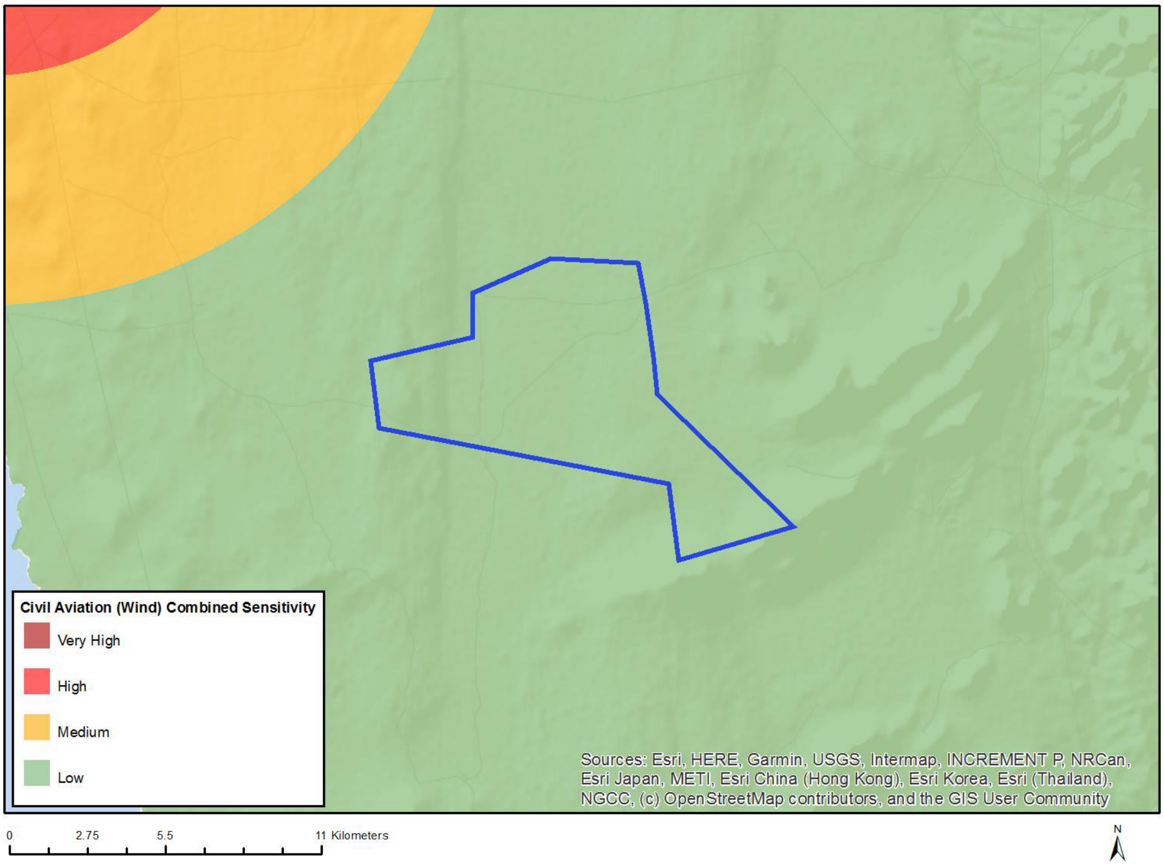


Figure B.76: Screening Tool Map showing the Komas WEF Assessed Area in terms of Civil Aviation Sensitivity.

Defence

The site visit undertaken by the EAP on 29 September 2020 confirmed that the proposed project site is dominated by natural vegetation and that there are no areas of cultivation present on site. There are a few farmsteads on site. No defence installations were found within the proposed project assessed area and footprint for the proposed Komas WEF. According to the VIA, much of the area is characterised by natural vegetation which is dominated by Karoo and Fynbos shrubland.

The ATNS data does not reflect any defence installations within the proposed project area or within a 30 km radius. The Screening Tool also does not show any defence installations in the proposed project area, and denotes the area as of low sensitivity (Figure B.77). This is in line with the findings of the Phase 1 and Phase 2 Wind and Solar SEA Reports.

Refer to Appendix B of the Defence Site Sensitivity Verification in Appendix C.13 for a letter of no objection from the Department of Defence (dated 14 October 2020), which confirms that the proposed Komas WEF project area is not a concern from a defence perspective.

The proposed Komas WEF project site was determined and verified to be of low sensitivity (as it relates to defence installations).

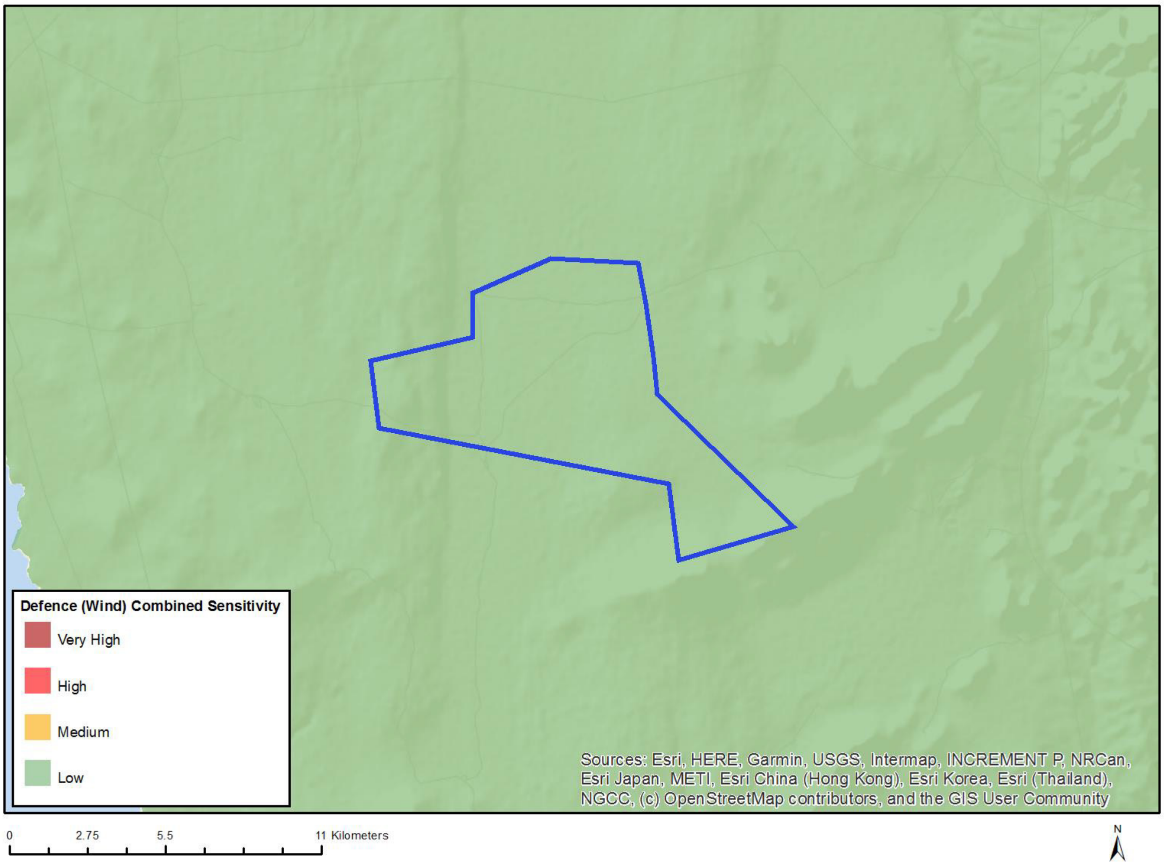


Figure B.77: Screening Tool Map showing the Komas WEF Assessed Area in terms of Defence Sensitivity.

SECTION C: PUBLIC PARTICIPATION

C.1 Introduction to the Public Participation Process

This section provides an overview of the tasks undertaken during the BA, with a particular emphasis on providing a clear record of the Public Participation Process (PPP) that is being followed. An integrated PPP was initially proposed and undertaken for the four separate BA processes (i.e. for the proposed Komas and Gromis WEFs and the associated electrical infrastructure projects to support the proposed Komas and Gromis WEFs). Therefore, integrated site notices were placed and integrated pre-application meetings were also held with the DEFF, SANParks and Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR) formerly known as the Department of Environment and Nature Conservation (DENC) where the proposed projects were discussed jointly. However, due to delays on some of the projects, it is recommended that separate BA processes be undertaken for the four proposed projects as discussed above. Where possible and feasible, joint meetings will still be held with Stakeholders, Organs of State and Interested and Affected Parties (I&APs), as relevant.

The integrated PPP for the proposed projects was initially recommended due to the close proximity of the sites (i.e. the proposed projects will take place within the same geographical area) and that the proposed projects entail the same type of activity (i.e. generation of energy using a renewable source (i.e. wind), and distribution of electricity via power lines).

The PPP for this BA process is driven by a stakeholder engagement process that includes inputs from authorities, I&APs, technical specialists and the project proponent. Guideline 4 on "Public Participation in support of the EIA Regulations" published by the former Department of Environmental Affairs and Tourism (DEAT) in May 2006, states that public participation is one of the most important aspects of the EA Process. This stems from the requirement that people have a right to be informed about potential decisions that may affect them and that they must be afforded an opportunity to influence those decisions. Effective public participation also improves the ability of the Competent Authority (CA), i.e. DEFF, to make informed decisions and results in improved decision-making as the view of all parties are considered.

An effective PPP could therefore result in stakeholders working together to produce better decisions than if they had worked independently. The DEAT guideline states the following in terms of PPP:

- "*Provides an opportunity for I&APs, EAPs and the CA to obtain clear, accurate and understandable information about the environmental impacts of the proposed activity or implications of a decision;*
  - *Provides I&APs with an opportunity to voice their support, concern and question regarding the project, application or decision;*
  - *Enables an applicant to incorporate the needs, preferences and values of affected parties into its application;*
  - *Provides opportunities for clearing up misunderstanding about technical issues, resolving disputes and reconciling conflicting interests;*
  - *Is an important aspect of securing transparency and accountability in decision-making; and*
  - *Contributes toward maintaining a health, vibrant democracy*."

To the above, one can add the following universally recognised principles for public participation:

- Inclusive consultation that enables all sectors of society to participate in the consultation and assessment Process;
- Provision of accurate and easily accessible information in a language that is clear and sufficiently non-technical for I&APs to understand, and that is sufficient to enable meaningful participation;
- Active empowerment of grassroots people to understand concepts and information with a view to active and meaningful participation;
- Use of a variety of methods for information dissemination in order to improve accessibility, for example, by way of discussion documents, meetings, workshops, focus group discussions, and the printed and broadcast media;
- Affording I&APs sufficient time to study material, to exchange information, and to make contributions at various stages during the assessment process;
- Provision of opportunities for I&APs to provide their inputs via a range of methods, for example, via written submissions or direct contact with members of the BA team; and
- Public participation is a process and vehicle to provide sufficient and accessible information to I&APs in an objective manner to assist I&APs to identify issues of concern, to identify alternatives, to suggest opportunities to reduce potentially negative or enhance potentially positive impacts, and to verify that issues and/or inputs have been captured and addressed during the assessment process.

At the outset it is important to highlight two key aspects of public participation:

- There are practical and financial limitations to the involvement of all individuals within a PPP. Hence, public participation aims to generate issues that are representative of societal sectors, not each individual. Hence, the PPP will be designed to be inclusive of a broad range of sectors relevant to the proposed project.
- The PPP will aim to raise a diversity of perspectives and will not be designed to force consensus amongst I&APs. Indeed, diversity of opinion rather than consensus building is likely to enrich ultimate decision-making. Therefore, where possible, the PPP will aim to obtain an indication of trade-offs that all stakeholders (i.e. I&APs, technical specialists, the authorities and the development proponent) are willing to accept with regard to the ecological sustainability, social equity and economic growth associated with the project.

The DEA (2017), Public Participation Guideline in terms of the NEMA EIA Regulations, 2014, as amended, was also considered during this BA process.

The key steps in the PPP for the BA is described below. This approach is structured in line with the requirements of Chapter 6 (PPP) of the NEMA EIA Regulations, 2014, as amended (i.e. GN R326), as well as the approved Public Participation Plan, as described below. Various mechanisms will be undertaken to provide notice to all potential and registered I&APs of the proposed project, as described below.

The BA Report is currently being released to I&APs, Stakeholders and Organs of State (including the National DEFF) for a 30-day commenting period. The Application for EA will be submitted to the National at the same time as the Draft BA Report.

C.2 Requirement for a Public Participation Plan

On 5 June 2020, the Minister of Forestry, Fisheries and the Environment issued Directions in terms of regulation 4 (10) of the Regulations issued by the Minister of Cooperative Governance and Traditional

Affairs in terms of section 27(2) of the Disaster Management Act, 2002 (Act 57 of 2002). These Directions were published in GG 43412, GN 650 on 5 June 2020, regarding measures to address, prevent and combat the spread of COVID-19 relating to national environmental management permits and licences.

Regulation 5.1 of GN 650 states that Authorities responsible for the processing of applications contemplated in the NEMA EIA Regulations, 2014, as amended, will be receiving such applications from 5 June 2020 and will receive and process applications and issue decisions in the manner as set out in Annexure 2 of GN 650. Regulation 5.2 of GN 650 states that Annexure 3 includes additional requirements in respect of the provision, supporting or obtaining of services contemplated in Regulation 5.1.

Annexure 3 of GN 650 states that an EAP must:

- Prepare a written Public Participation Plan, containing proposals on how the identification of and consultation with all potential I&APs will be ensured in accordance with Regulation 41(2)(a) to (d) of the NEMA EIA Regulations, 2014, as amended, or proposed alternative reasonable methods as provided for in regulation 41(2)(e), for purposes of an application and submit such plan to the competent authority; and
- Request a meeting or pre-application discussion with the competent authority to determine the reasonable measures to be followed to identify potential I&APs and register IA&Ps for purposes of conducting public participation on the application requiring adherence to Chapter 6 of the NEMA EIA Regulations, 2014, as amended, as set out in the Public Participation Plan and obtain agreement from the competent authority on the Public Participation Plan.

GN 650 also states that for new applications, the Public Participation Plan agreed with the competent authority must be annexed to the application form.

The Public Participation Plan required in terms of GN 650 was submitted to the DEFF via email on 1 December 2020 and then approved by the DEFF on 3 December 2020. Refer to Appendix D.1 of this BA Report for a copy of the Public Participation Plan, Appendix D.2 for proof of submission of Public Participation Plan to the DEFF, and Appendix D.3 for a copy of DEFF's Approval of the Public Participation Plan. The PPP is being undertaken in compliance with the Public Participation Plan.

C.3 Pre-Application Meetings and Consultation with the DEFF

Pre-application meetings with DEFF: Integrated Environmental Authorisations

1. First Pre-application meeting held on 18 August 2020

A Pre-Application Meeting took place with the Competent Authority, the DEFF, on 18 August 2020 (Reference Number: 2020-08-0001), in order to discuss and agree on various aspects with the DEFF prior to the application for EA being submitted and prior to the release of the Draft BA Report for comment. The following points were discussed with the DEFF:

- An overview of the project description of the proposed Komas WEF and associated infrastructure;
- Discussion and confirmation on the specialist studies to be undertaken as part of the BA process;
- Discussion and confirmation of the proposed approach and period of the pre-construction bat monitoring at the Komas WEF site.

- Discussion on the findings and outcomes of the Terrestrial Biodiversity offset studies which were compiled by Mr Simon Todd of 3Foxes Biodiversity Solutions for the proposed Komas WEF, and to confirm the way forward regarding this aspect.
- Discussion and confirmation of the proposed Public Participation Plan which will be submitted to DEFF for approval in light of the Directions issued by DEFF on 5 June 2020 in GN No. 650 (regarding measures to prevent the spread of COVID-19 relating to National Environmental Management permits and licences).
- Discussion and confirmation of the proposed schedule for the BA process.
- Discussion on the way forward.

2. Second Pre-application meeting held on 7 October 2020

A second pre-application meeting was also held with the DEFF on 7 October 2020. The following points were discussed with the DEFF at this second pre-application meeting:

- Further discussion and update on the proposed Biodiversity mitigation strategy and the implementation thereof with the landowners. Mr Simon Todd of 3Foxes Biodiversity Solution's updates to the Biodiversity Offset Analysis Report to address the comments raised at the first pre-application meeting.

  Mr Todd presented the following:
  - Proposed mitigation strategies to be implemented for the proposed Komas (and Gromis which is subject to a separate application process) WEFs and the proposed enforcement thereof; and
  - Confirmation on the way forward regarding the proposed mitigation strategies for the proposed Komas (and Gromis) WEFs.

- Discussion and confirmation regarding any Wake Effect requirements for the Komas (and Gromis) WEF BAs.
- Discussion and confirmation of the scope of the Avifaunal Assessments to be undertaken for the proposed Komas (and Gromis) WEF BAs and the sign-off thereof by a SACNASP registered Avifaunal specialist.
- Provide feedback from SABAA in relation to the lost data on the 110 m mast at the proposed Komas WEF site.
- Discussion and confirmation of the proposed PPP to be undertaken.
- Discussion and confirmation of the proposed schedules of the BA processes.
- Discussion on the way forward.

Refer to Appendix H.1 of this BA Report for a copy of the Pre-Application Meeting Request Forms submitted to the DEFF (for the first and second meeting held on 18 August and 7 October 2020 respectively); Appendix H.2 for copies of the presentations delivered at the said Pre-Application Meetings; Appendix H.3 for copies of the Pre-Application Meeting Notes; as well as Appendix H.4 with copies of correspondence from the DEFF with approval of the Pre-Application Meeting Notes.

The Pre-Application Meeting Notes for the first pre-application meeting were submitted to the DEFF via email on 2 September 2020 and approved by the DEFF on 16 September 2020. The meeting notes for the second pre-application meeting were submitted to the DEFF via email on 27 October 2020 and approved by the DEFF on 5 November 2020.

The Public Participation Plan was therefore discussed with the DEFF during the Pre-Application Meetings held on 18 August and 7 October 2020 in order to facilitate the decision-making on the plan itself.

Pre-application meeting with DEFF: Biodiversity Conservation

In addition to the two pre-application meetings discussed above, a separate pre-application meeting was also held with the Biodiversity Conservation section of DEFF on 15 December 2020. The purpose of the meeting was to introduce the proposed Komas WEF project and to provide feedback on biodiversity conservation issues and requirements (Appendix H.5 of this BA Report).

Pre-application meetings with SANParks and DAEARDLR

1. First Pre-application meeting held on 2 November 2020

A meeting was held with SANParks and DAEARDLR on 2 November 2020 (Appendix I). The purpose of the meeting was to introduce the proposed Komas WEF project and associated EGI and to provide feedback on *inter alia*, the impact assessment undertaken and to discuss components of appropriate mitigation biodiversity conservation issues and requirements for the proposed Komas WEF project. The proposed Gromis WEF and associated EGI, which will be assessed in separate BA processes, were also discussed at this meeting (but will not be discussed further here).

The agenda and meeting notes are included in Appendix I of this BA Report. Subsequent to the meeting Mr Conrad Geldenhuys of DAEARDLR provided comments on the proposed Komas WEF project. The comments, dated 11 December 2020, are included in Appendix I of this report.

The comments provided include the following:

- Lack of assessment of alternative sites;
- Mitigation hierarchy options such as alternative sites must also apply to REDZ developments;
- Landscape level impacts of developments in the broader region must be considered, in the cumulative sense;
- Mitigation options such as more conservative land management practices (grazing pressure reduction) on one property is valuable, but cannot adequately compensate for losses in broad-scale connectivity and ecosystem function or conservation area expansion;
- If the grazing system option is pursued further as mitigation, it is proposed that livestock grazing rather be terminated as a whole rather than enforcing a grazing pressure quantum. It would be complicated to enforce due to continuously changing goalposts as the veld changes between the seasons; and
- The location of the proposed Komas WEF is within the NC-PAES and the SANParks Namaqua National Park Potential Expansion envelope and Priority Natural Area Buffer Zone (as captured in the Namaqua National Park Management Plan). Assuming that Wind Energy developments are incompatible with conservation land this cannot be mitigated.

2. Second Pre-application meeting held on 27 January 2021

A second pre-application meeting was also held with SANParks, DAEARDLR and DEFF (Biodiversity Conservation) on 27 January 2021. The agenda and meeting notes are included in Appendix I of this BA Report.

The purpose of the meeting was to discuss comments received from SANParks (for the proposed Gromis WEF project), DAEARDLR and DEFF, and analyse acceptability of the proposed mitigation measures for the proposed Komas WEF (and Gromis WEF).

It was noted at the meeting that the Draft BA report will be submitted to SANParks, DAEARDLR and DEFF (Biodiversity Conservation) for further comment. These comments and other comments received following the release of the Draft BA report for comment will be included and responded to in the Issues and Responses Report of the Final BA Report. The Final BA Report will be submitted to the DEFF, in accordance with Regulation 19 (1) of the NEMA EIA Regulations, 2014, as amended, for decision-making in terms of Regulation 20 (however with a reduced 57-day timeframe as the proposed project falls within the Springbok REDZ (REDZ 8), as explained above). Following this meeting, comments were received from SANParks dated 15 February 2021. These comments are included in Appendix D.8 and are addressed in the Comments and Respoonses Report (C&RR) in Appendix D.9 of the BA Report. Please note the comments received from SANParks is in response to CSIR and ENERTRAG correspondence on the proposed development of the Komas (and Gromis) Wind Energy Facility and the responses thereto provided by the project team. It gives a number of overarching points which apply to both the Komas and Gromis projects (especially the Gromis WEF project which will be subject to a separate BA process). This letter must therefore be read in this context, i.e. that the comments mostly refer to the proposed Gromis WEF. The comments in this letter pertaining to the Komas WEF have been addressed in the C&RR as stated above.

C.4 Landowner Written Consent.

Regulation 39 (1) of the NEMA EIA Regulations, 2014, as amended, states that "*if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land*".

Regulation 39 (2) of the NEMA EIA Regulations, 2014, as amended, further states that "*sub-regulation (1) does not apply in respect of: (a) linear activities; (b) activities constituting, or activities directly related to prospecting or exploration of a mineral and petroleum resource or extraction and primary processing of a mineral or petroleum resource; and (c) strategic integrated project as contemplated in the Infrastructure Development Act, 2014*".

The proposed Komas WEF constitutes a non-linear activity, and landowner consent is therefore required for the following land portions:

- Portion 1 of the Farm Zonnekwa No. 326; Surveyor General 21 Digit Code: C05300000000032600001;
- Portion 2 of the Farm Zonnekwa No. 328; Surveyor General 21 Digit Code: C05300000000032800002;
- Portion 3 of the Farm Zonnekwa No. 328: Surveyor General 21 Digit Code: C05300000000032800003;
- Portion 4 of the Farm Zonnekwa No. 328: Surveyor General 21 Digit Code: C05300000000032800004; and
- Portion 4 of the Farm Kap Vley No. 315: Surveyor General 21 Digit Code: C05300000000031500004.

Written consent has been obtained from the landowners of these farm portions on which the proposed Komas WEF (i.e. non-linear infrastructure) is proposed to be located. The written consent has been included as an appendix to the Application for EA, which has been submitted to the DEFF, together with this Draft BA Report for comment.

The access road leading to the proposed Komas WEF, will be upgraded and potentially widened, however landowner consent is not legally required in terms of Regulation 39 of the NEMA EIA Regulations, 2014, as amended, as the access road constitutes a linear activity.

C.5 Site Notice Boards

One specific mechanism of informing I&APs of the proposed project includes the placement of site notice boards. Regulation 41 (2) (a) of the NEMA EIA Regulations, 2014, as amended, requires that a notice board providing information on the proposed project and BA process is fixed at a place that is conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of the site where the application will be undertaken or any alternative site.

Notice boards were placed at the entrances to the proposed project area, as well as at strategic locations, namely the Kleinsee Public Library, and well-known retail facilities in Kleinsee and in Komaggas. The site notice boards were placed on 29 September 2020. Table C.1 provides a breakdown of the locations at which the site notice boards were placed.

Table C.1. Site Notice Board Placement for the Proposed Komas WEF Project

Number	Locality / Description	Co-ordinates
1	Site Notice board placed at the entrance to the Komas site via the surfaced road between the R355 and Komaggas.	29°46'58.82"S and 17°23'50.91"E
2	Site Notice board placed at the entrance gate via the road that links Kleinsee to Komaggas.	29°49'26.85"S and 17°7'31.47"E
3	Site Notice board placed at Kleinsee Public Library.	29°40'48.66"S and 17° 4'12.97"E
4	Site Notice board placed at the entrance of the Hazra General Dealer in Kleinsee.	29°40'49.18"S and 17° 4'11.51"E
5	Site Notice board placed at the entrance of the Helpmekaar Kafee (Café) in Komaggas	29°47'44.40"S and 17°29'9.50"E

.

Site notice boards were placed in English and Afrikaans; and include the following information, in compliance with Regulation 41 (3) of the NEMA EIA Regulations, 2014, as amended:

- The details of the proposed project that are subjected to public participation;
- Explains that a BA procedure is applicable to the proposed project;
- The nature and location of the proposed project;
- Details on where further information on the BA project can be obtained; and
- The manner in which and the person to whom representations in respect of the BA Project can be made.

Refer to Appendix D.4 of this BA Report for copies and proof of placement of the site notice boards.

C.6 Newspaper Advertisement

Regulation 41 (2) (c) of the NEMA EIA Regulations, 2014, as amended, requires the placement of a newspaper advertisement in one local newspaper or any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of the NEMA EIA Regulations, 2014, as amended.

In line with this, in order to notify and inform the public of the proposed project, to invite I&APs to register on the project database, as well as to inform I&APs of the release of the BA Report for comment, the BA process has been advertised in a local newspaper at the commencement of the 30-day comment period for the BA Report. Specifically, the newspaper advertisement was placed in the "Plattelander" local newspaper in English and Afrikaans. The content of the newspaper advertisement complies with Regulation 41 (3) of the NEMA EIA Regulations, 2014, as amended. The newspaper advertisement also includes the details of the project website where information available on the proposed project can be downloaded from. Refer to Appendix D.5 of this BA Report for copies the content of the newspaper advertisements. Proof of placement of the newspaper advertisements will be included in the Final BA Report.

At this stage, there are no official Gazettes published specifically for the purpose of providing public notice of applications or other submissions made in terms of the NEMA EIA Regulations, 2014, as amended.

C.7 Determination of Appropriate Measures

Refer to the section below which provides a detailed outline of the measures taken to include all potential I&APs, stakeholders and Organs of State in the BA process.

In terms of Regulation 41 (2) (e) of GN R326, at this stage of the assessment process no persons have been identified as desiring but unable to participate in the process. Therefore, no alternative methods have been agreed to by the competent authority.. If during the BA Process, persons are identified as desiring but unable to participate due to illiteracy, disability or any other disadvantage, then the EAP can arrange focus-group meetings with the relevant persons via teleconference. Holding a teleconference can allow the EAP to verbally explain the project to the relevant person. The teleconference will be undertaken at no cost to the relevant person.

In line with Regulation 41 (2) (b) of GN R326 and prior to the commencement of the BA process (and advertising the EA Process in the local print media), an initial database of I&APs (including key stakeholders and Organs of State) was developed for the BA process. This was undertaken based on research. Appendix D.6 of this BA Report includes a copy of the I&AP Database.

In line with Regulation 41 (2) (b) of GN R326, the database includes the details of the following:

- Landowners of the affected farm portions;
- Occupiers of the affected farm portions;
- Landowners of the neighbouring adjacent farm portions;
- The municipal councillor of the ward in which the proposed project will be undertaken (Ward 8 of the NKLM) and relevant rate payer organisations (Nama Khoi Rate Payers Association);
- The municipality which has jurisdiction in the area (i.e. NKLM and the NDM);
- Relevant Organs of State that have jurisdiction in respect of any aspect of the activity; and

- Any other party as required by the competent authority.

The I&AP database contains, as a minimum, the competent authority (DEFF); relevant state departments (e.g. the DAEARDLR, DHSWS, DMRE, etc.); relevant organs of state (e.g. NKLM, NDM, Eskom SOC Ltd etc.); as well as potential and registered I&APs (e.g. landowners, neighbours, etc.).

The above stakeholders, Organs of State and I&APs have accordingly received written notification of the commencement of the BA process and release of the BA Report for comment.

While I&APs have been encouraged to register their interest in the project from the start of the process, following the public announcements, the identification and registration of I&APs is ongoing for the duration of the study. Stakeholders from a variety of sectors, geographical locations and/or interest groups are expected to show an interest in the proposed project, for example:

- Provincial and Local Government Departments;
- Local interest groups, for example, Councillors and Rate Payers associations;
- Surrounding landowners;
- Farmer Organisations;
- Environmental Groups and NGOs; and
- Grassroots communities and structures.

As per Regulation 42 of the GN 326, in terms of the electronic database, I&AP details will be captured and automatically updated as and when information is distributed to or received from I&APs. This ongoing record of communication is an important component of the PPP. It must be noted that while not required by the regulations, those I&APs proactively identified at the outset of the BA process will remain on the project database throughout the process and will be kept informed of all opportunities to comment and will only be removed from the database by request.

C.8 Approach to the PPP

In terms of Regulation 41 (6) of GN R326 the section below outlines the PPP for this assessment in order to provide potential I&APs, Stakeholders and Organs of State access to information on the project and the opportunity to comment at the various stages of the assessment process.

C.8.1 BA Report Phase - Review of the Draft BA Report

As noted above, the BA Report for the proposed project is currently being released to I&APs, Stakeholders and Organs of State for a 30-day commenting period. The section below summarises the PPP for the review of the BA Report.

- **Database Development and Maintenance**: In line with Regulation 41 (2) (b) of GN R326, an initial database of potential I&APs was developed for the BA process, and will be updated throughout the BA process.
- **Site Notice Board**: As noted in Section C (5) above, site notice boards were placed for the proposed project. A copy of the notice boards is included in Appendix D.4 of this BA Report.
- **Advertisement to Register Interest:** An advertisement was placed in the “Plattelander” in English and Afrikaans; at the commencement of the 30-day review period for the BA Report. A copy of the content of the advertisements is included in Appendix D.5 of this BA Report.

- **Letter 1 to I&APs (Commencement of the BA process)**: Written notification of the availability of the BA Report (i.e. Letter 1) was sent to all I&APs and Organs of State included on the project database via email, where email addresses are available. This letter was sent at the commencement of the 30-day review period on the BA Report, and included information on the project and notification of the release and availability of the report. Letter 1 was written in English and Afrikaans. Proof of email, as well as copies of the Letter 1 and emails sent will be included in the Final BA Report that will be submitted to the DEFF for decision-making.
- **Text Messaging**: SMS texts were also sent to all I&APs on the database, where cell phone numbers are available, to inform them of the proposed project and how to access the Draft BA Report.
- Where possible, communication will be made with the ward councillor to request that they send notifications of the project and report availability and executive summaries via their local networks (such as WhatsApp groups, Neighbourhood Watch groups, other social media mechanisms etc.).
- **Executive Summary of the BA Report**: An Executive Summary of the BA Report was emailed to I&APs on the database, and uploaded to the project website (https://www.csir.co.za/environmental-impact-assessment).
- **30-day Comment Period**: As noted above, potential I&APs, including authorities and Organs of State, were notified via Letter 1, of the 30-day comment and registration period within which to submit comments on the BA Report and/or to register on the I&AP database.
- **Availability of Information:** The Draft BA Report is currently being made available for a 30-day commenting period, and is being distributed to ensure access to information on the project and to communicate the outcome of specialist studies. The Draft BA Report has been uploaded to the project website (https://www.csir.co.za/environmental-impact-assessment) for I&APs to access it. As a supplementary mechanism, the Draft BA Report was also uploaded to other alternative web-platforms such as Dropbox or Google Drive (the platform to be used will be confirmed in Letter 1 to I&APs). If an I&AP cannot access the report via the project website, via the alternative web-platforms such as Dropbox or Google Drive, and if additional information is required (other than what is provided in the Executive Summary), then the I&AP can contact the EAP, who will then make an electronic copy available (where feasibly possible).
- **Comments Received**: A key component of the BA process is documenting and responding to the comments received from I&APs and the authorities. Copies of all comments received during the review of the Draft BA Report will be included as an appendix to the Final BA Report and in the Comments and Response Report.

C.8.2 Compilation of Final BA Reports for Submission to the DEFF

Following the 30-day commenting period of the BA Report and incorporation of the comments received into the report, the Final BA Report will be submitted to the DEFF for decision-making in line with Regulation 19 (1) (a) of the NEMA EIA Regulations, 2014, as amended. The report will be submitted electronically to the DEFF via the Novell S-Filer system, as recommended by the DEFF since June 2020.

In line with best practice, I&APs on the project database will be notified via Letter 2 via email (where email addresses are available) of the submission of the Final BA Report to the DEFF for decision-making. To ensure ongoing access to information, a copy of the Final BA Report that will be submitted for decision-making and the Comments and Response Report (detailing comments received during the BA Phase and responses thereto) will be placed on the project website (i.e. https://www.csir.co.za/environmental-impact-assessment). As a supplementary mechanism, the Final BA Report will also be uploaded to other alternative web-platforms such as Dropbox or Google Drive.

The Final BA Report that will be submitted for decision-making to the DEFF will include proof of the PPP that was undertaken to inform Organs of State, Stakeholders and I&APs of the availability of the Draft BA Report for the 30-day review (as explained above).

The DEFF will have 57 days from receipt of the Final BA Report (as opposed to 107 days as the proposed Komas WEF falls within the Springbok REDZ) to either grant or refuse EA (in line with Regulation 20 (1) of the NEMA EIA Regulations, 2014, as amended, and GN 114 of February 2018).

C.8.3 Environmental Decision-Making and Appeal Period

Subsequent to the decision-making phase, if EA is granted by the DEFF for the proposed project, all registered I&APs, Organs of State and stakeholders on the project database will receive notification of the issuing of the EA and the associated appeal period. The NEMA EIA Regulations, 2014, as amended, (i.e. Regulation 4 (1)) states that after the CA has a reached a decision, it must inform the Applicant of the decision, in writing, within 5 days of such decision. Regulation 4 (2) of the NEMA EIA Regulations, 2014, as amended, stipulates that I&APs need to be informed of the EA and associated appeal period within 14 days of the date of the decision. All registered I&APs will be informed of the outcome of the EA and the appeal procedure, as well as the respective timelines.

The distribution of the EA (should such authorisation be granted by the DEFF), as well as the notification of the appeal period, will include a letter (i.e. Letter 3 (Release of EA and Notification of Opportunity to Appeal)) to be sent via email to all registered I&APs, Stakeholders and Organs of State on the database, where email addresses are available. The letter will include information on the appeal period, as well as details regarding where to obtain a copy of the EA. A copy of the EA will be emailed with Letter 3. The EA will also be uploaded to the project website (i.e. https://www.csir.co.za/environmental-impact-assessment). SMS texts will also be sent to all I&APs on the database, where cell phone numbers are available, to inform them of the EA (should it be granted).

SECTION D: IMPACT ASSESSMENT

This section includes a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the construction phase, operational phase and decommissioning phase of the proposed Komas WEF, in line with the requirements of the NEMA EIA Regulations, 2014, as amended.

D.1 Approach to the BA: Methodology of the Impact Assessment

The identification of potential impacts includes impacts that may occur during the construction, operational and decommissioning phases of the proposed development. The assessment of impacts includes direct, indirect as well as cumulative impacts. In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed project is well understood so that the impacts associated with the proposed project can be assessed. The process of identification and assessment of impacts includes:

- Determining the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Determining future changes to the environment that will occur if the activity does not proceed;
- Develop an understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts which are likely to occur if the activity is undertaken.

The impact assessment methodology has been aligned with the requirements for BA Reports as stipulated in Appendix 1 (3) (1) (j) of the NEMA EIA Regulations, 2014, as amended, which state the following:

"A BA Report must contain the information that is necessary for the Competent Authority to consider and come to a decision on the application, and must include an assessment of each identified potentially significant impact and risk, including –

(i) cumulative impacts;
(ii) the nature, significance and consequences of the impact and risk;
(iii) the extent and duration of the impact and risk;
(iv) the probability of the impact and risk occurring;
(v) the degree to which the impact and risk can be reversed;
(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and
(vii) the degree to which the impact and risk can be mitigated".

As per the then DEAT Guideline 5: Assessment of Alternatives and Impacts, the following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks have been rated in terms of the direct, indirect and cumulative:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

- **Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

The cumulative impacts have been assessed by identifying other REFs (i.e. nine proposed WEFs and five proposed solar PV facilities (including the hybrid one)) within 50 km of the proposed Komas WEF (see Table D.1 and Figure D.1). These facilities include projects which have received EA and projects for which applications have been submitted to the CA and where the EIAs or BAs are currently being conducted at the time when this BA process commenced.

The information was collected from the National DEFF REEA database, 2020 Quarter 4; as well as from the South African Heritage Resources Information System (SAHRIS). The proposed WEFs which are in the immediate vicinity of the proposed Komas WEF are the following:

- Kap Vley WEF (EA received on 25 October 2019);
- Namas WEF (EA received on 18 February 2019);
- Zonnequa WEF (EA received on 25 February 2019); and the
- Gromis WEF (BA specialist studies currently being undertaken).

Table D.1 provides more details and Figure D.1 provides an illustration of the proposed projects considered in the cumulative impact assessment.

Each specialist study in Appendix C of the BA Report contains feedback on the assessment of potential cumulative impacts. The specialists assessed such impacts based on their expertise and knowledge of similar projects and management actions.

A summary of the process flow followed in the cumulative impact assessment is provided below:

- A list of authorised Renewable Energy within a 50 km radius was identified based on research, SAHRIS and REEA.

- This resulted in 11 Renewable Energy Projects. Of these, nine are WEFs and two are solar PV projects.

- In addition to the above, the current project, i.e. the proposed Komas WEF, was also considered as part of the cumulative assessment.

- Considering all of the above, the cumulative impacts were then clearly defined, and where possible the size of the identified impact was quantified and indicated, i.e. hectares of cumulatively transformed land. With regards to the levels of transformation, the current state of the affected area was also taken into consideration. In most cases the actual development footprint of the nearby Renewable Energy developments could not be easily quantified or accessed spatially. For example, the REEA database contains land parcels, and not the footprints. Hence the land parcels were considered, which took into account the worst case. This allowed the determination of the following in the relevant specialist assessments:

    - The total affected land parcel area taken up by authorised renewable energy projects within the 50 km radius.

    - The total affected land parcel area of the proposed Komas WEF site.

- The total area within the 50 km radius around the proposed project.
- The total combined size of the land parcels affected by renewable energy projects as a percentage of the available habitat in the 50 km radius.

- Therefore, the assessment of cumulative impacts was based on the specialist and EAP's knowledge of similar approved Renewable Energy projects in the 50 km radius. In some cases, the specialists involved in this BA Process were also involved in some of the other Renewable Energy Projects within the 50 km radius, thus being well aware of the type of impacts and mitigation measures recommended. The specialists assessed such impacts based on their expertise and knowledge of similar projects and management actions. However, it is important to note that the assessment of cumulative impacts is not necessarily solely focused on an assessment of impacts linked to previously authorised similar developments and consideration of their mitigation measures, but also about the sensitivities of the land on which the projects take place. For example, from a heritage point of view, it is also about other heritage resources, the type of locations they could occur in, and any other developments that may have impacted on heritage resources.

Table D.1. Proposed renewable energy facilities within 50 km of the proposed Komas WEF which have been considered for the cumulative impact assessment

DEA Reference Number	PROJECT TITLE	APPLICANT	EAP	TECHNOLOGY	MEGAWATT	STATUS
12/12/20/2331/1 12/12/20/2331/1/AM1 12/12/20/2331/2 12/12/20/2331/3	Project Blue Wind Energy Facility Near Kleinsee within the Namakwa Magisterial District, Northern Cape Province. (Phase 1-3)	Diamond Wind (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind and Solar PV	150 MW Wind 65 MW Solar PV	Approved
12/12/20/2212	Proposed 300 MW Kleinzee WEF in the Northern Cape Province.	Eskom Holdings SOC Limited	Savannah Environmental Consultants (Pty) Ltd	Wind	300 MW	Approved
14/12/16/3/3/2/1046	The proposed Kap Vley WEF and its associated infrastructure near Kleinzee, Nama Khoi Local Municipality, Northern Cape Province.	Kap Vley Wind Farm (Pty) Ltd	Council for Scientific and Industrial Research	Wind	300 MW	Approved
14/12/16/3/3/1/1971	Proposed Namas Wind Farm near Kleinsee, Namakwaland Magisterial District, Northern Cape.	Genesis Namas Wind (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW	Approved
14/12/16/3/3/1/1970	Proposed Zonnequa Wind Farm near Kleinsee, Namakwaland Magisterial District, Northern Cape.	Genesis Zonnequa Wind (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW	Approved
12/12/20/2154	Proposed construction of the 7.2 MW Koingnaas Wind Energy Facility Within The De Beers Mining Area on the Farm Koingnaas 745 near Koingnaas, Northern Cape Province.	Just PalmTree Power Pty Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind	7.2 MW	Approved

DEA Reference Number	PROJECT TITLE	APPLICANT	EAP	TECHNOLOGY	MEGAWATT	STATUS
12/12/20/1807	Proposed establishment of the Kannikwa Vlakte wind farm.	Kannikwa Vlakte Wind Development Company Pty Ltd	Galago Environmental cc	Wind	120 MW	Approved
12/12/20/1721 12/12/20/1721/AM1 12/12/20/1721/AM2 12/12/20/1721/AM3 12/12/20/1721/AM4 12/12/20/1721/AM5	The proposed Springbok Wind Energy facility near Springbok, Northern Cape Province.	Mulilo Springbok Wind Power (Pty) Ltd	Holland & Associates Environmental Consultants	Wind	55.5 MW	Approved
TBA	The proposed Gromis WEF and associated infrastructure near Kleinsee in the Northern Cape Province.	Genesis ENERTRAG Gromis Wind (Pty) Ltd	Council for Scientific and Industrial Research	Wind	200 MW	In process
14/12/16/3/3/1/416	Nigramoep Solar PV Solar Energy Facility on a site near Nababeep, Northern Cape.	South African Renewable Green Energy (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Solar PV	20 MW	In process

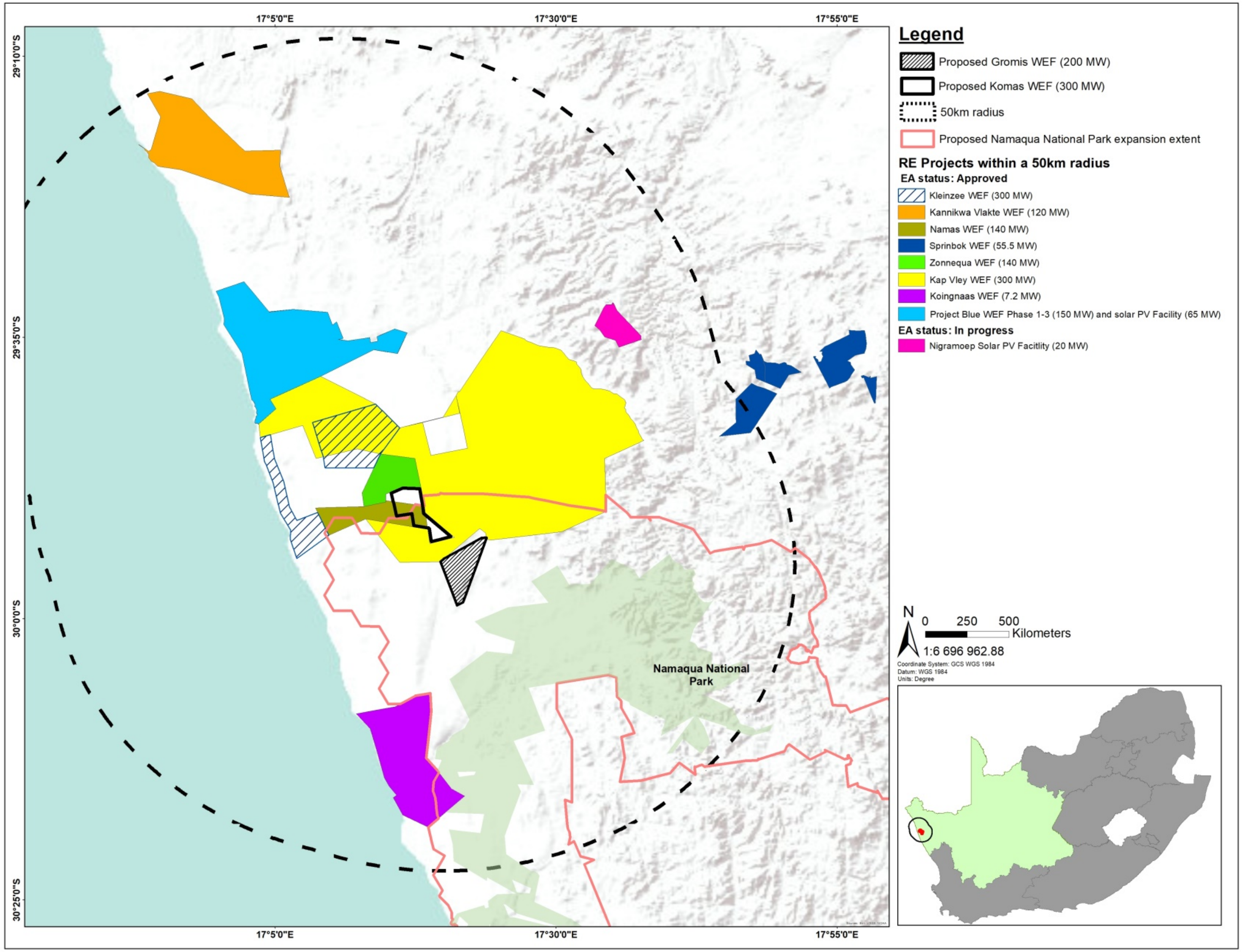


Figure D.1: Projects within the 50 km radius of the proposed Komas WEF considered for the Cumulative Impact Assessment

In addition to the above, the impact assessment methodology includes the following aspects:

Nature of impact/risk - The type of effect that a proposed activity will have on the environment.

Status - Whether the impact/risk on the overall environment will be:
- Positive - environment overall will benefit from the impact/risk;
- Negative - environment overall will be adversely affected by the impact/risk; or
- Neutral - environment overall not be affected.

Spatial extent – The size of the area that will be affected by the impact/risk:
- Site specific;
- Local (<10 km from site);
- Regional (<100 km of site);
- National; or
- International (e.g. Greenhouse Gas emissions or migrant birds).

Duration – The timeframe during which the impact/risk will be experienced:
- Very short term (instantaneous);
- Short term (less than 1 year);
- Medium term (1 to 10 years);
- Long term (the impact will cease after the operational life of the activity (i.e. the impact or risk will occur for the project duration)); or
- Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient (i.e. the impact will occur beyond the project decommissioning)).

Consequence – The anticipated consequence of the risk/impact:
- Extreme (extreme alteration of natural systems, patterns or Process, i.e. where environmental functions and Process are altered such that they permanently cease);
- Severe (severe alteration of natural systems, patterns or Process, i.e. where environmental functions and Process are altered such that they temporarily or permanently cease);
- Substantial (substantial alteration of natural systems, patterns or Process, i.e. where environmental functions and Process are altered such that they temporarily or permanently cease);
- Moderate (notable alteration of natural systems, patterns or Process, i.e. where the environment continues to function but in a modified manner); or
- Slight (negligible alteration of natural systems, patterns or Process, i.e. where no natural systems/environmental functions, patterns, or Process are affected).

Reversibility of the Impacts - the extent to which the impacts/risks are reversible assuming that the project has reached the end of its life cycle (decommissioning phase):
- High reversibility of impacts (impact is highly reversible at end of project life i.e. this is the most favourable assessment for the environment);
- Moderate reversibility of impacts;
- Low reversibility of impacts; or
- Impacts are non-reversible (impact is permanent, i.e. this is the least favourable assessment for the environment).

Irreplaceability of Receiving Environment/Resource Loss caused by impacts/risks – the degree to which the impact causes irreplaceable loss of resources assuming that the project has reached the end of its life cycle (decommissioning phase):

- High irreplaceability of resources (project will destroy unique resources that cannot be replaced, i.e. this is the least favourable assessment for the environment);
- Moderate irreplaceability of resources;
- Low irreplaceability of resources; or
- Resources are replaceable (the affected resource is easy to replace/rehabilitate, i.e. this is the most favourable assessment for the environment).

Using the criteria above, the impacts are further assessed in terms of the following:

Probability – The probability of the impact/risk occurring:
- Extremely unlikely (little to no chance of occurring);
- Very unlikely (<30% chance of occurring);
- Unlikely (30-50% chance of occurring)
- Likely (51 – 90% chance of occurring); or
- Very Likely (>90% chance of occurring regardless of prevention measures).

To determine the significance of the identified impact/risk, the consequence is multiplied by probability (qualitatively as shown in Figure D.2). This approach incorporates internationally recognised methods from the Intergovernmental Panel on Climate Change (IPCC) (2014) assessment of the effects of climate change and is based on an interpretation of existing information in relation to the proposed activity, to generate an integrated picture of the risks related to a specified activity in a given location, with and without mitigation. Risk is assessed for each significant stressor (e.g. physical disturbance), on each different type of receiving entity (e.g. the municipal capacity, a sensitive wetland), qualitatively (very low, low, moderate, high, and very high) against a predefined set of criteria (i.e. probability and consequence):

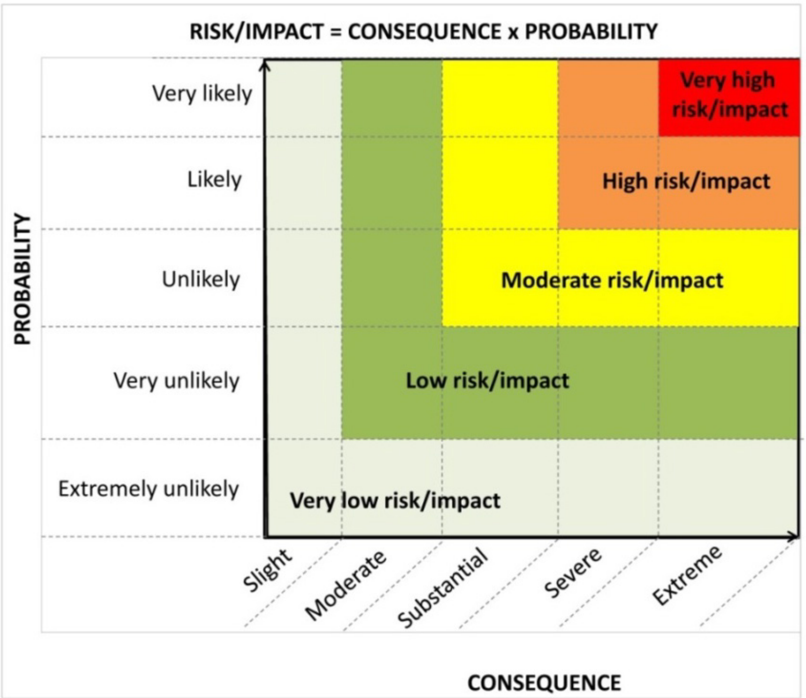


Figure D.2: Guide to assessing risk/impact significance as a result of consequence and probability

Significance – Will the impact cause a notable alteration of the environment?

- Very low (the risk/impact may result in very minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);
- Low (the risk/impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);
- Moderate (the risk/impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated);
- High (the risk/impact will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making); and
- Very high (the risk/impact will result in very major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making (i.e. the project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating)).

With the implementation of mitigation measures, the residual impacts/risks will be ranked as follows in terms of significance (based on Figure D.2):

- Very low = 5;
- Low = 4;
- Moderate = 3;
- High = 2; and
- Very high = 1.

Confidence – The degree of confidence in predictions based on available information and specialist knowledge:

- Low;
- Medium; or
- High.

Impacts have been collated into the EMPrs (Appendix G of the BA Report) and these include the following:

- Quantifiable standards for measuring and monitoring mitigatory measures and enhancements (as applicable). This includes a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness.
- Identifying negative impacts and prescribing mitigation measures to avoid or reduce negative impacts. Where no mitigatory measures are possible this is stated.
- Positive impacts and augmentation measures have been identified to potentially enhance positive impacts where possible.

Other aspects to be taken into consideration in the assessment of impact significance are:

- Impacts are evaluated for the construction and operational phases of the development. The assessment of impacts for the decommissioning phase is brief, as there is limited understanding at this stage of what this might entail. The relevant rehabilitation guidelines and legal requirements applicable at the time will need to be applied;
- Impacts have been evaluated with and without mitigation in order to determine the effectiveness of mitigation measures on reducing the significance of a particular impact;

- The impact evaluation has, where possible, taken into consideration the cumulative effects associated with this and other facility/project which are either developed or in the process of being developed in the local area; and
- The impact assessment attempts to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are used as a measure of the level of impact.

D.2 Assessment of Environmental Risks and Impacts

The issues and impacts presented in this section have been identified via the environmental *status quo* of the receiving environment (environmental, social and heritage features present on site - as discussed in Section B of this BA Report) and inputs provided in the specialist studies included in this BA report (Appendices C.1 – C.11). The impact assessments of the specialist studies undertaken to inform this BA have been summarised in this section. **It should be noted that unless otherwise stated (i.e. unless impacts are specified as positive), impacts identified and their associated significance are deemed to be negative.**

Refer to Appendix C.1 – C.11 of this report for the full specialist studies undertaken (including the Terms of Reference for each study). All proposed mitigation measures, as relevant, have been carried over into the EMPrs, included in Appendix G of this report.

D.2.1 Terrestrial Biodiversity

The Terrestrial Biodiversity Impact Assessment was undertaken by Simon Todd of 3Foxes Biodiversity Solutions to inform the outcome of this BA from a terrestrial biodiversity perspective. It was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended. The complete Terrestrial Biodiversity Impact Assessment is included in Appendix C.1 of this BA report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Terrestrial Biodiversity Assessment as extracted from Todd (2020) (Appendix C.1 of the BA Report).

Important note: *This assessment is conducted according to Appendix 6 of the NEMA EIA Regulations, 2014, as amended. As explained in Section A.11, the assessment was commissioned in September 2018. It was therefore commissioned a substantial period prior to the publishing of the Assessment Protocol for Terrestrial Biodiversity and Species in GN 320 on 20 March 2020. The Terrestrial Biodiversity assessment was also undertaken and commissioned prior to the Species Protocol published in GN 1150 dated 30 October 2020 came into effect (as discussed in Section A.11). Therefore, the Terrestrial Biodiversity Assessment was undertaken in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended, and not in accordance with the latest Protocols indicated above. Proof of the date of appointment of the Terrestrial Biodiversity specialist, Simon Todd of 3Foxes Biodiversity Solutions, is provided in Appendix F.2.*

It is important to note that apart from the Terrestrial Biodiversity Impact Assessment noted above, two additional Biodiversity Offset studies have also been prepared. The biodiversity studies that were undertaken to inform this BA process are indicated below:

- Terrestrial Biodiversity Impact Assessment Report to assess potential impacts (ST)
- An initial Biodiversity Offset Analyis report compiled recommending livestock grazing reduction (ST)

- This proposed recommendation to reduce the livestock grazing on site was not supported by DEFF (2 x pre-appl. meetings)
- SANParks commented and not in agreement either
- The initial Biodiversity Offset Analysis report was updasted (ST), recommending livestock removal for 30 years.
- As livestock removal is not supported by DEFF, the Applicant commissioned an Additional Offset Biodiversity Report (including proposed implementation (Mark Botha) – This study amended / added to the impact ratings and recommended an Offset.

D.2.1.1 Approach and Methodology

The approach and methodology adopted in the Terrestrial Biodiversity Impact Assessment is described in this section.

The Terrestrial Biodiversity Impact Assessment was also conducted according to the best-practice guidelines and principles for biodiversity assessment as outlined by Brownlie (2005) and De Villiers *et al*. (2005).

In terms of NEMA, this assessment demonstrates how the proponent intends to comply with the principles contained in Section 2 of NEMA, which amongst other things, indicates that environmental management should:

- (In order of priority) aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity (Figure D.3);
- Avoid degradation of the environment;
- Avoid jeopardising ecosystem integrity;
- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and
- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

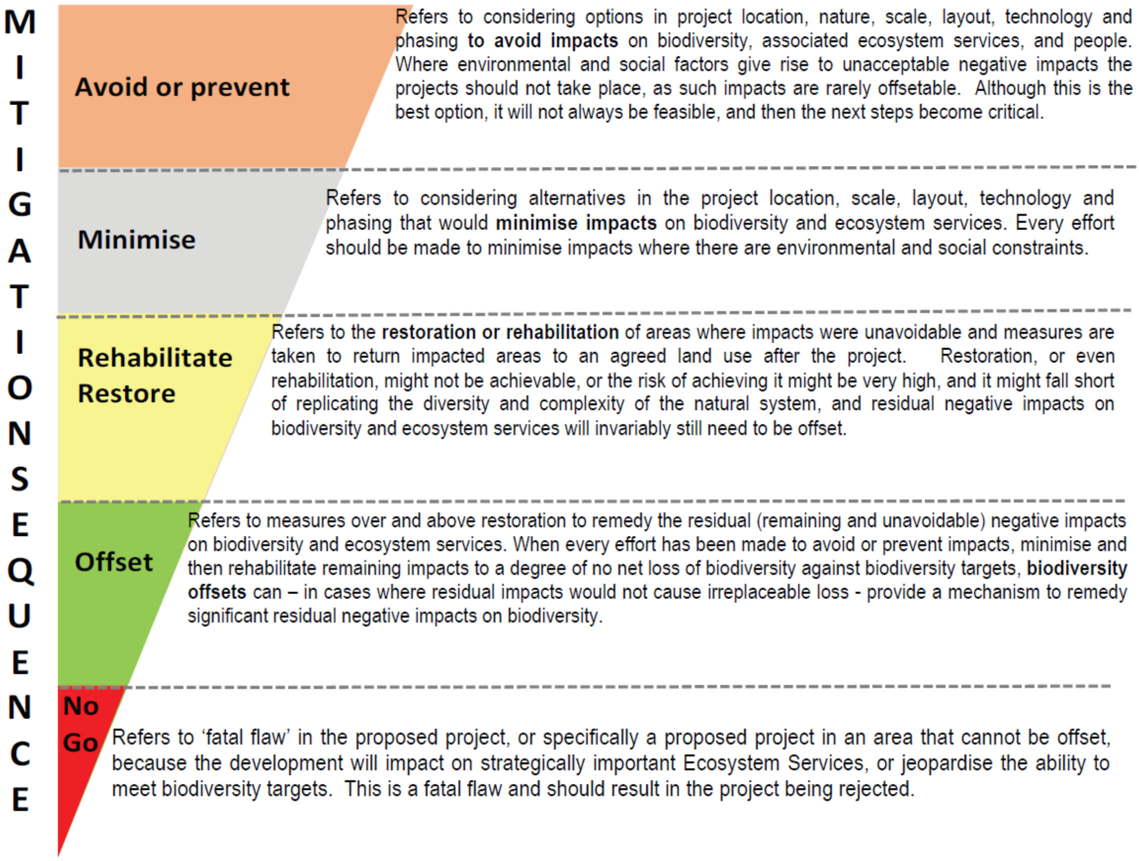


Figure D.3. The mitigation hierarchy that is used to guide the study in terms of the priority of different mitigation and avoidance strategies.

Furthermore, in terms of best practice guidelines as outlined by Brownlie (2005) and De Villiers et al. (2005), a precautionary and risk-averse approach should be adopted for projects which may result in substantial detrimental impacts on biodiversity and ecosystems, especially the irreversible loss of habitat and ecological functioning in threatened ecosystems or designated sensitive areas: i.e. CBAs (as identified by systematic conservation plans, Biodiversity Sector Plans or Bioregional Plans) and Freshwater Ecosystem Priority Areas.

In order to adhere to the above principles and best-practice guidelines, the following approach forms the basis for the study approach and assessment philosophy:

- The study includes data searches, desktop studies, site walkovers / field survey of the properties to be affected by the proposed development and baseline data collection, including:
  - A description of the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

In terms of **pattern**, the following is identified or described:

Community and ecosystem level

- The main vegetation type, its aerial extent and interaction with neighboring types, soils or topography; and
- Threatened or vulnerable ecosystems (*cf. SA vegetation map/National Spatial Biodiversity Assessment, fine-scale systematic conservation plans, etc.*).

Species level

- SCC (giving location if possible using the Global Positioning System (GPS);
- The viability of an estimated population size of the SCC that are present (including the degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High=70-100% confident, Medium 40-70% confident, low 0-40% confident); and
- The likelihood of other SCC, occurring in the vicinity (include degree of confidence).

Fauna

- Describe and assess the terrestrial fauna present in the area that will be affected by the proposed development;
- Conduct a faunal assessment that can be integrated into the ecological study;
- Describe the existing impacts of current land use as they affect the fauna;
- Clarify SSC and that are known to be:
  - endemic to the region;
  - that are considered to be of conservational concern;
  - that are in commercial trade (CITES listed species); or
  - are of cultural significance.
- Provide monitoring requirements as input into the EMPrs for faunal related issues.

Other pattern issues

- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity;
- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites); and
- The condition of the site in terms of current or previous land uses.

In terms of **process**, the following is identified and/or described:

- The key ecological “drivers” of ecosystems on the site and in the vicinity, such as fire;
- Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e. *corridors* such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and *vegetation boundaries* such as edaphic interfaces, upland-lowland interfaces or biome boundaries);
- Any possible changes in key processes, e.g. increased fire frequency or drainage/artificial recharge of aquatic systems;
- Furthermore, any further studies that may be required during or after the BA process will be outlined;
- All relevant legislation, permits and standards that would apply to the development will be identified; and
- The opportunities and constraints for development will be described and shown graphically on an aerial photograph, satellite image or map delineated at an appropriate level of spatial accuracy.

D.2.1.2 Relevant Project Aspects relating to Terrestrial Biodiversity and Species Impacts

The development of the proposed Komas WEF and associated infrastructure will result in the clearance of vegetation which will cause habit loss and loss of plant SCC and fauna during the construction phase. The operational phase of the proposed Komas WEF will result in impacts on CBAs due to habitat loss and disturbance, increased soil erosion and increased alien plant invasion. It will also cause noise and disturbance to fauna. The decommissioning phase will also result in habitat loss and disturbance which will cause increased soil erosion and increased alien plant invasion.

D.2.1.3 Potential Impacts

The potential direct, indirect and cumulative impacts identified as part of the Terrestrial Biodiversity Impact Assessment are included below:

Construction Phase:

- Impact on vegetation and plant SCC; and
- Direct and indirect faunal impacts.

Impact on vegetation and plant SCC

Although the abundance of plant SCC at the site is low, some individuals of such species are highly likely to be impacted by the development. However, the density of SCC is low and there are no species of very high concern which would be particularly badly affected by the development. Aside from the impact on SCC, there would be a more general loss of intact vegetation within the development footprint. This impact would be generated by turbine foundations, turbine hard-stands as well as access roads and the on-site SS and lay-down areas. Additional avoidance of impact on plant SCC could be achieved through a preconstruction walk-through of the facility before construction to micro-site the roads and turbine positions where necessary.

Direct and indirect faunal impacts

The construction of the development will result in significant habitat loss, noise and disturbance on site. This will lead to direct and indirect disturbance of resident fauna. Some slow-moving or retiring species such as many reptiles would likely not be able to escape the construction machinery and would be killed. There are also several species present at the site which are vulnerable to poaching and there is a risk that these species may be targeted. This impact would be caused by the presence and operation of construction machinery and personnel on the site. This impact would however be transient and restricted to the construction phase, with significantly lower levels of disturbance during the operational phase.

Operational Phase:

- Increased soil erosion;
- Increased Alien Plant Invasion;
- Operational impacts on fauna; and
- Impacts on CBAs.

Increased soil erosion

The site has sandy soils that are vulnerable to erosion, especially in the face of the strong winds that the area experiences. Once mobilised, the sands can be very difficult to arrest as the moving sand smothers new vegetation as it travels. There are already several areas of mobile dunes at the site that are severely affected by wind erosion.

Increased Alien Plant Invasion

There are already several alien species present on the site such as *Acacia cyclops* and disturbance created during construction would leave the site vulnerable to further alien plant invasion, especially along the access roads and other areas which receive additional run-off from the hardened surfaces of the development.

Operational impacts on fauna

Operational activities as well as the presence of the turbines and the noise they generate may deter some sensitive fauna from the area. In addition, the access roads may function to fragment the habitat for some fauna, which are either unable to or unwilling to traverse open areas. For some species this relates to predation risk as slow-moving species such as tortoises are vulnerable to predation by crows and other predators. In terms of habitat disruption, subterranean species such as Golden Moles and burrowing snakes and skinks are particularly vulnerable to this type of impact as they are unable to traverse the hardened roads or become very exposed to predation when doing so. This is a low-level continuous impact which could have significant cumulative impact on sensitive species.

Impacts on CBAs

A significant proportion of the development is located within an area that is a recognised area of biodiversity significance and has been classified as a Tier 2 CBA. The development will result in direct habitat loss equivalent to about 31-33 ha within the CBA 2 as well as potentially affect broad-scale ecological processes operating in the area. The impact on the CBA 2 would result from the transformation of currently intact habitat as well as the presence and operation of the facility.

Decommissioning Phase:

- Increased soil erosion; and
- Increased alien plant invasion.

Increased soil erosion

As already described, the site has sandy soils that are vulnerable to erosion, especially in the face of the strong winds that the area experiences. Once mobilised, the sands can be very difficult to arrest as the moving sand smothers new vegetation as it travels. Decommissioning will remove the hard infrastructure from the site, generating disturbance and leaving areas that are unvegetated and vulnerable to erosion.

Increased alien plant invasion

There are already several alien species present on the site such as *Acacia cyclops* and disturbance created during decommissioning would leave the site vulnerable to further alien plant invasion.

Cumulative Impacts:

- Cumulative habitat loss and impact on broad-scale ecological processes; and
- Decreased ability to meet conservation targets.

The cumulative assessment considers all nine WEFs and two solar PV facilities that are proposed (which have either received EA or have submitted an application to DEFF) within 50 km of the subject site. This includes the proposed 300 MW Kap Vley project east of the site, the proposed 140 MW Namas WEF west of the site, the proposed 140 MW Zonnequa WEF northwest of the site, the proposed 300 MW Eskom Kleinzee WEF towards the coast and the proposed Project Blue WEF around Kleinsee. Those projects further afield are generally in a different environment and ecological context from the proposed Komas WEF site and as such are of less relevance when considering the cumulative impacts of the Komas development and the surrounding projects. The footprint of these different facilities would be approximately 700ha and the Komas development would add an additional 11% to this, assuming that all these different developments go ahead, which is unlikely. However, this is a simplistic analysis and the real concern would be around the disruption of ecological processes and removal of important biodiversity features from possible future conservation expansion. The long-term potential impact of wind energy development should also be placed in context of other development impacts in the area, especially mining. The extent of habitat loss due to mining in the area around Kleinsee alone is more than 4000 ha and similar extents have been lost further afield both to the north and south of Kleinsee. The total extent of habitat loss from wind energy development would thus be less than 10% of that caused my mining. The primary ecological process that would potentially be affected is likely to be landscape connectivity for fauna. Not all species would be equally affected and species that may be particularly vulnerable to wind farm impacts include golden moles and Bat-eared Foxes, which may be sensitive to the noise turbines generate, while subterannean reptiles may experience fragmentation due to roads and noise. Bat-eared Foxes are however fairly mobile and would easily be able to move through wind farm areas if required. This would however not be the case for golden moles and subterranean reptiles, with the result that these groups can be idenitified as being most vulnerable to cumulative impact in the area. There is however currently no available information or research on this topic and long-term monitoring would be required to identify which species are impacted and the degree of impact. As such, the degree and nature of cumulative impacts on fauna in the area must be considered with a high degree of uncertainty.

Although the concentration of wind energy development in the area is a potential concern, the area is a REDZ, which has the purpose of encouraging renewable energy development within these areas, with the result that high cumulative impacts are to be expected in these areas. In the broader Namaqualand Coastal-Plain context, the concentration of wind energy projects in this restricted area can be viewed as positive as it discourages the development of wind farms in other more important areas. In addition, the total remaining extent of Namaqualand Strandveld is more than 250 000 ha and the loss of less than 0.5% of this area to wind farm development would not constitute significant cumulative loss, especially given that large tracts of this vegetation type are protected within the Namakwa National Park. The contribution of the Komas WEF to cumulative impacts is this seen as being relatively low. Overall, it does not appear that cumulative impacts on fauna and flora resulting from the Komas wind farm development would warrant an offset as these are considered relatively low after mitigation.

The additional Biodiversity Offset Report (including the proposed implementation) (Botha, 2021) notes that assessment of cumulative impacts is notoriously difficult, especially in a landscape where several development applications have been approved, but are not yet constructed, and several of which may never be constructed (for financial, regulatory, commercial or other unrelated reasons). Further, the proposed WEF is located in the REDZ which was designed (through a strategic assessment) to deliberately cluster impacts from renewable energy facilities.

It is further stated that it is very unlikely that the proposed Komas WEF, or indeed the cumulative impact of all the WEFs in this part of the REDZ, will impact on any foundational ecological processes. Either way, the offset design should endeavour to secure spatial representation to cater for persistence of these processes (Botha, 2021).

D.2.1.4 Impact Assessment

The table below includes an assessment of the potential **direct impacts to the Terrestrial Biodiversity (fauna and flora)** identified for the proposed Komas WEF and associated infrastructure for the construction, operation, and decommissioning phases and the cumulative impacts. The full assessment is provided in the Terrestrial Biodiversity Impact Assessment (Appendix C.1 of the BA Report).

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Impact on vegetation and plant SCC.	• No development of turbines, roads or other infrastructure within No-Go areas. • Preconstruction walk-through of the development footprint to further refine the layout and reduce impacts on SCC through micro-siting of the turbines and access roads. • Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna.	**Moderate**	**Low**
Faunal impacts.	• Avoidance of identified areas of high faunal importance at the design stage. • Ensure that laydown areas and other temporary infrastructure is located within medium- or low- sensitivity areas, preferably previously transformed areas if possible. • Search and rescue for reptiles and other vulnerable species to be undertaken during construction, before areas are cleared. • During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. • Limit access to the site and ensure that construction staff and machinery	**Moderate**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	remain within the demarcated construction areas. • Environmental induction to be conducted for all staff and contractors on-site. • All construction vehicles should adhere to a low speed limit (40 km/h for cars and 30 km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits should apply within the construction area as well as on the public gravel access roads to the site. • If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which should be directed downwards.		
Impact on CBAs	• Minimise the development footprint as far as possible, which includes locating temporary-use areas such as construction camps and lay-down areas in previously disturbed areas.	**Moderate**	**Low**[8]
OPERATIONAL PHASE: DIRECT IMPACTS			
Increased soil erosion.	• Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan (see EMPrs in Appendix G). • All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. • Regular monitoring for erosion to be undertaken after construction to	**Moderate**	**Low**

[8] Please note there is a discrepancy in the assessment rating provided in the additional Biodiversity Offset Report (Botha 2021). In this report, the significance is assessed to moderate before and after mitigation, prior to the implementation of an offset. Botha (2021) notes that with the implementation of an offset, the significance is low.

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. • All cleared areas should be revegetated with indigenous perennial species from the local area. • Avoid areas of high wind erosion vulnerability as much as possible. • Use net barriers, geotextiles, active rehabilitation and other measures during and after construction to minimise sand movement at the site.		
Increased alien plant invasion.	• Alien management plan to be implemented during the operational phase of the development, which makes provision for regular alien clearing and monitoring. • Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. • Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. Problem woody species such as *Acacia cyclops* are already present in the area and are likely to increase rapidly if not controlled. • Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems. • Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned. The use of herbicides should	**Moderate**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	be avoided as far as possible.		
Impacts on fauna.	• Open space management plan for the development, which makes provision for favourable management of the facility and the surrounding area for fauna. • Limiting access to the site to staff and contractors only. • 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 20 cm of the ground as tortoises become stuck against such fences and are electrocuted to death. • If 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 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.	**Moderate**	**Low**
Impacts on CBAs.	• Avoid impact to restricted and specialised habitats such as pans or active dune fields. • Implement a management plan for the site which takes cognisance of the ecological value of the area and is favourable for the maintenance of	**Moderate**	**Low** [9]

[9] Please note there is a discrepancy in the assessment rating provided in the additional Biodiversity Offset Report (Botha 2021). In this report, the significance is assessed to moderate before and after mitigation, prior to the implementation of an offset. Botha (2021) notes that with the implementation

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	fauna and flora in the area.		
DECOMMISSIONING PHASE: DIRECT IMPACTS			
Increased soil erosion.	• All hard infrastructure should be removed and the footprint areas rehabilitated with locally-sourced perennial species. • The use of net barriers, geotextiles, active rehabilitation and other measures after decommissioning to minimise sand movement and enhance revegetation at the site. • Monitoring of rehabilitation success at the site for at least three years after decommissioning or until the rehabilitation benchmarks and criteria have been met. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.	**High**	**Low**
Increased alien plant invasion.	• Alien management plan to be implemented during the decommissioning phase of the development, which makes provision for regular alien clearing and monitoring for at least three years after decommissioning. • Active rehabilitation and revegetation of previously disturbed areas with indigenous species selected from the local environment. • Wherever excavation is necessary for decommissioning, topsoil should be set aside and replaced after decommissioning activities are complete to encourage natural regeneration of the local indigenous species. • Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. • Regular monitoring for alien plants within the disturbed areas for at least three years after decommissioning or until alien invasive are no longer a	**High**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	problem at the site. • Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.		
CUMULATIVE IMPACTS			
Cumulative habitat loss and impact on broad scale ecological processes.	• Minimise the development footprint as far as possible. • The facility should be managed in a biodiversity-conscious manner in accordance with an open-space management plan for the facility. • Ensure that on-site impacts on plant SCC are maintained at acceptable levels through avoidance of significant populations of these species.	**Moderate**	**Low**
Impaired ability to meet conservation targets.	• Engage with the provincial and national conservation authorities on the implications of the current development for future conservation expansion in the area. (Note: An initial Biodiversity offset analysis has been conducted and is included in Appendix J.3(2) of this BA Report). The proposed mitigation measures in this report, i.e to reduce the livestock grazing on site, was not support by DEFF or by the Northern Cape Department of Conservation. Therefore, an additional Biodiversity Offset Report (including proposed implementation) was prepared by Mr. Mark Botha (2021). In addition, comment on the Terrestrial Biodiversity Impact Assessment and the initial Biodiversity Offset Analysis, including the recommendations held there-in, has been received from the provincial commenting authorities. • Develop an ecological offset study to evaluate the potential need for an offset to mitigate the impacts of the development on CBAs and the NC-PAES Focus Areas. (Note: An initial Biodiversity Offset Analysis has been completed and is included in Appendix J.3(2) of this BA Report. An additional Biodiversity Offset Report (including proposed implementation)	**Moderate**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	was also prepared by Mr Mark Botha and is included in Appendix J.3(1).		

Impact significance included in the Biodiversity Offset Implementation Report

Below is the impact assessment provided by Mr. Mark Botha in his additional Biodiversity Offset Implementation Report (including proposed implementation) (Appendix J.3(1) of this BA Report) which comprises an amended table of impact significance ratings to clarify the requirement for a biodiversity offset. This includes highly summarised impact ratings for Birds and Bats.

Todd (2020a) sets out his rationale for impact significance ratings in section 1.7 on p 39 of the Biodiversity Impact Assessment Report (Appendix C.1 of this BA Report).

Of importance here is that whether the final rating is 'moderate' or 'high' is not really material from an offset perspective as either would trigger an offset requirement. What follows is an elaboration of Todd's impact significance ratings to tease out some of the specific administrative and biodiversity planning features and their likely impact ratings.

Even after mitigation, several negative impacts are still assessed as Moderate. Therefore, it would appear that an offset is required to mitigate the impacts on the ability to meet conservation targets, to contribute to the expansion of Protected Areas and to ensure that the features driving the designation as CBA2 are effectively protected.

It is however noted that the CBA and PAE Focus Areas in this specific region are notional, and algorithm determined hexagons. Only once these are adequately downscaled in an appropriate regional plan can the specific Komas impacts be adequately contextualised and rated as local, regional or national. There are many options in the landscape to achieve the national targets (Botha, 2021).

It is very unlikely that the Komas WEF, or indeed the cumulative impact of all the WEFs in this part of the REDZ, will impact on any foundational ecological processes. However, the proposed biodiversity offset will be implemented in an attempt to counterbalance the impacts on all affected biodiversity components at the proposed Komas WEF site. Details on the proposed biodiversity offset are included in Sections D.2.1.7 and D.2.1.8 below.

Phase/Impact	Before Mitigation	After Mitigation but prior to offset	Considerations
Construction Phase			
Impact on plant SCC	Moderate	Low	
Impact on Fauna	Moderate	Low	
Operational Phase			
Increased Soil Erosion	Moderate	Low	
Increased Alien Plant Invasion	Moderate	Low	
Terrestrial Faunal Impact	Moderate	Low	
Avifauna Impact (Simmons & Martins 2021; Dippenaar 2021)	Moderate - High	Moderate	Mitigation dependent. Acknowledged to be likely over-estimate
CBA2	Moderate	Moderate	Low if offset included
National & NC-PAES Focus Area	Moderate	Moderate	Low if offset included
SANParks' Expansion footprint, buffer zone	Moderate	Moderate	Low if offset included
Decommissioning Phase			
Increased Soil Erosion	High	Low	
Increased Alien Plant Invasion	High	Low	
Cumulative Impacts			
Broad-Scale Ecological Processes	Moderate	Low	
Ability to Meet Conservation Targets	Low	Low	Low if offset included
Reduction of Offset Receiving Area	Low	Low	Very low. Receiving area only likely next to NNP; REDZ and electricity infrastructure more important.

D.2.1.5 Comparative assessment of alternatives

Two alternatives were provided by the Project Applicant for assessment of the BESS and on-site SS complex area (Option 1 and Option 2). There is not a strong preference between these alternatives from a Terrestrial Biodiversity perspective, but Option 2 is favoured as it closer to the proposed Collector SS (which will be assessed as part of a separate BA process) (See Figure A.1). However, Option 1 is also feasible and is therefore acceptable from a Terrestrial Biodiversity impact perspective.

D.2.1.6 Assessment of No-Go alternative

The No-Go alternative would result in the development not going ahead and the current land-use of extensive livestock grazing continuing at the site. Although extensive livestock grazing can be compatible with biodiversity maintenance, it can also result in a decline in plant and animal species richness if grazing pressure is too high. In the long-term the No-Go alternative would result in the maintenance of the status quo, which can be considered to represent a low negative impact on biodiversity.

D.2.1.7 The need to implement a Biodiversity offset

The Biodiversity Impact Assessment concluded that a biodiversity offset is not considered necessary for development of the site and the on-site mitigation and avoidance measures are considered sufficient to reduce the impacts of the development on the CBA and NC-PAES Focus Area to an acceptable level (Todd, 2021a). However, these on-site mitigation and avoidance measures (i.e. the reduction or removal of livestock grazing on the proposed Komas WEF site) were not deemed acceptable to DEFF and SANParks following the pre-application meetings. DEFF commented that they cannot enforce conditions in the EA on third parties, therefore this condition to reduce the livestock grazing cannot be included in the EA. Therefore, based on these objections and following official comments received from SANParks dated 15 February 2021 (see Appendix D of the BA Report) the Project Applicant commissioned an additional Biodiversity Offset Report (including proposed implementation) which was undertaken by Mr. Mark Botha of *Conservation Strategy, Tactics and Insight* (dated February 2021). This study is included in Appendix J.3(1) of this BA Report (together with the initial Biodiversity Offset Analysis which was undertaken by Mr. Simon Todd (Appendix J.3(2)). It should be noted that the recommendations of the additional Biodiversity Offset Report (including implementation) replace those in the initial Biodiversity Offset Analysis which was undertaken prior to the comments raised by DEFF and SANParks during the pre-application phase.

Therefore, based on the objections from DEFF and SANParks as indicated above, the additional Biodiversity Offset report (including proposed implemention) concluded that an offset is required and should be implemented. The additional Biodiversity Offset study (Botha, 2021) recommends that the implementation of a Biodiversity Offset is appropriate as the **residual impact is negative and of moderate significance**. This is based on the Draft Biodiversity Offset Policy (DEA, 2017). An offset of 810 ha, in Namaqualand Strandveld or an adjacent, related vegetation type in the PAES Focus Area is prudent (Botha, 2021). In the Northern Cape, with several options for meeting targets, it is argued that this mitigation is possible through an offset that secures the features and values for which the CBA is designated.

D.2.1.8 The determinitation of an appropriate biodiversity offset

The proposed Biodiversity Offset was determined based on guidance from the Draft National Biodiversity Offset Guideline Policy (DEA 2017) and based on a risk averse and precautionary approach that was followed.

The additional Biodiversity Offset Report (including proposed implementation) proposes a ratio of 20:1 which considers the impacts of the proposed Komas WEF on the CBA2 and the NNP Expansion Footprint. Impacts on Ecological Support Areas (ESA - often a buffer to CBAs) attract a ratio of 5:1 (DEA 2017). While there is an argument that maximum ratios should not apply in designated development zones (such as REDZs), it is prudent to suggest a 20:1 ratio in line with the Draft Policy indicated above (DEA 2017) as the impact on the applicant is not unacceptably prejudicial (Botha, 2021).

Please refer to the table below taken from the additional Biodiversity Offset Report (Botha (2021)) for the direct footprint impacts from the proposed Komas WEF on various biodiversity features, applicable offset ratios and final offset requirement:

Table: Direct footprint impacts from Komas on various biodiversity features, applicable offset ratios, and final offset requirement

Feature impacted by Komas	*Area (ha)*	*add 5%*	*Total (ha)*	*Ratio*	*Offset (ha)*
Namaqualand Strandveld	79	4	83		
- of which NNP Expansion Footprint	30	2	32	1:20	
- CBA2 (overlaps entirely with above)	31	2	33	1:20	660
- ESA	28	2	30	1:5	150
Total area of offset					**810**

Hence, an Offset of 810 ha of Namaqualand Strandveld, within at least CBA2, preferably CBA1, and within the NNP Expansion Footprint is required. Other features of the offset (habitat composition, ecosystem functionality or ecological process considerations) do not appear to require any adjustment of the impact metrics or ratios.

<u>Biodiversity Offset Options</u>

The Biodiversity Offset Report (Botha, 2021; PP 11-13) sets out how the Mitigation Hierarchy was implemented prior to pursuing an offset as a viable form of mitigation.

The minimum requirements to design an appropriate offset are addressed in the Biodiversity Offset Report. It includes a checklist of required features for the Komas WEF that should be satisfied by the proposed biodiversity offset:

- sufficient area (810 ha) of Namaqualand Strandveld, in reasonable to good condition (or alternatively a mix of different related vegetation types of greater conservation concern than Namaqualand Strandveld);
- sufficient area to secure, or at least contribute significantly to ecological connectivity in this landscape, and climate change gradients (altitudinal, as well as edaphic boundaries);
- be currently designated at least as CBA2 (and/or ideally in CBA1);
- be in the Namaqua National Park Expansion Footprint;

- if unable to secure the impacted vegetation type, it may be possible to "trade-up" for a more threatened, range restricted or species-rich related vegetation type that still meets the other criteria above (Botha 2018).

The said Report lists four options which meet the above-mentioned criteria which can be pursued for the Komas Biodiversity Offset. These include the following:

1. ***Gromis Set-aside*.**

   An area on the southern portion of the farm Platvley 314 (Portion 1) (the 'Gromis' property co-incidentally owned by an owner of the proposed Komas WEF site) has been identified for biodiversity protection (and supported by the terrestrial ecology, bird and bat specialists). This area includes the most conservation-worthy and sensitive habitats on the properties assessed, and is designated as largely CBA1. It could easily be secured through a Lease agreement or purchase, and declared as a Procted Area. If SANParks is unwilling to take on the inclusion into and management of this set-aside as part of the NNP at this stage, it is entirely feasible for it to be managed independently until SANParks is able to incorporate it.

2. *P**urchase offset rights to Roodekol Farm 336 (Portion 5) and an additional property**.*

   The applicant could conclude a purchase agreement with the World Wildlife Fund (WWF) for the rights to Roodekol Farm (Portion 5) as an offset, and an agreement for another property to make up the balance of the required area (another 430 ha would be required). This option would require an agreement between the applicant and WWF, containing a clause that WWF must use the funds from selling the right over Roodekol (Portion 5) to secure further properties in the NNP Expansion Zone, preferably in Namaqualand Strandveld. (This mode of implementation has precedence with the adjacent Kap Vley WEF and is expeditious in the Draft BAR and REIPPP with its inherent uncertainties). WWF has indicated willingness to explore this option (Jan Coetzee WWF-SA pers comm February 2021).

3. ***Secure rights to use sufficient alternative properties** in the list as PAs.* These could be declared and managed independently until such time as SANParks is able to consolidate them into the NNP.

4. ***Purchase or secure farms on open market in the Park Expansion Footprint*** and CBA2 areas, declare sufficient area as a Protected Area, manage them independently until such time as SANParks incorporates this portion of the Park Expansion Footprint into the NNP. At least 9 548 ha of land that meets the offset requirements has recently been offered to conservation for acquisition.

It appears that the best place to locate the offset is on the Gromis site (Farm Platvley 314, Portion 1), This option is preferred by the Project Applicant and is also supported by the property landlowner. The proposed Gromis set aside comprises an area of approximately 1 141 ha which consists of 202 ha and 939 ha of CBA1 and CBA2 respectively. The area of the set aside on the Gromis site proposed for the offset is supported by both the Avifauna and Bat specialists. Although the proposed Gromis set aside meets all the requirements to address the impacts associated with the Komas WEF, it is noted that SANParks' preference may differ from the applicant's, but cannot dictate which specific offset is required, only those which it is prepared to take short term management responsibility for.

D.2.1.9 Concluding statement Biodiversity Offset Implementation study (Mr. Mark Botha)

The Biodiversity Offset Implementation study concluded that although the proposed Komas WEF impacts marginally on the NNP Expansion Footprint, and thus the PAES ocus area, and thus a CBA2 in terms of the applicable provincial plan, these impacts are not deemed sufficiently high to suggest that the development should not proceed. The impacts on intrinsic biodiversity features appear manageable. As the project is located in a REDZ and there are several offset options in the immediate vicinity, all with high likelihood of success, the specialist notes that he has no objections to the proposed Komas WEF development proceeding.

D.2.2 Aquatic Biodiversity

The Aquatic Biodiversity Assessment was undertaken by Joshua Gericke and Louise Zdanow from Enviroswift (Pty) Ltd to inform the outcome of this BA from an aquatic biodiversity perspective. An Aquatic Biodiversity Compliance Statement was undertaken in terms of the requirements of the Aquatic Biodiversity Protocol as per Government Notice 320 published on 20 March 2020 in GG No. 43110. The complete Aquatic Biodiversity Compliance Statement is included in Appendix C.2 of this report. The following section provides a summary of the Approach, Key Findings and Concluding Statement undertaken for the Aquatic Biodiversity Compliance Statement. The information below is extracted from Enviroswift (2020) (Appendix C.2 of the BA Report).

Note: An Aquatic Biodiversity Compliance Statement is not required to formally rate aquatic impacts. It is only required to indicate whether or not the proposed development will have an unacceptable impact on the aquatic resources of the site (if any). It must provide a substantiated statement on the acceptability, or not, of the proposed development and a recommendation on the approval, or not of the proposed development. Therefore, an assessment of impacts was not provided in this section.

D.2.2.1 Approach and Methodology

Available national and provincial databases were utilised in order to confirm the presence or absence of watercourses within the study area and to determine the high level conservation significance of the study area. Primary resources which were utilised are listed within Section 1.1.6 of the Compliance Statement included in Appendix C.2 of the BA Report.

The desktop assessment was followed by a physical site survey undertaken on the 29th of January 2020 in order to groundtruth the accuracy of the desktop information, as well as to verify the perceived level of sensitivity of the study area.

All results including supplementary maps produced with the use of Quantum Geographic Information System (QGIS) as well as the site sensitivity are included within the report. As indicated above, the report was prepared in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice 320, dated 20 March 2020), as well as in line with the NWA.

D.2.2.2 Verification of Aquatic Biodiversity sensitivity as identified by the Screening Tool

As described in Section B of this BA Report, according to the National Wetland Map 5 (CSIR, 2018), a large depression wetland is located within the western portion of the study area (Figure B.23). This depression has been indicated as an area of very high sensitivity in terms of Aquatic Biodiversity by the

National Environmental Screening Tool (Figure B.24). However, upon investigation of this area during the field survey undertaken in January 2020 it was found that the area indicated as wetland habitat is in fact an extensive dune field. This dune field is a flat area located between two ridge lines and is characterised by fresh, wind-blown sand and dry terrestrial vegetation (Figure B.25). There is no indication that water accumulates within this area, and no wetland indicators as defined by the delineation guidelines (DWAF 2005, updated 2008) were encountered e.g. hydromorphic soils, wetland vegetation, signs of salt accumulation or hardened / cracked surface layers. Therefore, the site sensitivity verification disputes the rating of very high sensitivity assigned to this area in the National Web-Based Screening Tool in terms of Aquatic Biodiversity.

D.2.2.3 Results of the Field Study

The low regional rainfall, semi-desert conditions and dominance of well drained, sandy soils within the study area is not conducive to the formation of wetland habitat. Furthermore, the relatively flat topography, the absence of ridges, and the lack of concentrated flow paths is not conducive to the formation of drainage lines. **No watercourses as defined by the NWA were therefore encountered within the study area, and no additional watercourses have been indicated within 500 m of the study area by desktop resources.**

D.2.2.4 Comparative assessment of alternatives

The Project Applicant provided two alternatives for assessment for the BESS and on-site SS complex area (Option 1 and Option 2). Both alternatives are acceptable from an aquatic perspective as there are no watercourses on the proposed Komas WEF site.

D.2.2.5 Concluding Statement

No watercourses were encountered within the study area. It is therefore the opinion of the specialist that the study area is not considered to be important in terms of Aquatic Biodiversity and would fall within the low sensitivity category as defined by the National Web-Based Environmental Screening Tool. The proposed development will not have an impact on any aquatic features and a full Aquatic Biodiversity Specialist Assessment is therefore not required. A Compliance Statement has been prepared instead of a full specialist assessment in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Gazette 43110/ Government Notice 320, dated 20 March 2020). It is the opinion of the Aquatic Biodiversity specialist that this Compliance Statement is sufficient as the aquatic sensitivity of the site was rated as very low and therefore the rating of very high significance as identified by the National Web-Based Environmental Screening Tool is disputed based on the evidence collected during the site visit and as motivated in this report.

It is the opinion of the specialist that the proposed development of the Komas WEF and associated infrastructure does not pose an unacceptable risk and can therefore be approved from an Aquatic Biodiversity perspective.

D.2.3 Avifauna Impact Assessment

The Avifauna Impact Assessment was undertaken by Dr. Rob Simmons of Birds and Bats Unlimited to inform the outcome of this BA from an Avifaunal perspective. The Avifauna Impact Assessment is undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended. The complete Avifauna Impact Assessment is included in Appendix C.3 of this report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Avifauna Impact Assessment. The information below is extracted from Simmons (2020) (Appendix C.3 of the BA Report).

Important Note: *The Avifauna Impact Assessment (Appendix C.3) was commissioned in February 2019. It was therefore commissioned a substantial period prior to the Assessment Protocol for Avifauna Specialist Assessment published in GN 320 on 20 March 2020 came into effect. Therefore, the Avifauna Assessment was undertaken in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended. Proof of the date of appointment of the avifauna specialist, Dr. Rob Simmons of Birds and Bats Unlimited, is provided in Appendix F.2.*

D.2.3.1 Approach and Methodology

The avian pre-construction monitoring reported here covered 12-months in accordance with the requirements of the Best Practice Guidelines for assessing and monitoring the impacts of wind energy facilities in southern Africa, produced by BirdLife South Africa and the Endangered Wildlife Trust (Jenkins et al. 2015).

Priority species, defined as the top 100 collision-prone species (CPS) and red-listed species that passed through the 27-km^2 area, were documented in autumn (March 2019), winter (July 2019), spring (October 2019) and summer (December 2019), to help quantify, assess, predict and reduce potential negative impacts to birds associated with the proposed Komas WEF. This covers all the bird-active months for migrant and resident bird species.

The following is reported on:

i. the species-richness of smaller resident bird species at the proposed Komas WEF site by season;
ii. the presence and passage rates of all larger priority avifauna species passing through the proposed WEF site (and the Control area) from Vantage Point (VP) surveys; and
iii. breeding species throughout the area.

The study concludes by identifying the potential impacts and the high- and medium-risk sensitivity areas within the proposed Komas WEF site, based on the presence and number of priority species using the area. The potential cumulative impacts were also identified and assessed as per Appendix 6 of the NEMA EIA Regulations, 2014, as amended.

Transects: All bird transects took place in the morning (bird-active) hours. Each 1-km transect was walked slowly over a 25- to 40-minute duration, depending on terrain and number of birds present. All species were identified where possible, and the number of individual birds and the perpendicular distance to them recorded with a Leica laser rangemaster 1600. This allows an estimate of the density (birds per unit area and kilometre) and the species richness in each area. All large birds (mainly raptors and bustards) were simultaneously recorded, and the position of any large active nests found in the study area were also noted and recorded.

Vantage Point (VP) monitoring is the most important aspect of such site surveys (Jenkins et al. 2015)). Each VP requires 12 hours' observations over two separate days to record passage rates of Priority Collision-Prone Species. That is, recording the number of priority species (e.g. large raptors and korhaans/bustards) passing, per hour, through the proposed Komas WEF site from equally spaced VPs in the WEF and Control areas. These were undertaken from hills and other raised points allowing uninterrupted views of about 1.5 km. Because Vulnerable Red Data Verreaux's Eagles were recorded in VP observations in July 2019, the observation hours were increased to 18 hours per site visit, (i.e. 6 hours per day for three days) based on recommendations in the Verreaux's Eagle Guidelines (Ralston-Paton, 2017).

At a distance of 1.5 km, it becomes more difficult to identify each species and their positions, but the presence and identity of larger birds is still possible over these distances with 8.5x or 10x Swarovski binoculars. The VPs were sited to cover the entire study area equally. The flight height and behaviour of identified birds was estimated every 15 seconds and recorded directly onto laminated Google Earth maps in the field, and then transferred to a digital Google Earth image of the area.

Flight height is a difficult parameter to measure but a Laser Rangemaster was used, and the presence of a 120 m wind mast on site and farmers' windmills were used to aid overall accuracy. In a test of the bird specialists' accuracy in estimating flight heights using a drone with a built-in GPS, the average error was found to be 9 m and the median error 11 m (Francisco Cervantes Peralta, Centre for Statistics and Ecology, UCT, pers. comm.).

D.2.3.2 Relevant Project Aspects relating to Avifaunal Impacts

Components of the proposed project that are relevant in terms of avifauna are listed below:

- A maximum of 50 WTGs with a maximum Hub Height and Rotor Diameter of 200 m each;
- Building Infrastructure including offices; O&M control centre; warehouse/workshop; ablution facility; converter/inverter stations; on-site SS and/or a switching SS; and guard houses; associated infrastructure;
- Internal 33 kV power lines;
- Fencing around the WEF infrastructure; and
- Construction work area (i.e. laydown area).

D.2.3.3 Potential Impacts

The potential impacts identified during the Avifauna Impact Assessment include:

Construction Phase:

- Disturbance and loss of foraging habitat around the WEF site for the Red-listed bird groups due to the construction of the WEF and associated infrastructure.

While the final footprint of most WEFs is likely to be relatively small, the construction phase of development incurs quite extensive temporary or permanent destruction of habitat. This may be of lasting significance where WEF sites coincide with critical areas for restricted range, endemic and/or threatened species. Similarly, construction, and maintenance activities are likely to cause some disturbance to birds in the general surrounds, and especially of shy and/or ground-nesting species resident in the area.

Mitigation of such effects requires that Best-Practice principles be rigorously applied – that sites are selected to avoid the destruction of key habitats, and construction and final footprints, as well as sources of disturbance of key species, must be minimised.

Some studies have shown significant decreases in the numbers of birds in areas where WEFs occur, as a result of avoidance due to noise or movement of the turbines (e.g. Larsen & Guillemette, 2007). Others have shown decreases attributed to a combination of collision casualties and avoidance, or exclusion from the impact zone of the facility (Stewart et al. 2007).

Such displacement effects are probably more relevant in situations where WEFs are built in natural habitat (Pearce-Higgins et al. 2009, Madders & Whitfield 2006) than in modified environments such as farmland (Devereaux et al. 2008).

Operational Phase:

- Fatalities caused by collisions with the wind turbines;
- Disturbance and loss of foraging habitat around the WEF site for the Red-listed bird groups due to the operation of the WEF and associated infrastructure;
- Entrapment in perimeter fences; and
- Electrocutions due to collision with associated infrastructure, e.g. internal 33 kV power lines.

The 12-month pre-construction bird monitoring concluded that the Verreaux's Eagle, Jackal Buzzard and Black-chested Snake Eagle recorded on the proposed Komas WEF site are the raptors species most likely to be impacted because of their high likelihood of occurrence and high proportion of flights at BSA.

Multiple factors influence the number of birds killed at any WEF. These can be classified into three broad groupings:

- avian variables (some birds, especially raptors are more prone to collision than others);
- location variables (wind farms placed on migration routes, in pristine vegetation or near roosts or nests will attract more fatalities than others); and
- facility-related variables (farms with more turbines, more lighting, or lattice towers may attract more fatalities).

Two studies have shown a direct relationship between the abundance of birds in an area and the number of collisions (Everaert 2003, Smallwood et al. 2009), and it is logical to assume that the more birds flying through an array of turbines, the higher the chances of a collision occurring. However, this is not found in all studies: De Lucas et al. (2008), found instead a closer relationship with individual species abundance (vultures) and fatalities, but no relationship for all birds. In South Africa, the specialist found that raptor abundance and fatalities were significantly related at an Eastern Cape WEF.

Larger WEFs, with more than 100 turbines, are almost, by definition, more likely to incur increased bird casualties (Kingsley & Whittam 2005), and turbine size may be proportional to collision risk – with taller turbines associated with higher mortality rates in most instances (e.g. de Lucas et al. 2009, Loss et al. 2013, Thaxter et al. 2007).

With newer technology, fewer, larger turbines are needed to generate the same amount of power, which may result in fewer collisions per MW produced (Erickson et al. 1999, Thaxgter et al. 2007). Certain tower structures, and particularly the old-fashioned lattice designs, present many potential perches for birds, increasing the likelihood of collisions as birds land or leave these sites. This problem has, largely, been solved with more modern, tubular tower designs (Drewitt & Langston 2006, 2008).

However, Loss et al. (2013) undertook a meta-analysis of all wind farms and associated fatalities in the USA and found a strong correlation of increasing hub height or blade length with increased impacts to birds. Thus, taller turbines appear to be riskier for birds. The specialist has added to that dataset with eight studies from South Africa and found that the relationship still holds.

Decommissioning Phase

- Disturbance and loss of foraging habitat around the WEF site for the Red-listed bird groups due to the decommissioning of the WEF and associated infrastructure.

Cumulative Impacts:

- Fatalities caused by collisions with the wind turbines;
- Disturbance and loss of foraging habitat around the WEF site for the Red-listed bird groups due to the construction, operation and decommissioning of the WEF and associated infrastructure;
- Entrapment in perimeter fences; and
- Electrocutions due to collision with associated infrastructure, e.g. internal 33 kV power lines.

The cumulative impacts of nine other proposed WEFs within 50 km of the proposed Komas WEF were assessed, and a minimum of 2 334 bird fatalities are estimated annually from these proposed facilities. Approximately 168 of these are estimated to be priority Red Data raptors per year.

D.2.3.4 Impact Assessment

The table below includes an assessment of the potential **direct impacts** identified for the proposed Komas WEF and associated infrastructure for the construction, operational and decommissioning phases. An assessment of the potential cumulative impacts is also included. The full assessment is provided in the Avifauna Impact Assessment (Appendix C.3 of the BA Report).

Impact	**Mitigation measure**	**Significance before mitigation**	**Significance after mitigation**
CONSTRUCTION PHASE: DIRECT IMPACTS			
Direct disturbance and loss of foraging habitat around the proposed Komas WEF site for the priority bird groups identified on site (Verreaux's Eagle, Jackal Buzzard Ludwig Bustard, Booted Eagle and Black-chested Snake Eagle).	• If an active nest of Verreaux's Eagle is found a buffer of 3.2 km would be required during the breeding season. • Dust suppression techniques must be implemented on all access roads. • Implement construction-phase monitoring to monitor the effect of the construction itself on priority birds.	**Moderate**	**Moderate**
OPERATIONAL PHASE: DIRECT IMPACTS			
Fatalities caused by avifauna colliding with wind turbines, disturbance and loss of foraging habitat around the proposed Komas WEF site for the Red-listed and priority bird groups identified as at risk. Outside the wind farm birds may be electrocuted or hit by the internal 33 kV overhead power lines, or with double fences, may be entrapped between them.	• If turbines are positioned within the medium-risk areas and they are found to result in mortalities of any Red Data birds then either the turbines must be erected with an automatic shut-down on demand system (DT-bird or similar) or a single blade should be painted black (or with signal red paint) for those select turbines to reduce impacts for eagles and other raptors (May et al. 2020). For turbines outside the medium-risk area (as presently likely) these mitigations are not necessary unless > 1 red data bird is found to be killed per year during the post-construction surveys. • 12-24 months post construction monitoring to be undertaken to assess the mortality of birds in the Komas WEF area, through systematic and direct observation and carcass searches.	**Moderate-High**	**Moderate**
DECOMMISSIONING PHASE: DIRECT IMPACTS			
Direct disturbance and loss of foraging habitat around the proposed Komas WEF site for the Red-listed bird groups	• Reduce degree of disturbance and length of disturbance to a minimum during sensitive breeding seasons, but only if breeding red data species are found within 3-5 km radius from the proposed Komas WEF site.	**Moderate-High**	**Moderate**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
identified as at risk (as noted above).	• Habitat can be rehabilitated to its former attractiveness (from a prey point of view) for the raptors. • The developer to implement decommissioning phase monitoring to assess the effects of rehabilitating the WEF, through direct observation.		
CUMULATIVE IMPACT (Construction, Operational and Decommissioning Phases)			
Fatalities caused by collisions with the wind turbines, entrapment in the perimeter fences, collision with the internal 33 kV power lines or electrocution. Disturbance and loss of foraging habitat around the WEF site for the Red-listed bird groups due to the construction, operation and decommissioning of the WEF and associated infrastructure.	• Although not enforceable on the applicant, all wind farms that are killing red data raptors (at > 1 red data individual per year) should be required to implement shut down on demand or black (red) blade mitigation.	**Moderate-High**	**Moderate**

D.2.3.5 Comparative Assessment of Alternatives

The Project Applicant provided two BESS and on-site SS complex site alternatives to be assessed (i.e. Option 1 and Option 2). Option 2 is the preferred avian option since it is (i) closer to the incoming power line and (ii) there are slightly fewer priority bird flights in this area than at Option 1. Option 1 is not fatally flawed and can be implemented and is therefore acceptable from an avifauna impact perspective.

D.2.3.6 Assessment of No-Go Alternative

The No-Go alternative will result in no additional impacts on avifauna (especially on the Priority bird species) and will result in the ecological status quo being maintained, which will be advantageous to the avifauna. Should the proposed Komas WEF (and other renewable energy projects) not be developed, South Africa will continue its dependence on fossil-fuel based energy instead of turning to green energy. This in turn will not present opportunities for the energy mix to be diversified and to reduce greenhouse gas emissions and associated climate change. Opportunities for renewable energy will be a hugely positive move for South Africa.

D.2.3.7 Concluding Statement

The expected impacts of the proposed Komas WEF and associated infrastructure were overall rated to be Negative and of Moderate significance pre- and post-mitigation**. It is therefore recommended that the proposed Komas WEF be authorised, on condition that the proposed mitigation measures as detailed above, in the Avifauna Impact Assessment (Appendix C.3) and in the EMPr (Appendix G of this BA Report) are strictly implemented.**

D.2.4 Bat Impact Assessment

The Bat Impact Assessment was undertaken by Stephanie Dippenaar of Stephanie Dippenaar Consulting to inform the outcome of this BA from a bat perspective. The Bat Impact Assessment was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended. The complete Bat Impact Assessment is included in Appendix C.4 of this report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Bat Impact Assessment. The information below is extracted from Dippenaar (2020) (Appendix C.4 of the BA Report).

D.2.4.1 Approach and Methodology

Acoustic monitoring of the echolocation calls of bats are used to determine the seasonal and diurnal activity patterns of bats at the proposed Komas WEF site. The *South African Good Practice Guidelines for Surveying Bats in Wind Farm Developments – Pre-Construction* (Sowler, *et al*. 2017), is followed throughout the monitoring process. More recent guidelines have been issued in 2020, but the bat monitoring commenced in 2019, when the 2017 Guidelines were still applicable. The following South African Guidelines are used in conjunction with the pre-construction guidelines:

- South African Bat Fatality Threshold Guidelines for Operational Wind Energy facilities (MacEwan, *et al*. 2018);
- Mitigation Guidance for Bats at Wind Energy facilities in South Africa (Aronson, *et al*. 2018); and

- South African Good Practice Guidelines for operational monitoring for Bats at Wind Energy Facilities (Aronson, *et al*. 2014).

The following approach was followed as per the ToR provided during the proposal phase of the bat monitoring:

- A desktop study was conducted of available literature to establish which species occur in the area. This includes the surrounding area as well as information from other wind developments in the area, where accessible.
- Background was provided regarding ecosystem services and the impact of a loss of bats on the broader environment.
- The local and global conservation status of all identified bat species was determined.
- Reconnaissance site visits were conducted as part of the initial project screening phase which included the installation of bat detecting equipment.
- Four site visits were conducted to the proposed Komas WEF site to conduct active surveys, one per season, and day-time investigations. These covered all the various biotopes occurring on site.
- The monitoring equipment was set up and verified. Data was downloaded throughout the monitoring year and echolocation calls were analysed. In cases of data loss, data was used from nearby monitoring systems for statistical analyses or extrapolated. This is explained as such in the report.
- Interviews were conducted with the landowner(s) regarding possible bat occurrence on the property and the surroundings.
- Inputs were provided to inform the turbine layout.
- Information was gathered from other wind farm developments in the close vicinity of the proposed Komas WEF site to assess the cumulative impact of each WEF.
- Mitigation measures are recommended.

The methods of investigation of bats at the proposed wind farm development are described below.

a. Desktop Investigation of the proposed Komas WEF development area as well as the surrounding environment.
b. Passive Acoustic Monitoring Systems: Four static monitoring systems were deployed at the proposed Komas WEF site, two at the Met mast, one at 110 m and one at 20 m height, and two temporary masts of 10 m high. Passive monitoring data[10] was collected between 10 August 2019 and 23 September 2020, representing the four seasons of the year. Seasonal transects were conducted, but limited bat activity was recorded during transect sessions.
c. Roost surveys.
d. Driven transects.
e. Data download and analysis.

[10] The monitoring systems used consist of four Wildlife Acoustics SM4BAT full spectrum bat detectors that are powered by 12V, 7 Amp-h sealed lead acid batteries replenished by photovoltaic (PV) solar panels, see Table 1. Two SD memory cards, class 10 speed, with a capacity of 64 GB or 128 GB each, were utilized within each detector to ensure substantial memory space with high quality recordings, even under conditions of multiple false environmental triggers.

D.2.4.2 Relevant Project Aspects relating to Bat Impacts

Components of the proposed Komas WEF project which could impact on bats, directly through mortality during the operational phase, and indirectly, through the loss of foraging habitat, are the following:

- Noise of construction activities;
- Clearance of natural vegetation for electrical connections, upgrading of access roads, creating hard standing areas or laydown areas;
- In cases where there will be demolition of existing buildings;
- New buildings, such as the BESS and on-site SS complex;
- It there are excavating areas or in areas where borrow pits are created (if required);
- Operational wind turbines. The turbine hub height and rotor diameter are 200 m each;
- Artificial lighting; and
- Decommissioning activities.

D.2.4.3 Potential Impacts

Bats are long-lived mammals and females often produce only one pup per year, resulting in a life-strategy characterized by slow reproduction (Barclay & Harder, 2003). Because of this, bat populations are sensitive to changes in mortality rates and their populations tend to recover slowly from declines. The potential impacts identified during the Bat Impact Assessment include:

Construction Phase:

- Roost disturbance, destruction and fragmentation due to construction activities;
- Creating new habitat amongst the turbines, such as buildings, excavations, or quarries (if applicable); and
- Disturbance to bats during the construction activities during night-time.

Roost disturbance, destruction and fragmentation due to construction activities

The destruction of active bat roosts and/or features that could serve as potential roosts, such as rock formations situated at the southern area of the site and the removal of the limited number of trees on site. The destruction of derelict holes, such as aardvark holes and any fragmentation of woody habitat which include dense bushes. The removal of limited trees and bushes would have an impact on the clutter and clutter-edge foraging groups.

Creating new habitat amongst the turbines, such as buildings, excavations, or quarries (if relevant)

Creating new habitat amongst the turbines which might attract bats. This include buildings with roofs that could serve as roosting space or open water sources in areas where borrow pits are created (if required); quarries or excavation (where applicable) where water could accumulate.

Operational Phase:

- Mortality due to direct collision or barotrauma of resident bats;

- Mortality due to direct collision or barotrauma of migrating bats;
- Loss of bats of conservation value;
- Attraction of bats to wind turbines;
- Loss of habitat and foraging space; and
- Reduction in the size, genetic diversity, resilience, and persistence of bat populations.

Mortality due to direct collision or barotrauma of resident bats

Fatality through direct collision or barotrauma of resident bats occupying the airspace amongst the turbines. The turning blades of the turbines during operation are the most important aspect of the project that would impact negatively on bats. High flying Molossidae species have predominantly been confirmed at the proposed Komas WEF site.

Mortality due to direct collision or barotrauma of migrating bats

Bat fatality during migration. A limited amount of calls similar to *Miniopterus natalensis* (Natal Long-fingered bat), a migration species, have been recorded.

Loss of bats of conservation value

Loss of bats of conservation value. A limited amount of calls similar to the red data *Miniopterus natalensis* have been recorded, as well as the endemic *Sauromys petrophilus.*

Attraction of bats to wind turbines

Bat mortality due to the attraction of bats to wind turbines (Horn, *et al*. 2008). Bats have been shown to sometimes be attracted to wind turbines out of curiosity or reasons still under investigation.

Reduction in the size, genetic diversity, resilience, and persistence of bat populations

Reduction in the size, genetic diversity, resilience and persistence of bat populations. Bats have low reproductive rates and populations are susceptible to reduction by fatalities other than natural death. Furthermore, smaller bat populations are more susceptible to genetic inbreeding.

<u>Decommissioning Phase:</u>

- Disturbance due to decommissioning activities.

<u>Cumulative Impacts:</u>

- Cumulative effect of construction activities of several WEFs within 50 km from the proposed Komas WEF site. Although solar PV facilities have some impact in terms of habitat destruction, only WEFs were considered, as the operational cumulative impact of wind is the more severe and not comparable to the minor impact of solar PV facilities on bats.
- Cumulative resident bat mortality due to all the WEFs;
- Cumulative bat mortality due to direct collisions with the blades or barotrauma during foraging of migrating bats; and
- Cumulative reduction in the size, genetic diversity, resilience, and persistence of bat populations.

For the cumulative effect, the total output of approximately 1 063.7 MW for wind farm developments within a 50 km radius of the proposed Komas WEF, was considered. With Komas WEF added to this, the output will be 1 363.7 MW. Although not all the bat studies undertaken as part of a BA/ EIA of proposed wind farms within the 50 km radius were available, the bat monitoring reports of the wind farms directly adjacent to the proposed Komas WEF, were obtained. The collective Bat Index, thus the mean number of bats per hour per year, using Kap Vley, Namas, Kleinzee, Zonnequa and Komas WEFs, is calculated at **0,18**. According to the threshold levels of the Bat Guidelines (Sowler et al. 2017), this is classified as **high**. This is exacerbated by the fact that most bats occurring at these farms are medium-high or high risk species. If mitigation is diligently conducted at all these wind farms, this impact could be reduced.

D.2.4.4 Proposed mitigation measures

The following mitigation measures are proposed for the proposed Komas WEF:

1. **Turbine positions**

   The first step in mitigating the potential negative impacts of a proposed WEF on bats is to site turbines outside of sensitive areas. The applicant has already updated the initial turbine layout to exclude turbines or turbine components from the high bat sensitivity zones (see Figure 30 of the Bat Impact Assessment included in Appendix C.4 of this BA Report).

2. **Curtailment**[11]

   A. Curtailment to be implemented immediately from the onset of the turbines situated within the medium to high sensitivity zone, thus the moment the turbines start to turn. Therefore, turbines, WTG 23, WTG 24, WTG 37 WTG 38 and WTG 50 are not allowed to turn during the months, time periods and conditions indicated in the table below: If the developer decides to reduce the number of turbines, the first option, after the wind regime is taken into account, should be to reduce the turbines in the medium to high sensitivity zone. If a substantial number of turbines in the medium sensitivity zone is reduced, it will be at the discretion of the operational bat specialist as to whether some of the curtailment at the medium to high zone could be relieved. Operational monitoring and carcass searches will have to inform this decision.

CURTAILMENT FOR TURBINES NUMBERED WTG23, WTG24, WTG37, WTG38 AND WTG50			
Months	**Time periods**	**Temperature (°C)**	**Wind speed (m/s)**
February	19:00 – 02:00	Between 14 and 19 °C	Between 2.5 and 9 m/s
March	19:00 – 02:00	Between 14 and 19 °C	Between 2.5 and 9 m/s
April	19:00 – 02:00	Between 14 and 19 °C	Between 2.5 and 9 m/s

[11] Curtailment entails locking or feathering the turbine blades during high bat activity periods to reduce the risk of bat mortality via collision with blades and barotrauma. This results in a reduction of the power generation during conditions when electricity would usually be supplied (taken from the Bat Impact Assessment Report (Appendix C.4 of this BA Report).

B. **Additional Curtailment** to be implemented, under the advice and supervision of the bat specialist to be appointed at the start of the operational phase, when medium and high estimated true bat mortality is experienced.

MITIGATION FOR TURBINE NUMBERS WTG23, WTG24, WTG37, WTG38 and WTG50, or as advised by the bat specialist			
Months	**Time periods**	**Temperature (°C)**	**Wind speed (m/s)**
September	19:00 – 02:00	Between 14 and 22 °C	Between 2.5 and 9 m/s
December	19:00 – 02:00	Between 14 and 22 °C	Between 2.5 and 9 m/s
January	19:00 – 02:00	Between 14 and 22 °C	Between 2.5 and 9 m/s

3. Feathering and Freewheeling of turbine blades

Normally operating turbine blades are at right angles to the wind. To avoid bat fatality at areas highly sensitive to bat activity, feathering as a mitigation measure is applied and the angle of the blades is pitched parallel with the wind direction and so that the blades only spin at very low rotation and minimal movement (not complete standstill) to prevent. The turbines will not come to a complete standstill, but the movement of the turbines would be minimal so that to prevent bat fatalities are prevented during conditions when power is not generated.

The cut-in speed is the lowest wind speed at which turbines generate power. Free-wheeling occurs when turbine blades are allowed to rotate below the cut-in speed and thereby increase the risk of collision at areas already highly sensitive to bat activity. Freewheeling should be prevented as much as possible, and to an extent that bat mortality is avoided below cut-in speed and should commence immediately after installation for the duration of the project to prevent bat mortality.

4. Bat deterrents

Bat deterrents are a developing technology that works on the principle of emitting ultrasonic noise that prevents bats from echolocating and therefore cause bats to avoid the area. Not enough research is done in South Africa to establish the success of bat deterrents yet, but this mitigation measure could be used together with curtailment, or even as an alternative, depending on research and the consequent opinion of the operational bat specialist and SABAA. During post construction, turbines with high mortality could be specifically targeted for bat deterrents.

Bat deterrent suppliers indicate that Molossidae bats react well to deterrents. This could be an option for mitigation but will have to be discussed with a bat specialist and the applicant. Deterrents are now deployed at two operational wind farms in South Africa and the current bat specialist, Ms Stephanie Dippenaar, is managing one of these WEFs. They are awaiting bat monitoring information to ascertain the effectiveness of the deterrents.

All turbine components should be excluded from no-go areas as indicated on the bat sensitivity map. Mitigation is recommended, as per Section 9 of the Bat Impact Assessment (Appendix C.4 of this BA Report) and summarised in section A above in section D 2.4.4 of this BA Report, for the turbines situated within the medium to high sensitivity zones. The rest of the proposed Komas WEF site is classified as medium sensitivity. Operational monitoring should inform the extent of mitigation required, but due to the bat activity being above the threshold, there is a possibility that more stringent mitigation would be required and would need to be implemented by the developer. The threshold range is specified in the Bat Guidelines (Sowler et al. 2017) (0 to >13 bat passes per hour, with >13 pointing to a high class (an upper class) of the Succulent Karoo bat threshold. Therefore, the developer needs to include this in the financial cost structure from the start of the project.

D.2.4.5 Impact Assessment

The table below includes an assessment of the potential **direct impacts** to bats identified for the proposed Komas WEF and associated infrastructure for the construction, operational and decommissioning phases. It also includes an assessment of the potential cumulative impacts. The full assessment is provided in the Bat Impact Assessment (Appendix C.4 of the BA Report).

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Active roost destruction and potential roost destruction.	• Keep construction activities out of high sensitive areas for bats. • Avoid destruction of rock formations along southern ridge lines. • Avoid destruction of trees. • Take care before destroying dense bushes to avoid unnecessary roost destruction. • All aardvark holes, derelict holes or excavations should be carefully investigated for bat roosts before destruction.	**Moderate**	**Low**
Creating new habitat amongst the turbines which might attract bats. This include buildings with roofs that could serve as roosting space or open water sources from quarries or excavation where water could accumulate.	• Completely seal off roofs of new buildings (e.g. SS and site buildings). Note a small bat species could enter a hole the size of one- by- one centimetres. • Roofs need to be regularly inspected during the lifetime of the wind farm and any new holes need to be sealed. • Excavation areas or artificial depressions should be filled and rehabilitated to avoid creating areas of open water sources which could attract bats during rainy spells.	**Moderate**	**Very Low**
Construction noise, especially during night-time.	• Nightly construction activities should be avoided, or if necessary, minimised to the shortest period possible. • With the exception of compulsory civil aviation lighting, artificial lighting during construction should be minimised, especially bright	**Moderate**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	lights or spotlights. • Lights should avoid skyward illumination. Turbine tower lights should be switched off when not in operation, where possible.		
OPERATIONAL PHASE: DIRECT IMPACT			
Fatality of resident bats through direct collision or barotrauma.	• Mitigation as proposed in Section A above in section D 2.4.4 of this BA Report as well as in Section 9.2 (Table 7) of the Bat Impact Assessment (Appendix C.4) should be applied from the start of operation of the turbines for the site as a whole. Mitigation measures must be adapted by a bat specialist as data is collected during the operational phase. • Mitigation as proposed for Medium to High sensitivity zones indicated in Section B above and in Section 9.2 (Table 8), of the Bat Impact Assessment (Appendix C.4), must be adhered to as from the start of operation of the turbines. If the developer decides to reduce the number of turbines, the first option, after the wind regime is taken into account, should be to reduce the turbines in the medium to high sensitivity zone. If a substantial number of turbines in the medium sensitivity zone is reduced, it will be at the discretion of the operational bat specialist as to whether some of the dfsfr at the medium to high zone could be relieved. Operational monitoring and carcass searches will have to inform this decision. • A suitably qualified bat specialist must be appointed at the start of the operational phase. Careful observation should take place during post-construction and mitigation should be discussed between the bat specialist and Project Developer. Mitigation should be adapted and implemented without delay. Where high bat mortality occurs, those turbines should be mitigated, using Section B above in section D 2.4.4	**High**	**Moderate**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	of this BA Report and Section 9.2 (Table 8) of the Bat Impact Assessment (Appendix C.4), as a starting point for discussions. • With the exception of compulsory civil aviation lighting, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible. • At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South African Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et. al., 2020) or later versions valid at the time of monitoring, as well as other relevant South African guidelines as applicable during the monitoring period. • It is understood that static monitoring equipment for bats on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines, but having more refined static data from sampling points at height, would aid in interpreting future fatality records of the wind farm; therefore, the installation of more than one monitoring system at height, will be recommended. • Ultrasound should be investigated for use at turbines displaying high mortality.		
Bat fatality of migratory species through direct collision or barotrauma.	• Mitigation measures as described above for the impact regarding the fatality of resident bats through direct collision or barotrauma (as contained in Section 11.2.1 of the Bat Impact Assessment (Appendix C.4)).	**Low**	**Low**
Loss of bats of conservation value.	• Mitigation measures as described above for the impact regarding the fatality of resident bats through direct collision or barotrauma (as	**Low**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	contained in Section 11.2.1 of the Bat Impact Assessment (Appendix C.4)). Proven mitigation measures, such as curtailment, should be applied if high numbers of bat passes concerned with bats of conservation value is recorded during post-construction.		
Bat fatality due to the attraction of bats to turbine blades.	• Investigate ultrasonic deterrents and implement at turbines with high fatality.	**Low**	**Low**
Loss of habitat and foraging space during operation of the wind turbines.	• Mitigation measures as described above for the impact regarding the fatality of resident bats through direct collision or barotrauma (as contained in Section 11.2.1 of the Bat Impact Assessment (Appendix C.4)).	**High**	**Moderate**
OPERATIONAL PHASE: INDIRECT IMPACT			
Reduction in size, genetic diversity, resilience, and persistence of bat populations.	• Mitigation measures as described above for the impact regarding the fatality of resident bats through direct collision or barotrauma (as contained in Section 11.2.1 of the Bat Impact Assessment (Appendix C.4)). Care should be taken during post construction monitoring to verify the numbers of this species, especially within the RSA of the turbine blades.	**High**	**Moderate**
DECOMMISSIONING PHASE: DIRECT IMPACT			
Bat disturbance due to decommissioning activities and noise, especially during night-time.	• Nightly decommissioning activities should be avoided, or if necessary, minimised to the shortest period possible. • Except for compulsory lighting required in terms of civil aviation, artificial lighting during construction should be minimised, especially bright lights or spotlights. • Lights should avoid skyward illumination.	**Low**	**Very Low**
CUMULATIVE IMPACTS			
CONSTRUCTION PHASE			

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
Cumulative effect of construction activities of several WEFs within 50 km from the proposed Komas WEF site. Cumulative effect of destruction of active roosts due to several WEFs as well as features that could serve as potential roosts.	• Project specific mitigation should be adhered to, especially adhering to buffer zones and sensitivity areas and recommended mitigation, for each renewable energy project. • Post construction bat monitoring as per the relevant Bat South African guidelines.	**Moderate**	**Low**
CUMULATIVE IMPACTS			
OPERATIONAL PHASE: DIRECT IMPACTS			
Cumulative bat mortality of **resident bats** due to direct blade impact or barotrauma during foraging of migrating bats on several wind farms.	• Although not enforceable on the Project Applicant it is recommended that the project specific mitigation should be adhered to and each wind farm should apply specific mitigation measures as recommended. • Although not enforceable on the Project Applicant it is recommended that the buffer zones and sensitivity areas should be adhered to and recommended mitigation, for each renewable energy project. Post construction monitoring as per the relevant bat guidelines in South Africa. • Post construction monitoring as per the relevant bat guidelines in South Africa.	**High**	**High**
Cumulative bat mortality of **migrating bats** due to direct blade impact or barotrauma during foraging of migrating bats on several wind farms.	• Although not enforceable on the Project Applicant it is recommended that the project specific mitigation should be adhered to and each wind farm should apply specific mitigation measures as recommended. • Although not enforceable on the Project Applicant it is recommended	**Moderate**	**Low**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	that the buffer zones and sensitivity areas should be adhered to and recommended mitigation, for each renewable energy project. • Post construction monitoring as per the relevant guidelines in South Africa.		
Habitat loss over several wind farms.	• Although not enforceable on the Project Applicant it is recommended that the project specific mitigation should be adhered to, especially adhering to buffer zones and sensitivity areas and recommended mitigation, for each WEF. • Post construction monitoring as per the relevant guidelines in South Africa.	**Moderate**	**Low**
CUMULATIVE IMPACTS			
OPERATIONAL PHASE: INDIRECT IMPACTS			
Cumulative reduction in the size, genetic diversity, resilience and persistence of bat populations	• Although not enforceable on the Project Applicant it is recommended that the project specific mitigation should be adhered to and each wind farm should apply specific mitigation measures as recommended. • Although not enforceable on the Project Applicant it is recommended that the buffer zones and sensitivity areas should be adhered to and recommended mitigation, for each renewable energy project. • Post construction monitoring as per the relevant bat guidelines in South Africa.	**High**	**Low**

D.2.4.6 Comparative Assessment of Alternatives

No turbine layout alternatives were provided; however, the initial turbine layout was re-designed after specialist input to avoid environmental sensitive areas on site. Alternatives were provided for the BESS and on-site SS complex area (Option 1 and Option 2). Apart from habitat destruction, the negative impact of an onsite SS on insectivorous bats should be low. There is no preference from a bat perspective and both options are acceptable.

D.2.4.7 Assessment of No-Go Alternative

Although the No-Go alternative was investigated, it is understandable that this is a renewable energy development within the REDZ, and development is inevitable. One development option, i.e. the proposed WEF, was provided, which is the preferred option.

D.2.4.8 Concluding statement

According to the likelihood of fatality risk, as indicated by the South African Good Practice Guidelines for Surveying Bats in Wind Farm Development - Pre-construction (Sowler et. al. 2017), *Tadarida aegyptiaca* (Egyptian free-tailed bat of the *Molossidae* family) is the most dominant species on site, with nearly all the calls recorded at the high monitoring system, situated within the rotor swept area of the proposed turbine blades. These are high risk bats as they are adapted to foraging at high altitudes. Limited activity has been recorded by *M. natalensis*, the only red data species noted at the proposed Komas WEF site. Although the Molossidae species, *T. aegyptiaca* and *S. petrophilus*, have a conservation status of Least Concern, abundant species are valuable to local ecosystems as their contribution to ecological services is greater due to their high numbers.

The extent to which bats may be affected by the proposed Komas wind farm will depend on the extent to which the proposed development area is used for foraging or as a flight path by local bats. The most important aspect of the project that would affect bats adversely is the wind turbines themselves, and direct collisions and barotrauma because of operational turning blades. Some of the other main potential negative impacts to bats include loss of foraging habitat, loss of existing and potential roosts and attracting bats by artificially creating new bat conducive areas.

During the pre-construction monitoring period, the nightly mean bat activity was higher than the highest threshold figures for Succulent Karoo for the site as a whole. Therefore, bat populations might be severely negatively impacted upon by the proposed Komas WEF development, should the development progress without the implementation of the recommended mitigation measures. The monitoring system stationed at high altitude (110 m) was used to plot bat activity and weather conditions to describe the relationship between bats and weather conditions on site, in particular the activity within the rotor swept area of the turbine blades. This information was then used to develop a mitigation scheme for the proposed Komas WEF.

As indicated above, the mean number of bats per hour per year for the proposed Komas WEF as well as the surrounding authorised WEFs, are calculated at 0,18. According to the threshold levels of the South African Good Practice Guidelines for Surveying Bats in Wind Farm Development - Pre-construction (Sowler *et al*. 2017), this Bat Index is classified as high. This is excarbated if one considers that most bats are high risk species. It is therefore evident that due to the large area and the bat activity for the Succulent Karoo biome, the cumulative effect would be high. If mitigation is diligently conducted at all WEFs, this impact could be reduced.

All bat species observed at the proposed Komas WEF site were more active between February and May, with a peak in activity around March 2020. High bat activity was also observed in September 2020, during spring. The highest bat activity was recorded in the southern section of the farm. In general, bats seem to be active from about two hours after sunset, while a gradual decline of activity is shown from 0:00 to sunrise.

All turbines components should be excluded from the no-go areas as indicated on the bat sensitivity map (Figures D.8 and D.12 of this BA Report). The revised turbine layout avoids these areas. Mitigation is recommended, as per Section 9.2 (Table 8) of the Bat Impact Assessment (Appendix C.4 of this BA Report), for the turbines situated within the medium-high sensitivity zones. The remainder of the proposed Komas WEF site is classified as of medium sensitivity and if it is recommended that mitigation measures (such as feathering of blades parallel with wind direction) are applied so that blades turn at very low rotation and minimal movement (not complete standstill) to prevent bat fatalities during conditions when power is not generated.

The following mitigation measures are proposed:

- Curtailment to be implemented as specified in Section 9.2, Table 7 of the Bat Impact Assessment (Appendix C.4 of this BA Report) immediately from the onset of the turbines situated within the medium-high sensitivity zone, thus the moment the turbines start to turn. If the number of turbines are reduced, the developer could consult with the operational bat specialist as to whether curtailment could also be reduced, after more data becomes available.

- Curtailment as specified in Section 9.2, Table 8 of the Bat Impact Assessment (Appendix C.4 of this BA Report), for those turbines situated in the medium sensitivity zone, if necessary and with the advice of the operational bat specialist.

- Freewheeling: The cut-in speed is the lowest wind speed at which turbines generate power. Freewheeling occurs when turbine blades are allowed to rotate below the cut-in speed and thereby increase the risk of collision at areas already highly sensitive to bat activity. Freewheeling should be prevented as much as possible by curtailing blade rotation when turbines are not generating power and feathering of blades parallel to the wind will reduce blade rotation to avoid bat mortality.

- Bat deterrents could be an option for mitigation but will have to be investigated.

Operational monitoring should inform the extent of mitigation required, but due to the general high Bat Index, it is likely that more stringent mitigation might need to be implemented.

It should be noted that 12-months pre-construction bat monitoring is required in terms of the South African Good Practice Guidelines for Surveying Bats in Wind Energy Facility Developments – Pre-Construction (Sowler, et al. 2017), but the semi-desert Succulent Karoo environment is subjected to erratic climate conditions which vary from year to year. These changes could result in changes in the bat activity and occurrence which have not been accounted for in this report. If the proponent adheres to the proposed mitigation measures, the potential impact on bats from the proposed Komas Wind Farm is predicted to be Negative and of Moderate significance. **It is therefore the opinion of the bat specialist, based on the one-year pre-construction monitoring which was undertaken at the proposed Komas WEF site, that EA may be granted for the proposed Komas WEF development.**

D.2.5 Visual (including Flicker) Impact Assessment

The VIA (including Flicker) was undertaken by SiVEST SA (Pty) Ltd to inform the outcome of this BA from a visual perspective. The VIA was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended. The complete VIA is included in Appendix C.5 of this report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the VIA. The information below is extracted from SiVEST SA (2020) (Appendix C.5 of the BA Report).

D.2.5.1 Approach and Methodology

The VIA is based on a combination of desktop-level assessment supported by field-based observation.

- Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by National Geospatial Information (NGI), the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (Geoterraimage – 2018). The characteristics identified via desktop means were later verified during the site visit.

- Identification of sensitive and potentially sensitive receptor locations

Visual receptor locations and routes that are sensitive and / or potentially sensitive to the visual intrusion of the proposed development were assessed in order to determine the impact of the proposed development on each of the identified receptor locations.

- Fieldwork and photographic review

A four (4) day site visit was undertaken between the 10th and the 13th of February 2020 (mid-summer). The aim of the site visit was to:

a. verify the landscape characteristics identified via desktop means;
b. conduct a photographic survey of the proposed study area;
c. verify the sensitivity of visual receptor locations identified via desktop means;
d. eliminate receptor locations that are unlikely to be influenced by the proposed development;
e. identify any additional visually sensitive receptor locations within the study area; and
f. assist with the impact rating assessment from visually sensitive receptor locations.

- Photomontages

An indicative range of locations (referred to as "view points") was selected for modelling purposes and photomontages were produced from these viewpoints. The preliminary wind turbine layout for the proposed Komas WEF, as provided by the Applicant, was modelled in 3D at the correct scale and then superimposed onto landscape photographs taken during the site visit. Although the turbine layout has subsequently changed, the resulting photomontages still demonstrate the likely visibility of the proposed turbines from various locations within the visual assessment zone and also illustrate how views from each selected view point could potentially be transformed by the proposed Komas WEF development if the wind turbines are erected on the site as proposed.

D.2.5.2 Relevant Project Aspects relating to Visual Impacts

Detailed below is a preliminary list of the key components of the proposed Komas WEF development that have visual implications. Although the associated on-site infrastructure has been included here, the visual impact of associated infrastructure is generally far less significant than the visual impact associated with wind turbines. The infrastructure would however, magnify the visual prominence of the proposed development if located on ridge tops or flat sites in natural settings where there is limited tall wooded vegetation present to conceal the impact.

- <u>**Turbines**</u>

Wind turbines proposed for the Komas WEF will have a hub height of up to 200 m, a rotor diameter of up to 200 m and a blade length of up to 100 m (Figure D.4), resulting in a maximum height at the blade tip of 300 m. At this stage, it is proposed that up to 50 turbines will be constructed. The height of the turbines and their location on relatively flat terrain would result in the development typically being visible over a large area.

Internationally, studies have demonstrated that there is a direct correlation between the number of turbines and the degree of objection to a WEF, with less opposition being encountered when fewer turbines are proposed (Devine-Wright, 2005). Certain objectors to wind energy developments also mention the “sky space” occupied by the rotors of a turbine. As well as height, "sky space" is an important issue. “Sky space” refers to the area in which the rotors would rotate.

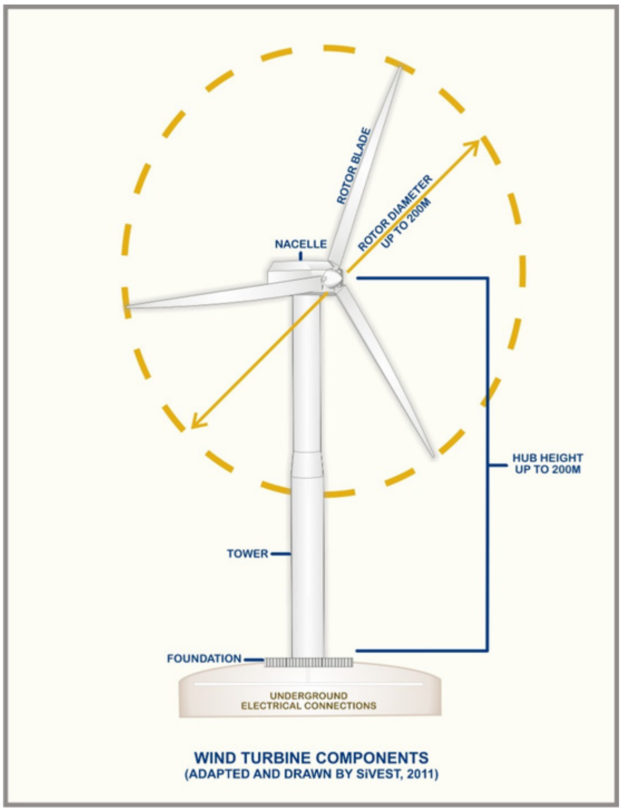


Figure D.4: Typical components of a wind turbine

The visual prominence of the development would be exacerbated within natural settings, in areas of flat terrain or if located on a ridge top. Even dense stands of wooded vegetation are likely to offer only partial visual screening, as the wind turbines are of such a height that they will rise above even mature large trees.

- <u>**Shadow flicker**</u>

Shadow flicker is an effect which is caused when shadows repeatedly pass over the same point. It can be caused by wind turbines when the sun passes behind the hub of a wind turbine and casts a shadow that continually passes over the same point as the rotor blades of the wind turbine rotate (http://www.ecotricity.co.uk).

The effect of shadow flicker is only likely to be experienced by people situated directly within the shadow cast by the rotor blades of the wind turbine. As such, shadow flicker is only expected to have an impact on people residing in houses located within close proximity of a wind turbine (less than 500 m) and at a specific orientation, particularly in areas where there is little screening present. Shadow flicker may also be experienced by and impact on motorists if a wind turbine is located in close proximity to an existing road. The impact of shadow flicker can be effectively mitigated by choosing the correct site and layout for the wind turbines, taking the orientation of the turbines relative to the nearby houses and the latitude of the site into consideration. Tall structures and trees will also obstruct shadows and prevent the effect of shadow flicker from impacting on surrounding residents (http://www.ecotricity.co.uk).

- **Motion-based visual intrusion**

An important component of the visual impacts associated with wind turbines is the movement of the rotor blades. Labelled as motion-based visual intrusion, this refers to the inclination of the viewer to focus on discordant, moving features when scanning the landscape. Evidence from surveys of public attitudes towards WEFs suggest that the viewing of moving rotor blades is not necessarily perceived negatively (Bishop and Miller, 2006). The authors of the study suggest two possible reasons for this; firstly, when the turbines are moving they are seen as being 'at work', 'doing good' and producing energy. Conversely, when they are stationary they are regarded as a visual intrusion that has no evident purpose. More interestingly, the second theory that explains this perception is related to the intrinsic value of wind in certain areas and how turbines may be an expression or extension of an otherwise 'invisible' presence.

Famous winds across the world include the Mistral of the Camargue in France, the Föhn in the Alps, or the Bise in the Lavaux region of Switzerland. The wind, in these cases, is an intrinsic component of the landscape being expressed in the shape of trees or drifts of sands, but being otherwise invisible. The authors of the study argue that wind turbines in these environments give expression, when moving, to this quintessential landscape element. In a South African context, this phenomenon may well be experienced if wind farms are developed in areas where typical winds, like berg winds, or the south-easter in the Cape are an intrinsic part of the environment. In this way, it may even be possible that wind farms will, through time, form part of the cultural landscape of an area, and become a representation of the opportunities presented by the natural environment.

BESS and On-site Substation complex

The BESS and on-site SS structures are generally large, highly visible structures which are more industrial in character than the other components of a WEF. In the context of a largely natural landscape, the new BESS and on-site SS complex will be perceived to be highly incongruous. However, the BESS and on-site SS complex would likely be perceived as a part of the proposed Komas WEF complex and as such, the BESS and SS complex would be dwarfed by the large number of turbines that would be visible. The proposed BESS and on-site SS complex is thus not expected to be associated with any significant visual impacts, or even a measurable cumulative impact. At this stage, two (2) BESS and on-site SS complex site alternatives (i.e. Option 1 and Option 2) have been identified for assessment during the BA process.

- **Overhead Power lines/underground cabling**

Wind turbines will be connected to the proposed on-site SS using medium voltage (33 kV) underground cabling. Excavations associated with the power lines may become prominent if they create a linear feature that contrasts with the surrounding vegetation.

Figure D.5 below shows the process typically associated with the generation of electricity from WEFs.

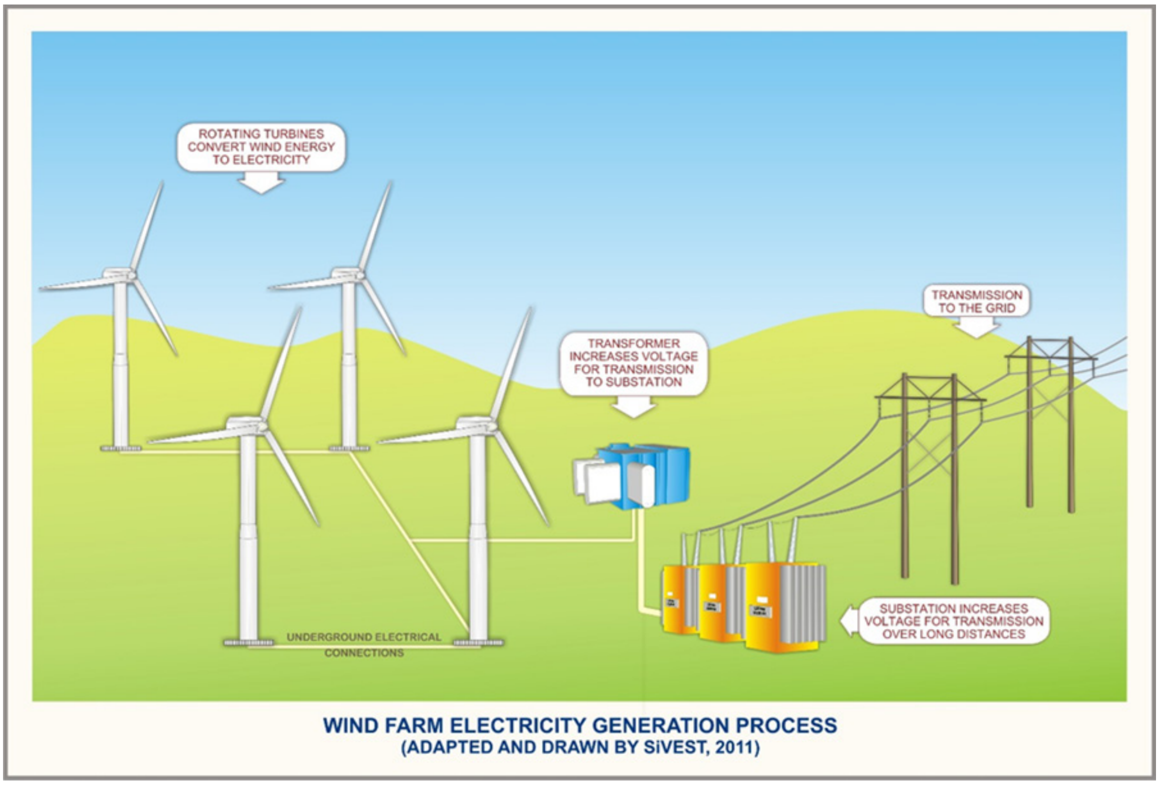


Figure D.5: Conceptual wind farm electricity generation process showing electrical connections.

- **Access Roads**

Access roads may become visually prominent if they create linear features which contrast with the surrounding landscape. The level of contrast would increase where the roads require the cutting of 'terraces' into steep-sided slopes or across contours. Considering that the proposed access roads will be mostly located on flat terrain, it is likely that visual impacts associated with the construction of these access roads will be reduced. If, however these roads are not maintained correctly during the construction phase, vehicles travelling along the gravel access roads could expose surrounding farmsteads / homesteads to dust plumes.

- **Construction Laydown Areas**

From a visual perspective, laydown areas could result in visual impacts if they are placed in prominent positions such as on ridge tops. In these locations, buildings may break the natural skyline, drawing the attention of the viewer.

The visual impact of infrastructure associated with a WEF is generally not regarded as a significant factor when compared to the visual impact associated with wind turbines. The infrastructure would however increase the visual "clutter" of the WEF and magnify the visual prominence of the development if located on ridge tops or flat sites in natural settings where there is limited tall wooded vegetation to conceal the impact.

D.2.5.3 Potential Impacts

The potential visual impacts resulting from the proposed Komas WEF project on landscape features and receptors are listed below for each of the project phases, including cumulative impacts. The impacts identified are direct and cumulative impacts. No indirect impacts have been identified.

Construction Phase:

- Potential visual intrusion resulting from large construction vehicles and equipment;
- Potential visual effect of construction laydown areas and material stockpiles;
- Potential impacts of increased dust emissions from construction activities and related traffic;
- Potential visual pollution resulting from littering on the construction site; and
- Potential visual scarring of the landscape as a result of site clearance and earthworks.

The construction activities may result in large trucks travelling to and from the development site. This will impact on the natural character of the study area. The increased traffic on these roads and the dust plumes will create a visual impact. In addition, surface disturbance during construction would also result in a greater amount of bare soil being exposed which could result in a greater visual contrast with the surrounding environment.

The assessment revealed that the proposed WEF will have a negative low visual impact significance during construction, with the implementation of the recommended mitigation measures.

Operational Phase:

- Potential alteration of the visual character of the area;
- Potential visual intrusion resulting from wind turbines dominating the skyline in a largely natural / rural area;
- Potential visual clutter caused by the SS and other associated infrastructure on-site;
- Potential visual effect on surrounding farmsteads; and
- Potential alteration of the night-time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines.

Overall, the 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 rural setting. As such, WEF development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader in the study area.

The area is not however typically valued or utilised for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. The proposed development will have a high level of impact on three (3) of these receptors, a medium level of impact on seven (7) identified receptors and negligible impact on the remaining three (3) receptors-please refer to the table below.

Summary: Potentially sensitive visual receptor rating

Receptor Location	Distance to Nearest Turbine	Screening	Contrast	overall Impact Rating
R02 – Farmstead	Medium (2)	Medium (2)	High (3)	**MEDIUM (7)**
R03 – Farmstead	High (3)	Medium (2)	High (3)	**HIGH (8)**
R04 – Farmstead	Medium (2)	Medium (2)	High (2)	**MEDIUM (6)**
R05 – Farmstead	Low (1)	High (3)	Medium (2)	**MEDIUM (6)**
R06 – Farmstead	>10KM FROM NEAREST TURBINE			**NEGLIGiBLE**
R10 – Farmstead	Low (1)	Medium (2)	Medium (2)	**MEDIUM (5)**
R12 – Farmstead	Low (1)	High (3)	High (3)	**MEDIUM (7)**
R14 – Farmstead	High (3)	High (3)	High (3)	**HIGH (9)**
R15 – Farmstead	Medium (2)	High (3)	High (3)	**HIGH (8)**
R16 – Farmstead	>10KM FROM NEAREST TURBINE			**NEGLIGiBLE**
R18 – Farmstead	Low (1)	Medium (2)	High (3)	**MEDIUM (6)**
R20 – Farmstead	>10KM FROM NEAREST TURBINE			**NEGLIGiBLE**
R21 – Farmstead	Low (1)	Medium (2)	High (3)	**MEDIUM (6)**

The assessment revealed that the proposed WEF will have a negative moderate visual impact during operation, with relatively few mitigation measures available to reduce the visual impact.

Decommissioning Phase:

- Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process; and
- Potential impacts of increased dust emissions from decommissioning activities and related traffic.

Cumulative Impacts:

- Combined visual impacts from several renewable energy facilities in the broader area during the construction and operation phases could potentially alter the sense of place and visual character of the area; and

- Combined visual impacts from several renewable energy facilities in the broader area during construction and operations phases could potentially exacerbate visual impacts on visual receptors.

Several renewable energy developments are being proposed within a 50 km radius of the proposed Komas WEF application site. These renewable energy developments have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other, could significantly alter the sense of place and visual character in the broader region. It was however determined, that only five of these would have any significant impact on the landscape within the study area, these being; the proposed Gromis WEF which is subject to another BA process which is currently being undertaken, the proposed Kleinzee WEF and the proposed Kap Vley, Namas and Zonnequa WEFs (which have received EAs on 25 October 2018, 18 February 2019 and 25 February 2019 respectively). All of these projects are in close proximity to one another and to the proposed Komas WEF development area and it is anticipated that this concentration of facilities will alter the inherent sense of place and introduce an increasingly industrial character into a largely rural area. This will result in significant cumulative impacts, rated as having negative impacts of moderate significance during both construction and operation phases of the project. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists.

It should be noted that the study area is located within the Springbok REDZ (known as REDZ 8), and thus the relevant authorities support the concentration of renewable energy developments in this area. In addition, it is possible that the three WEFs (i.e. the Kap Vley, Namas and Zonnequa WEFs) in close proximity to each other could be seen as one large WEF rather than three separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

D.2.5.4 *Impact Assessment*

The table below includes a summary of the assessment of the potential **direct visual impacts** identified for the proposed Komas WEF and associated infrastructure for the construction, operational and decommissioning phases. It also includes a summary of the cumulative impacts. The full assessment is provided in the VIA (Appendix C.5 of the BA Report).

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			

Visual intrusion, visual effect of construction laydown areas and material stockpiles, visual pollution resulting from littering on the construction site, landscape scarring and dust emissions.	• Carefully plan to minimise the construction period and avoid construction delays.
	• Position laydown areas and related storage / stockpile areas in unobtrusive positions in the landscape, where possible.
	• Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
	• Vegetation clearing should take place in a phased manner.
	• 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.
	• Ensure that dust suppression techniques are implemented:
	  ○ on all access roads;
	  ○ in all areas where vegetation clearing has taken place; and
	  ○ on all soil stockpiles.
	• Maintain a neat construction site.
		Moderate	**Low**

OPERATIONAL PHASE: DIRECT IMPACTS			
Alteration of visual character of the area, visual intrusion resulting from wind turbines dominating the skyline in a largely natural / rural area, Kap Vley, Namas and Zonnequa WEFs visual	<u>Design Phase:</u> • In areas of 'Very High' and 'High Sensitivity', the number of turbines should be limited, where possible. • No turbines should be placed within 500 m of the dwellings or farmsteads which are situated within the proposed Komas WEF development area (i.e. 500 m	**Moderate**	**Moderate**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
clutter caused by the SS and other associated infrastructure on-site, dust emissions, visual effect on surrounding farmsteads, and light pollution and glare (i.e. alteration of the night-time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines).	exclusion buffers – see Figures D.9 and D.12). • Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. • Turbine colours should adhere to the SACAA requirements. <u>Operational Phase:</u> • If possible, turbines should be painted plain white, as this is a less industrial colour. Bright colours and logos on the turbines should be kept to a minimum. • Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). • If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale. Repeating elements of the same height, scale and form can give the impression of unity which will lessen the visual impact that would typically be experienced in a chaotic landscapes made up of diverse colours, textures and patterns (Vissering, 2011). • Light fittings for security at night should reflect the light toward the ground and prevent light spill. • Where practically possible, the O&M buildings should not be illuminated at night. • Cables should be buried underground where feasible. • The O&M buildings should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible. • Unless there are water shortages, dust suppression techniques must be implemented on all access roads.		
DECOMMISSIONING PHASE: DIRECT IMPACTS			

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
Visual intrusion and dust emissions.	• Carefully plan to reduce the decommissioning period. • Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. • Maintain a neat decommissioning site by removing rubble and waste materials regularly. • Make use of existing gravel access roads where possible. • Dust suppression techniques must be implemented on all gravel access roads.	**Moderate**	**Low**
CUMULATIVE IMPACTS			
CONSTRUCTION ACTIVITIES			

Visual intrusion and dust emissions.
Combined visual impacts from several renewable energy facilities in the broader area during the construction phase could potentially alter the sense of place and visual character of the area.
Combined visual impacts from several renewable energy facilities in the broader area during construction phase could potentially exacerbate visual impacts on visual receptors.
	• Carefully plan to minimise the construction period and avoid construction delays.
	• Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.
	• Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
	• Vegetation clearing should take place in a phased manner.
	• Access roads must be kept as narrow as possible and existing gravel access roads must be used where possible.
	• Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible.
	• Ensure that dust suppression techniques are implemented:
	    ○ on all access roads;
	    ○ in all areas where vegetation clearing has taken place; and
	    ○ on all soil stockpiles.
	• Maintain a neat construction site by removing litter, rubble and waste materials regularly.
	• Formulation and adherence to an EMPr, monitored by an ECO.
	• In areas of 'Very High' and 'High Sensitivity', the number of turbines should be
		Moderate	**Moderate**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	limited, where possible. • Steep slopes (>1:5 gradient) should be avoided.		
CUMULATIVE IMPACTS - OPERATIONAL ACTIVITIES			
Visual intrusion, dust emission and light pollution and glare. Combined visual impacts from several renewable energy facilities in the broader area during operation phase could potentially alter the sense of place and visual character of the area. Combined visual impacts from several renewable energy facilities in the broader area during the operations phase could potentially exacerbate visual impacts on visual receptors.	• Development on steep slopes (>1:5 gradient) should be avoided. • No turbines should be placed within 500 m of the dwellings or farmsteads which are situated within the proposed application (i.e. 500 m exclusion buffers – see Section 1.6.2 of the VIA and Figures D.9 and D.12) • Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. • Turbine colours should adhere to SACAA requirements. • Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. • If possible, turbines should be painted plain white, as this is a less industrial colour. Bright colours and logos on the turbines should be kept to a minimum. • Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). • If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale. Repeating elements of the same height, scale and form can give the impression of unity which will lessen the visual impact that would typically be experienced in a chaotic landscapes made up of diverse colours, textures and patterns (Vissering, 2011). • Light fittings for security at night should reflect the light toward the ground and prevent light spill. • Where practically possible, the O&M buildings should not be illuminated at night.	**Moderate**	**Moderate**

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	• Cables should be buried underground where feasible. • The O&M buildings should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible. • Unless there are water shortages, dust suppression techniques must be implemented on all access roads.		

D.2.5.5 Comparative assessment of alternatives

A comparative assessment of alternatives (Option 1 and Option 2) for the proposed BESS and on-site SS complex area was undertaken in order to determine which of the alternatives would be preferred from a visual perspective.

The BESS and on-site SS complex area Option 1 is situated within a highly natural / scenic part of the study area and as such it is expected to alter the character to some degree. It is located on relatively flat terrain and as such would only be moderately exposed on the skyline. The closest potentially sensitive receptor to this alternative is approximately 2.6 km away, this being the R02 farmstead. The significance of the visual impacts from Option 1 affecting this receptor are therefore rated as moderate. The remaining receptors are all more than 2 km away and thus would only be subjected to moderate or low levels of impact.

In addition, the proposed BESS and on-site SS complex would form part of the proposed Komas WEF and would be dwarfed by the large number of wind turbines that would be visible. Accordingly, no fatal flaws were identified in respect of Option 1. In light of the fact that Option 2 is closer to the nearest receptor, Option 1 is considered to be preferred from a visual perspective (while Option 2 was also found to be favourable). No fatal flaws were therefore identified for either of the alternatives.

D.2.5.6 Assessment of No-Go alternative

The 'No Go' alternative is essentially the option of not developing a WEF in this area. The area would thus retain its visual character and sense of place and there would be no visual impacts. However, considering the fact that the proposed Komas WEF is in the Springbok REDZ and development of other WEF is likely anyway, there are no flaws associated with proceeding with the proposed Komas WEF.

D.2.5.7 Concluding Statement

Overall, the 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 rural setting. As such, WEF development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader in the study area.

The area is not however typically valued or utilised for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. The proposed development will have a high level of impact on three (3) of these receptors, a medium level of impact on seven (7) identified receptors and negligible impact on the remaining three (3) receptors.

The assessment revealed that the proposed Komas WEF will have a negative low visual impact during construction and a negative moderate visual impact during operation, with relatively few mitigation measures available to reduce the visual impact.

Although several proposed renewable energy developments and infrastructure projects were identified within a 50 km radius of the proposed Komas WEF development site, it was determined that only five of these would have any significant impact on the landscape within the visual assessment zone. These are the proposed Gromis WEF which is currently being undertaken as part of a separate BA process and the proposed Kleinzee, Kap Vley, Namas and Zonnequa WEFs. All of these projects are in close proximity to one another and to the proposed Komas WEF development area. It is anticipated that this concentration of facilities will alter the inherent sense of place and introduce an increasingly industrial character into a largely rural area. This will result in significant cumulative impacts, rated as negative moderate during both construction and operation phases of the project. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. It should also be emphasised that the proposed Komas WEF will be located in the Springbok REDZ 8, i.e. an area which is earmarked for the development of WEFs.

It is SiVEST's opinion that the potential visual impacts associated with the proposed Komas WEF development and associated infrastructure during the operational phase are of moderate significance pre- and post-mitigation. Given the low level of human habitation and the absence of sensitive receptors however, the project is deemed acceptable from a visual and flicker perspective and the EA should be granted. SiVEST is of the opinion that the impacts associated with the construction, operation and decommissioning phases of the proposed Komas WEF can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

D.2.6 Heritage Impact Assessment (Archaeology and Cultural Landscape)

The HIA was undertaken by Dr. Jayson Orton of ASHA Consulting (Pty) Ltd to inform the outcome of this BA from an archaeology and cultural landscape perspective (Appendix C.6). The HIA was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended. As noted above, an integrated HIA containing Archaeology, Cultural Landscape and Palaeontology has been undertaken for the project. The complete HIA is included in Appendix C.6 of this report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the HIA. The information below is extracted from Orton (2020) (Appendix C.6 of the BA Report).

D.2.6.1 Approach and Methodology

Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. This literature included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS). The 1:50 000 and 1:250 000 topographic maps and the historical aerial images were sourced from the Chief Directorate: National Geo-Spatial Information. Data were also collected via a field survey.

Field survey

The site was subjected to a detailed foot survey on 6th, 7th, 10th and 11th January 2020. This was during summer but, in this very dry area, the season makes no meaningful difference to vegetation covering and hence the ground visibility for the archaeological survey. Other heritage resources are not affected by seasonality. During the survey the positions of finds and survey tracks were recorded on a hand-held GPS receiver set to the WGS84 datum. Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

It should be noted that the amount of time between the dates of the field inspection and final report do not materially affect the outcome of the study.

D.2.6.2 Relevant Project Aspects relating to Heritage Impacts

All aspects of the proposed development are relevant since excavations for foundations may impact on archaeological and/or palaeontological remains, while the above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage site that might be visually sensitive.

D.2.6.3 Potential Impacts

The potential impacts identified during the HIA include:

Construction Phase

- Potential impacts to palaeontological resources;
- Potential impacts to archaeological resources and graves; and
- Potential impacts to the cultural landscape.

The vast majority of impacts would occur during construction. Palaeontological resources are likely to consist of isolated bones and their locations cannot be predicted. Any fossils present could be of high significance and, if found and reported, impacts are expected to be of **low positive** significance after mitigation. This is because of the difficulty of finding fossils outside of the development context – their recovery would be a benefit to science. The region is well-known for its very high density of archaeological sites but their number and significance often decreases away from the coast. The survey revealed many small Later Stone Age archaeological sites with occasional historical artefacts also present. None of these was of high cultural significance and the WEF has avoided all known sites. Although it is possible that some sites were missed during the survey, these are likely to be less important ones and would be easily recorded during a pre-construction survey. Because of the ease with which mitigation can be effected, the impacts related to the loss of archaeological resources on site are expected to be of **very low negative** significance after mitigation. Although culturally important, graves are very unlikely to be impacted and their locations generally cannot be predicted. The impact significance is therefore expected to be **very low negative** before and after mitigation. Impacts to the cultural landscape cannot be mitigated because of the size of the turbines but the expected impacts would be of **moderate negative** significance. Impacts to the cultural landscape during the operation and decommissioning phases are respectively of low and moderate significance before and after mitigation.

Operational Phase

- Potential impacts to the cultural landscape.

Decommissioning Phase

- Potential impacts to the cultural landscape.

Cumulative impacts

- Potential impacts to palaeontological resources;

- Potential impacts to archaeological resources; and
- Potential impacts to the cultural landscape.

As indicated above, the vast majority of impacts would occur during construction. Cumulative impacts to archaeology are considered to be of moderate negative significance after mitigation, because there is the possibility that a large number of sites could be lost with extensive development of the area.

No indirect impacts are anticipated for the HIA.

D.2.6.4 Impact Assessment

The table below includes a summary of the assessment of the **potential direct heritage impacts** identified for the proposed Komas WEF and associated infrastructure for the construction, operational and decommissioning phases. It also includes a summary of the cumulative impacts. The full assessment is provided in the HIA (Appendix C.6 of the BA Report).

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Loss of palaeontological resources.	• Monitoring, inspection, sampling, curation as required.	**Low**	**Low (+)**
Loss of archaeological resources on site.	• Conduct a pre-construction survey, sampling and curation as required.	**Low**	**Very Low**
Loss of graves.	• Protect and report graves found during construction so that they can be rescued.	**Very Low**	**Very Low**
Impacts to the cultural landscape.	• Minimise the amount of land that gets disturbed and scarred.	**Moderate**	**Moderate**
OPERATIONAL PHASE: DIRECT IMPACT			
Impacts to the cultural landscape.	• None.	**Low**	**Low**
DECOMMISSIONING PHASE: DIRECT IMPACT			
Impacts to cultural landscape.	• Minimise the amount of land that gets disturbed and scarred.	**Moderate**	**Moderate**
CUMULATIVE IMPACTS			
Loss of palaeontological resources.	• Monitoring, inspection, sampling, curation as required.	**Low**	**Low (+)**
Loss of archaeological resources.	• Conduct a pre-construction survey, sampling and curation as required.	**Moderate**	**Very Low**
Loss of graves.	• Protect and report graves found during construction so that they can be rescued.	**Very Low**	**Very Low**
Impacts to the cultural landscape.	• Minimise the amount of land that gets disturbed and scarred.	**Moderate**	**Moderate**

D.2.6.5 Comparative assessment of alternatives

No heritage impacts are anticipated at either BESS and on-site SS complex area and the assessment undertaken thus apply equally to either the Option 1 or Option 2 alternative. There is no preference between Option 1 and Option 2, and therefore both alternatives are acceptable from a heritage perspective.

D.2.6.6 Assessment of No-Go alternative

The No-Go alternative would entail the site staying as it currently is. This means its continued use for small stock grazing and the continued natural erosion, weathering and trampling by animals. Palaeontological resources would not likely be affected because significant fossils will remain buried, but archaeological materials would suffer very minimal impacts. The landscape would remain unchanged. Overall, the significance of impacts related to the No-Go alternative is considered to be very low negative.

D.2.6.7 Concluding Statement

The main identified issues are the potential impacts to fossils, archaeological sites and the cultural landscape. Mitigation of the first two impacts can be easily effected and, in any case, fossils are not very likely to be found. The landscape can only be mitigated at the site-specific level with the broader impacts not able to be mitigated. This impact is not of high significance, especially given the project location within a REDZ. Table 7 in Section 5 of the HIA (Appendix C.6 of the BA Report) lists the heritage indicators and shows how they have been or will be responded to. None of them remain problematic. **There are no fatal flaws and the proposed Komas WEF development is acceptable from a heritage perspective, subject to the implementation of the recommended mitigation measures.**

D.2.7 Palaeontology Impact Assessment

The Palaeontology Impact Assessment was undertaken by John Pether, a Geological and Palaeontological Consultant, to inform the outcome of this BA from a palaeontological perspective. It was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended. As noted above, an integrated HIA containing Archaeology, Cultural Landscape and Palaeontology has been undertaken for the project (Appendix C.6). However, for ease of reference, this section only deals with the Palaeontology assessment. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement of the Palaeontology Impact Assessment. A full assessment is provided in the Palaeontology Impact Assessment (Appendix 4 of the HIA).

D.2.7.1 Approach and Methodology

The relatively few fossils from the Namaqualand coastal plain have been vital to the current understanding of the coastal-plain geological history, not only of Namaqualand, but the fossil findings are also relevant to the coastal plains of the wider southern Africa. Deposits or formations are rated in terms of their potential to include fossils of scientific importance, viz. their palaeontological sensitivity. Palaeontological sensitivity refers to the likelihood of finding significant fossils within a geologic unit, which informs the Intensity/Magnitude/Severity rating in an impact assessment. The rating criteria are included in Appendix 3 of the Palaeontology Impact Assessment (Appendix 4 of the HIA).

D.2.7.2 Relevant Project Aspects relating to Palaeontological Impacts

All aspects of the proposed Komas WEF development are relevant since excavations for foundations may impact on palaeontological remains.

D.2.7.3 Potential Impacts

The potential impacts identified during the Palaeontology Impact Assessment include:

Construction Phase

- Direct destruction of fossil resources.

The primary palaeontological concern is the fossil bones that are sparsely distributed in these aeolian deposits. In the Hardevlei and Koekenaap formations the fossil bone and marine shell material that may occur is likely to be in an archaeological context. Both artefacts and fossil bones are most often found on the compact palaeosurface of the Dorbank Formation beneath the surficial sands. The fossil bone material would be of late Quaternary age and comprised mainly of extant species (modern fauna), but could include species that did not historically occur in the region.

The fossil bone finds in the Dorbank Formation are generally the scattered, disarticulated and sometimes fragmented larger limb bones of antelopes and zebra. Pans and vleis/seep deposits, with greater fossil potential, may occur along buried drainage lines within the Dorbank Formation. Most finds have been at lower elevations in diamond-mine pits and little is known of this formation and its fossils at higher elevations and in this region of the coastal plain. Fossil finds could prove to be a scientifically significant addition to the poorly-known later mid-Quaternary fossil fauna of Namaqualand.

Due to the overall sparse distribution of fossil bones in the affected formations the palaeontological sensitivity and intensity of impact is considered to be LOW before and after mitigation for all excavations involved in the construction of the proposed Komas WEF and associated infrastructure. However, when fossils are found in such poorly fossiliferous formations, they provide very significant advances in the geological understanding of the stratigraphy of a region.

There will be a considerable number of excavations for turbine foundations (i.e. 50) distributed over and "sampling" a wide area during the construction phase. Therefore, in spite of the overall low fossil potential, there is a distinct possibility that buried palaeosurfaces bearing fossil bones and archaeological material may be exposed in some of the excavations. The excavations for cabling and other infrastructure such as the SS are relatively shallow and mainly affect the coversands, but the cabling trenches will traverse considerable lengths across the proposed WEFs development areas and intersect the locally-fossiliferous top of the Dorbank Unit in places.

Cumulative impacts

- Direct destruction of fossil resources.

Several other WEFs have been proposed in the area. Although this may mean that more impacts to palaeontology are anticipated, there is also the likelihood that there will be a gain in terms of the state of knowledge of these disciplines if mitigation measures are successfully applied. The significance of impacts is expected to be the same as that for the construction phase with a low negative and low positive impact to palaeontology.

D.2.7.4 Impact Assessment

The table below includes an assessment of the potential **direct impacts to Palaeontology resources** identified for the proposed Komas WEF and associated infrastructure for the construction phase and the cumulative impact. The full assessment is provided in the Palaeontological Impact Assessment (Appendix 4 to the HIA included as Appendix C.6 of the BA Report).

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Direct destruction of fossil resources.	• Monitoring of all construction-phase excavations by project staff and ECO. • Significant fossil chance finds should be safeguarded and reported at the earliest opportunity to SAHRA for recording and sampling by a professional palaeontologist. A protocol for Chance Fossil Finds is appended as Appendix 4 of the Palaeontology Impact Assessment. • These recommendations must be included within the EMPrs for the proposed Komas WEF development. • Inspection, sampling and recording of selected exposures in the event of fossil finds. • Fossil finds and the compiled contextual report deposited in a curatorial scientific institution.	Low	Low (+)
CUMULATIVE IMPACTS			
Disturbance, damage or destruction of significant fraction of fossil heritage within the lower Abrahamskraal Formation (Karoo Supergroup).	• Monitoring of all construction-phase excavations by project staff and ECO. • Significant fossil chance finds should be safeguarded and reported at the earliest opportunity to SAHRA for recording and sampling by a professional palaeontologist. A protocol for Chance Fossil Finds is appended as Appendix 4 of the Palaeontology Impact Assessment.	Low	Low (+)

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
	These recommendations must be included within the EMPrs for the proposed Komas WEF development. • Inspection, sampling and recording of selected exposures in the event of fossil finds. • Fossil finds and the compiled contextual report deposited in a curatorial scientific institution.		

D.2.7.5 Comparative assessment of alternatives

Due to the low palaeontological sensitivity of the site, there is no material difference between the palaeontological impact of the BESS and on-site SS complex area alternative (Option 1 or Option 2) and therefore both these alternatives are considered acceptable from a palaeontological perspective.

D.2.7.6 Assessment of No-Go alternative

The No-Go alternative would entail the site staying as it currently is. This means its continued use for small stock grazing and the continued natural erosion, weathering and trampling by animals. Palaeontological resources would not likely be affected because significant fossils will remain buried. Overall, the significance of impacts related to the No-Go alternative is considered to be very low negative.

D.2.7.7 Concluding Statement

Potential adjustments to the layout of the turbines and infrastructure do not affect this assessment.

If the recommended mitigation measures are applied to the proposed Komas WEF, it is possible that the WEF development will to some extent alleviate the negative cumulative impact on paleontological resources in the region.

The history of these vast tracts of sands, gravels and pedocretes of the Northern Cape Province is very poorly known, with very few fossils to rely on. Therefore, although of low probability; any find will be of considerable importance and could add to the scientific knowledge of the area in a positive manner.

The significance of potential impacts to palaeontological resources was assessed to be **low negative before and low positive after mitigation** during the construction phase of the proposed Komas WEF and associated infrastructure. **It is therefore the opinion of the specialist that development of the proposed Komas WEF and associated infrastructure is considered acceptable from a palaeontological perspective and can be authorised, subject to the implementation of the recommended mitigation measures.**

D.2.8 Agriculture

An Agriculture Compliance Statement was undertaken by Johann Lanz to inform the outcome of this BA from an agricultural and soils perspective. The complete Agriculture Compliance Statement is included in Appendix C.7 of this report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Agriculture Compliance Statement. The information below is extracted from the Agriculture Compliance Statement (Appendix C.7 of the BA Report).

D.2.8.1 Approach and Methodology

An Agricultural Compliance Statement was required and undertaken in terms of the requirements of the *Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources by onshore wind and/or solar photovoltaic energy generation facility where the electricity output is 20 megawatts or more*, gazetted on 20 March 2020 in GN 320 (in terms of Sections 24(5)(A) and (H) and 44 of NEMA, 1998). As per the requirement of the Protocol in GN 320, the assessment was based on a desktop analysis of existing soil and agricultural potential data for the site. Various information and desktop sources of information were used. The Compliance Statement was also informed by a site visit which was undertaken by the EAP, Minnelise Levendal, on 29 September 2020.

D.2.8.2 Relevant Project Aspects relating to Agricultural Impacts

For agricultural impacts, the exact nature of the different infrastructure within a development has very little bearing on the significance of impacts. What is of most relevance is simply the occupation of the land, and whether it is being occupied by a turbine foundation, a hardstand, a building or a SS makes no difference. What is of most relevance therefore is simply the total footprint of the proposed facility.

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

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

D.2.8.3 Potential Impacts

Two potential negative agricultural impacts have been identified. These impacts are described below and apply to the Komas WEF, and other associated infrastructure:

- Loss of agricultural land use - Agricultural grazing land directly occupied by the development infrastructure, which includes all associated infrastructure, will become unavailable for agricultural use; and
- Soil degradation - Soil degradation can result from erosion, topsoil loss and contamination. 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 excavations. Hydrocarbon spillages from construction activities can contaminate soil. Soil degradation will reduce the ability of the soil to support vegetation growth.

The potential cumulative agricultural impact of importance is a regional loss or degradation of agricultural land. There are thirteen other proposed renewable energy facilities within 50 km of the proposed Komas WEF site (as indicated in Table D.1 and Figure D.1) which have been included in the consideration of cumulative impact. All of these projects have the same agricultural impacts in an almost identical agricultural environment, and therefore the same mitigation measures apply to all. The cumulative impact is affecting an agricultural environment that has been declared a REDZ, i.e. the Springbok REDZ (REDZ 8) precisely because it is an environment that can accommodate numerous renewable energy developments without exceeding acceptable levels of agricultural land loss. This is primarily because of the low agricultural capability of land across the Springbok REDZ, and the fact that such land is not a scarce resource in South Africa.

In quantifying the cumulative impact, the area of land taken out of grazing as a result of all eleven developments plus the 300 MW of this development (total generation capacity of 1 797.7 MW) will amount to a total of approximately 726.31 hectares. This is calculated using the industry standards of

2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 50 km radius (approximately 785 000 ha), this amounts to 0.09% of the surface area. That is well within an acceptable limit in terms of loss of low potential agricultural land, of which there is no scarcity in the country. This is particularly so when considered within the context of the following point:

- In order for South Africa to achieve its renewable energy generation goals, agriculturally zoned land will need to be used for renewable energy generation. It is far more preferable to incur a cumulative loss of agricultural land in a region such as the one being assessed, which has no cultivation potential, and low grazing capacity, than to lose agricultural land that has a higher potential, and that is much scarcer, to renewable energy development elsewhere in the country. The limits of acceptable agricultural land loss are far higher in this region than in regions with higher agricultural potential.

Because of the negligible agricultural impacts of EGI, the agricultural environment can accommodate far more EGI than currently exists, or is currently proposed, before acceptable levels of change are exceeded.

It should also be noted that there are few land uses, other than renewable energy, that are competing for agricultural land use in this area. The cumulative impact from developments, other than renewable energy, is therefore likely to be low.

Due to all of the considerations discussed above, the cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. The proposed development is therefore acceptable in terms of cumulative impact, and it is therefore recommended that it is approved.

D.2.8.4 Assessment

An Agricultural Compliance Statement is not required to formally rate agricultural impacts. It is only required to indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site. It must provide a substantiated statement on the acceptability, or not, of the proposed development and a recommendation on the approval, or not of the proposed development. However, an assessment of agricultural impacts has been provided by the specialist. The table below includes a summary of the assessment of the potential direct agricultural impacts identified for the Komas WEF and associated infrastructure for the construction, operational and decommissioning phases. It also includes a summary of the cumulative impacts. The full assessment is provided in the Agriculture Compliance Statement (Appendix C.7 of the BA Report).

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Loss of agricultural land use.	• None.	**Low**	**Low**
Soil degradation.	• Storm water run-off control. • Maintain vegetation cover. • Strip, stockpile and re-spread topsoil.	**Low**	**Low**
OPERATIONAL PHASE: DIRECT IMPACTS			
Increased financial security for farming operations.	• None	**Low (+)**	**Low (+)**
DECOMMISSIONING PHASE: DIRECT IMPACTS			
Soil degradation.	• Storm water run-off control. • Maintain vegetation cover. • Strip, stockpile and re-spread topsoil.	**Low**	**Low**
CUMULATIVE IMPACT			
Regional loss and agricultural land use.	• None	**Very low**	**Very low**

D.2.8.5 Comparative Assessment of alternatives

Because of the agricultural uniformity and low potential, there is no material difference between the agricultural impact of the BESS and on-site SS complex area alternatives, i.e. Option 1 or Option 2, and therefore both these alternatives are considered acceptable from an agricultural perspective.

D.2.8.6 Assessment of No-go Alternative

The No-Go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed Komas WEF development. The one identified potential such impact is that due to continued low rainfall in the area, in addition to other economic and market pressures on farming, the agricultural enterprises will come under increased pressure in terms of economic viability, with resultant potential decrease in productivity.

The proposed development has both positive and negative agricultural impacts.

The balance of positive and negative agricultural impacts associated with both the development of the proposed Komas WEF and the No-Go alternative – that is the extent to which the development and the No-Go alternative will impact agricultural production – cannot reliably be determined to be significantly different. Therefore, from an agricultural impact perspective, there is no preferred alternative between the development and the No-Go.

The agricultural impact of the proposed development can confidently be assessed as negligible without entering into a more formal assessment.

D.2.8.7 Concluding Statement

The conclusion of this assessment is that the proposed Komas WEF development will not have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable. This is substantiated by the following points:

- The amount of agricultural land loss is within the allowable development limits prescribed by the agricultural protocol. These limits reflect the national need to conserve valuable agricultural land and therefore to steer, particularly renewable energy developments, onto land with low agricultural production potential.
- The proposed development poses a low risk in terms of causing soil degradation, which can be adequately and fairly easily managed by mitigation management actions. In addition, the degradation risk is only to land of low agricultural value, and the significance of the impact is therefore low.
- The outcome of the site sensitivity verification and assessment therefore confirms the current use of the land as agriculture and the environmental sensitivity as low, as identified by the National Web-Based Screening Tool. Therefore, a Compliance Statement was undertaken in accordance with the requirements of the Agricultural Protocol for Onshore Wind and/or Solar PV Energy Generation Facilities where the Electricity Output is 20 MW or more (GG 43110 / GNR 320, 20 March 2020).
- The overall significance of the potential impact on agricultural resources for the construction, operation and decommissioning phases is assessed as low to very low (with mitigation actions applied effectively).

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

D.2.9 Socio-Economic Impact Assessment

The Socio-Economic Impact Assessment was undertaken by Tony Barbour and Schalk van der Merwe of Tony Barbour Environmental Consulting to inform the outcome of this BA from a socio-economic perspective. The Socio-Economic Impact Assessment was undertaken in accordance with Appendix 6 of the NEMA EIA Regulations, 2014, as amended. The complete Socio-Economic Assessment is included in Appendix C.8 of this BA Report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Socio-Economic Assessment. The information below is extracted from the Socio-Economic Assessment (Appendix C.8 of the BA Report).

D.2.9.1 Approach and Methodology

The approach to the study is based on the Western Cape DEA&DP's Guidelines for Social Impact Assessment (SIA) (February 2007). These guidelines are based on international best practice. The key activities undertaken as part of the Socio-Economic Assessment process as embodied in the guidelines include:

5. Describing and obtaining an understanding of the proposed intervention (type, scale, and location), the settlements, and communities likely to be affected by the proposed project;
6. Collecting baseline data on the current social and economic environment;
7. Identifying the key potential social issues associated with the proposed project;
8. Site visit and semi-structured interviews with key stakeholders and affected individuals and communities;
9. Assessing and documenting the significance of social impacts associated with the proposed intervention; and
10. Consideration of other renewable energy projects that may pose cumulative impacts; and
11. Identification of enhancement and mitigation measures aimed at maximizing opportunities and avoiding and or reducing negative impacts.

The identification of potential social issues associated with the proposed Komas WEF is based on observations during the project site visit, review of relevant documentation, experience with similar projects and the general area. Annexure C of the Socio-Economic Impact Assessment (Appendix C.8) contains a list of the secondary information reviewed and interviews conducted.

A site visit was undertaken by Mr van der Merwe from 4-6 March 2020, when some of the interviews were conducted. The other interviews were conducted telephonically.

D.2.9.2 Relevant Project Aspects relating to Socio-Economic Impacts

From a socio-economic perspective, the most important project related aspects are employment creation over the lifetime of the project; and the development of the Socio-Economic Development (SED) Plan for implementation by the Project Applicant. This is relevant should the proposed Komas WEF project obtain preferred bidder status in terms of the REIPPPP. In this regard IPPs are required to contribute a percentage of projected revenues accrued over the 20-year project operational life toward SED initiatives. These contributions accrue over the 20-year project operation life and are used to invest in housing and infrastructure as well as healthcare, education and skills development.

D.2.9.3 Potential Impacts

The potential impacts identified for the Socio-Economic Impact Assessment for the proposed Komas WEF project include the following:

Construction Phase:

Positive impact:

- Creation of employment and business opportunities, and opportunity for skills development and on-site training.

The construction phase for a single 300 MW WEF is expected to extend over a period of approximately 24 months and create approximately ~ 200-250 employment opportunities. It is anticipated that approximately 55% (136) of the employment opportunities will be available to low skilled workers, 30% (76) to semi-skilled workers and 15% (38) for skilled personnel. The majority of low and semi-skilled employment opportunities will be available to Historically Disadvantaged (HD) members from the NKLM community. Due to the demise of the mining sector, the levels of unemployment in the NKLM are high. The towns that are likely to benefit are Komaggas, Buffelsrivier, Kleinsee, and Springbok. This would represent a significant positive social benefit in an area with limited employment opportunities. In order to maximise the potential benefits, the developer should commit to employing local community members to fill the low and medium skilled jobs.

The potential benefits for local communities are confirmed by the findings of the Overview of the IPPPP undertaken by the Department of Energy, National Treasury and the Development Bank of South Africa (DBSA) (March 2019). The review found that by the end of March 2019 the 64 renewable energy projects that had been successfully completed had created 31 633 job years of employment, compared to the anticipated 20 689. This was 53% more than planned.

The study also found that significantly more people from local communities were employed during construction than was initially planned.

The capital expenditure associated with the construction phase for a 300 MW WEF will be in the region of R 2.5 billion (2020 Rand value). The total wage bill will be in the region of R69 million (2020 Rand value). A percentage of the wage bill will be spent in the local economy which will create opportunities for local businesses in the town in the area, such as Komaggas, Buffelsrivier, Kleinsee, and Springbok. The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport and security, etc. associated with the construction workers on the site. The benefits to the local economy will be confined to the construction period (approximately 24 months).

Negative impacts:

- Impacts associated with the presence of construction workers on local communities;
- Impacts related to the potential influx of job-seekers;
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site;
- Increased risk of grass fires associated with construction related activities;
- Noise, dust, waste and safety impacts of construction related activities and vehicles; and
- Impacts on productive farmland due to construction activities.

Impacts associated with the presence of construction workers on local communities

Experience has shown that the presence of construction workers can pose a potential risk to family structures and social networks. These risks however tend to be more pronounced in isolated rural areas. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. The risks are linked to:

- An increase in alcohol and drug use;
- An increase in crime levels;
- The loss of girlfriends and/or wives to construction workers;
- An increase in teenage and unwanted pregnancies;
- An increase in prostitution; and
- An increase in sexually transmitted diseases (STDs), including HIV.

However, while the risk does exist, the majority of the low skilled (136) and semi-skilled (76) work opportunities associated with the construction phase are likely to benefit members from the local community. If these opportunities are taken up by local residents the potential impact on the local family and social network will be low as these workers come from local community. As indicated in the Overview of the IPPPP (March 2019), in terms of benefits for local communities, significantly more people from local communities were employed during construction than was initially planned. The expectation for local community participation was 13 058 job years. To date 18 253 job years have been realised (i.e. 140% more than initially planned), with 26 projects still in construction. The likelihood of local community members being employed during the construction phase is therefore high.

Employing members from the local community to fill the low-skilled job categories will reduce the risk and mitigate the potential impact on the local communities. The use of local residents to fill the low skilled job categories will also reduce the need to provide accommodation for construction workers in local towns in the area, such as Komaggas, Buffelsrivier, Kleinsee and Springbok. The non-local skilled workers (38) are likely to be accommodated in local guest facilities in the area, such as Die Houthoop Guest Farm. The presence of an additional 38 or so workers over a period of 24 months is unlikely to have a significant impact on local family networks and structures in the area.

In terms of potential threat to the families of local farm workers in the vicinity of the site, the risk is likely to be low. This is due to the low number of permanent and temporary farm workers on local farms in the area. The potential risk is therefore likely to be limited. The risks can also be effectively mitigated by ensuring that the movement of construction workers on and off the site is carefully controlled and managed. However, given the nature of construction projects it is not possible to totally avoid these potential impacts at an individual or family level.

While the risks associated with construction workers at a community level will be low, at an individual and family level they may be significant, especially in the case of contracting a sexually transmitted disease or an unplanned pregnancy. This potential risk should also be viewed within the context of the socio-economic benefits associated with the creation of employment opportunities for locals.

Impacts related to the potential influx of job-seekers

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become “economically stranded” in the area or decide to stay on irrespective of finding a job or not. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the manner in which they conduct themselves can impact on the local community.

Experience from other projects has also shown that the families of job seekers may accompany individual job seekers or follow them at a later date. In many cases the families of the job seekers that become "economically stranded" and the construction workers that decided to stay in the area, subsequently moved to the area. The influx of job seekers to the area and their families can also place pressure on the existing services in the area, specifically low-income housing. In addition to the pressure on local services the influx of construction workers and job seekers can also result in competition for scarce employment opportunities. Further secondary impacts included increase in crime levels, especially property crime, as a result of the increased number of unemployed people. These impacts can result in increased tensions and conflicts between local residents and job seekers from outside the area.

These issues are similar to the concerns associated with the presence of construction workers and are discussed above. However, in some instances the potential impact on the community may be greater given that they are unlikely to have accommodation and may decide to stay on in the area. In addition, they will not have a reliable source of income. The risk of crime associated with the influx of job seekers may therefore be greater.

However, the potential for economically motivated in-migration and subsequent labour stranding in the area linked to the proposed project is likely to be low. This is due to the location of the site, the relatively small size of the project (300 MW), the limited employment opportunities (~250) and short duration of the construction phase (approximately 24 months). There are limited economic opportunities in area, specifically Komaggas, Buffelsrivier, Kleinsee and Springbok. The risks associated with job seekers being attracted to and staying on in the area will therefore be low.

Increased risk of grass fires associated with construction related activities

The presence of construction workers and construction-related activities on the site poses an increased fire risk, which could, in turn, pose a threat grazing and livestock. Due to the climate and sparseness of vegetation, the study area is not considered veld fire prone. However, all the farming operations depend on grazing and any fires would have the potential to have a significant impact on the already stressed farming operations. The potential fire risk of grass fires is highest towards the end of the dry summer months (November-March). This period also coincides with dry, windy conditions in the area.

Noise, dust, waste and safety impacts of construction related activities and vehicles

The movement of heavy construction vehicles during the construction phase has the potential to damage local farm roads and create dust and safety impacts for other road users in the area and also impact on farming activities.

At this stage it is unclear which road(s) will be affected by the construction traffic. Local roads currently mainly carry local traffic and traffic volumes are low and there are no significant seasonal variations. Some farms, e.g. Rooivlei, Sonnekwa and Graafwater are only accessible via single access roads (viz the one linking the R355 to the Komaggas road). Interviewees indicated that the project would potentially lead to the improvement of local roads, which would remain as a post-construction benefit. The manager of Kleinsee Tourism also has indicated that the project also had the potential to improve access roads to Kleinsee (from e.g. Port Nolloth) which would benefit tourism in Kleinsee (de Vries – pers. comm).

In terms of the movement of construction traffic on the site, all the affected landowners indicated that the movement should be strictly limited to the relevant access road(s) and construction site. Off-road vehicle movement poses a significant risk to fragile vegetation, which, once damaged, may take a decade or more to recover. All the farmers interviewed also emphasized the need to keep farm gates closed and adherence to suitable speed limits, as failure to do so would endanger livestock on their properties. One interviewee proposed fencing in portions of road located across site-adjacent land to limit the risk of trespassing (Mostert – pers. comm).

The project components are likely to be transported to the site via the N7, which is an important tourist route between Namibia and the Cape. The transport of components to the site therefore has the potential to impact on other road users travelling along the N7, including tourists. Measures will need to be taken to ensure that the potential impact on motorist using the N7 is minimised. The potential impacts on tourists and locals can be effectively mitigated by restricting construction traffic movements to weekdays, and, where possible, limiting activities during over holiday periods, specifically Christmas and Easter holiday periods and other long weekends. The movement of heavy construction vehicles will also damage internal farm roads and other unsurfaced public roads that may be used to access the site. The damage will need to be repaired after the completion of the construction phase.

Experience from other projects also indicates that the transportation of construction workers to and from the site can result in the generation of waste along the route (packaging and bottles etc. thrown out of windows etc.)

Impacts on productive farmland due to construction activities.

Activities such as the establishment of access roads, the movement of heavy vehicles, the establishment of lay-down areas and foundations for the wind turbines, as well as the establishment of a SS and power lines will potentially damage topsoil and vegetation. As indicated above, all the affected landowners indicated that the movement should be strictly limited to the relevant access road(s) and construction site. Off-road vehicle movement poses a significant risk to fragile vegetation, which, once damaged, may take a decade or more to recover. The construction footprint should be minimised to mitigate the damage to the natural veld and disturbed areas should be rehabilitated upon completion of the construction phase.

<u>Operational Phase:</u>

Positive impacts:

- Establishment of renewable energy infrastructure;
- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training;
- Benefits associated with the establishment of a Community Trust; and
- Benefits for affected landowners through the generation of income.

Development of renewable energy infrastructure

The establishment of renewable energy infrastructure, such as the proposed WEF, should be viewed, firstly within the context of the South Africa's current reliance on coal powered energy to meet the majority of its energy needs, and secondly, within the context of the success of the REIPPPP.

The Green Jobs study (2011) notes that South Africa has one of the most carbon-intensive economies in the world, thus making the greening of the electricity mix a national imperative. The Greenpeace Report (Powering the future: Renewable Energy Roll-out in South Africa, 2013), notes that within a broader context of climate change, coal energy does not only have environmental impacts, it also has socio-economic impacts. Acid mine drainage from abandoned mines in South Africa impacts on water quality and poses the biggest threat to the country's limited water resources. Huge volumes of water are also required to wash coal and cool operating power stations.

The Green Jobs study (2011) identifies a number of advantages associated with wind power as a source of renewable energy, including zero CO_2 emissions during generation and low lifecycle emissions. GHG associated with the construction phase are offset within a very short period of time compared with the project's lifespan. Wind power therefore provides an ideal means for reaching emission reduction targets in a relatively easy manner. In addition, and of specific relevance to South Africa, wind as energy source is not dependent on water (as compared to the massive water requirements of conventional power stations), has a limited footprint and therefore does not impact on large tracts of land, poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.

The National Climate Change Response White Paper outlines the national response to the impacts of climate change, as well as the domestic contribution to international efforts to mitigate green-house gas emissions. As part of the global commitment, South Africa is targeting an emissions trajectory that peaks at 34% below a "business as usual" case in 2020, 42% below in 2025 and from 2035 declines in absolute terms. The emission reductions between March 2018 and 2019 are estimated to be 10.9 million tonnes of CO_2. This represents 53% of the total projected annual emission reductions achieved with only partial operation to date. Since operation, the IPPs have generated 35 699 GWh, resulting in 36.2 Mton of CO_2 emissions being offset and saving 42.8 million kilolitres of water related to fossil fuel power generation.

The REIPPPP had therefore contributed significantly towards meeting South Africa's GHG emission targets and, at the same time, supporting energy security, economic stability and environmental sustainability.

The establishment of renewable energy facilities, such as the proposed WEF, therefore not only address the environmental issues associated with climate change and consumption of scarce water resources, but also creates significant socio-economic opportunities and benefits, specifically for historically disadvantaged, rural communities.

Creation of employment and business opportunities

The total number of permanent employment opportunities associated with a 300 MW WEF would be ~ 20. Of this total ~ 12 are low skilled workers, 6 semi-skilled and 2 skilled. The annual wage bill for the operational phase will be ~ R 3 million (2020 Rand value). The majority of low and semi-skilled beneficiaries are likely to be HD members of the community. Given the location of the proposed facility the majority of permanent staff is likely to reside in the local towns in the area, such as Komaggas, Buffelsrivier, Kleinsee and Springbok.

Procurement during the operational phase will also create opportunities for the local economy and businesses. In this regard the overview of the IPPPP (March 2019) notes that the operational phase procurement spend over the 20 year for Bidding Window (BW1 to BW4), 1S2 and 2S2 will be in the region of R 73.1 billion. The Green Jobs study (2011) also found that energy generation is expected to become an increasingly important contributor to green job creation over time, as projects are constructed or commissioned. The study notes that largest gains are likely to be associated with O&M activities. In this regard, O&M employment linked to renewable energy generation plants will also be substantial in the longer term.

Establishment of a Community Trust

The establishment of a community benefit structure (typically, a Community Trust) also creates an opportunity to support local economic development in the area. The requirement for the project to allocate funds to socio-economic contributions (through structures such as Community Trusts) provides an opportunity to advance local community projects, which is guaranteed for a 20-year period (project lifespan). The revenue from the proposed Komas WEF can be used to support a number of social and economic initiatives in the area, including but not limited to:

- Creation of jobs;
- Education;
- Support for and provision of basic services;
- School feeding schemes;
- Training and skills development; and
- Support for SMME's.

The 2019 IPPP Overview notes that the SED contributions associated with the 64 IPPs has to date has amounted to R 860.1 million. The province with the highest SED contribution has been the Northern Cape Province, followed by the Eastern Cape and Western Cape.

Enterprise development contributions committed for BW1 to BW4, 1S2 and 2S2 amount to R7.2 billion. Of the total commitment, R5.6 billion is specifically committed directly within the local communities where the IPPs operate, contributing significantly to local enterprise development. Up until the end of March 2019 a total of R 254.3 million had already been made to the local communities located in the vicinity of the 64 operating IPPs.

The Green Jobs study (2011), found that the case for wind power is enhanced by the positive effect on rural or regional development. Wind farms located in rural areas create an opportunity to benefit the local and regional economy through the creation of jobs and tax revenues. In this regard the towns of Komaggas, Buffelsrivier, Kleinsee and Springbok are small rural towns.

The long-term duration of the contributions from the WEF also enables local municipalities and communities to undertake long term planning for the area. Experience has, however, shown that Community Trusts can be mismanaged. This issue will need to be addressed in order to maximise the potential benefits associated with the establishment of a Community Trust or other community benefit structure (entity). The REIPPP programme does however have stringent audit requirements in place to try and prevent the mismanagement of trusts.

Benefits to landowners

The income from the WEFs reduces the risks to the livelihoods of the affected landowners posed by droughts and fluctuating market prices for sheep and farming inputs, such as fuel, feed etc. The additional income from the WEF would improve economic security of farming operations, which in turn would improve job security of farm workers and benefit the local economy.

Negative impacts:

- The visual impacts and associated impact on sense of place and rural character of the landscape;
- Impact on property values and operations; and
- Impact on tourism.

Visual impacts and impact on sense of place

The potential visual impact on the areas sense of place and rural character was not raised as a concern by local landowners and tourism representatives interviewed. The is also located within the Springbok REDZ (REDZ 8). The area has therefore been identified as suitable for the establishment of renewable energy facilities, including WEFs. In addition, the local farmers, tourism officials and the Komaggas ward councillor indicated that the Kleinsee-Komaggas-Koingnaas area is well suited to the establishment of WEFs. This is linked to the sparse settlement pattern, low productive grazing value of the land, the relative absence of sensitive social and tourism receptors, and the fact that the WEFs would be able to provide economic opportunities for the local communities impacted by the closure of mining activities in the area. Due to the low water requirements WEFs were also regarded as sustainable in an arid area that is vulnerable to severe droughts. As such it is generally perceived as a potential stable source of income to buffer local farmers against droughts, and thus increase the viability and resilience of local farming. Based on the findings of the Socio-Economic Impact Assessment the significance is rated as Low Negative following mitigation.

Impact on property values and operations

A literature review was undertaken as part of the assessment (see section 4.4.6 for the literature review on the potential impact on property values. Based on the findings of the literature review the potential impact of WEFs on rural property values is likely to be low. This was confirmed by the feedback from the local landowners interviewed, none of whom raised concerns about the potential impact on property values.

Impact on tourism

A literature review was undertaken as part of the assessment. Based on the findings of the literature review there is limited evidence to suggest that the proposed Komas WEF would impact on the tourism in the NKLM and NDM at a local and regional level. The findings also indicate that WEFs do not impact on tourist routes. As noted above, the manager of Kleinsee Tourism also indicated that potential for improving the access roads to Kleinsee (from e.g. Port Nolloth) associated with the proposed Komas WEF had the potential to significantly benefit Kleinsee tourism (de Vries – pers. comm).

<u>Decommissioning Phase:</u>

- Social impacts associated with retrenchment including loss of jobs and source of income.

In the case of decommissioning ~ 20 permanent jobs associated with the operational phase would be lost. The potential impacts associated with the decommissioning phase can however be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low Negative. The proponent should also investigate the option of establishing an Environmental Rehabilitation Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20-25-year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure. Alternatively, the funds from the sale of the WEF components and associated infrastructure as scrap metal should be allocated to the rehabilitation of the site.

Cumulative Impacts:

- Impact on sense of place and the landscape;
- Impact on local services and accommodation; and
- Impact on local economy.

Cumulative impact on sense of place

Based on the findings of the Socio-Economic Impact Assessment the potential visual impact on the areas' sense of place and rural character was not raised as a concern by local landowners and tourism representatives interviewed. The site is also located within the Springbok REDZ (REDZ 8). The area has therefore been identified as suitable for the establishment of REFs, including WEFs. The significance of the potential cumulative impact on the areas character and sense of place is therefore regarded as **Low Negative**.

The findings of the VIA rate the significance of the cumulative impact on the areas sense of place as **Moderate Negative**. The VIA notes however that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists.

However, the potential impact of WEFs on the landscape is an issue that does need to be considered, specifically given South African's strong attachment to the land and the growing number of WEF applications. The Environmental Authorities should therefore be aware of the potential cumulative impacts when evaluating applications and the potential implications for other land uses, specifically game farming and associated tourist activities.

Cumulative impact on services

The establishment of the proposed Komas WEF and the other REFs in the NKLM and NDM may place pressure on local services, specifically medical, education and accommodation. This pressure will be associated with the potential influx of workers to the area associated with the construction and operational phases of renewable energy projects proposed in the area, including the proposed Komas WEF. The potential impact on local services can be mitigated by employing local community members. With effective mitigation the significance of the impact is rated as **Low Negative.**

In addition, as indicated below, this impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of renewable energy as an economic driver in the area.

Cumulative impact on local economies

In addition to the potential negative impacts, the establishment of the proposed Komas WEF and other REFs in the area also has the potential to create a number of socio-economic opportunities for the NKLM and NDM, which, in turn, will result in a positive social benefit. The positive cumulative impacts include creation of employment, skills development and training opportunities, creation of downstream business opportunities. The Community Trusts associated with each project will also create significant socio-economic benefits. These benefits should also be viewed within the context of the limited economic opportunities in the area and the impact of the decline in the mining sector in recent years. This significance of this benefit is rated as **High Positive** with enhancement.

Indirect cumulative impacts were identified.

D.2.9.4 Impact Assessment

The table below includes an assessment of the potential direct socio-economic impacts identified for the proposed Komas WEF and associated infrastructure for the construction, operational and decommissioning phases. It also includes an assessment of the potential cumulative impacts. The full assessment is included in the Socio-Economic Assessment (Appendix D.8 of the BA Report).

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Creation of employment and business opportunities, and opportunity for skills development and on-site training.	**Employment** • Where reasonable and practical the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories; Due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. • Where feasible, efforts should be made to employ local contactors that are compliant with B-BBEE criteria. • Before the construction phase commences the proponent should meet with representatives from the NKLM and NDM to establish the existence of a skills database for the area. If such a database exists, it should be made available to the contractors appointed for the construction phase. • The local authorities, relevant community representatives and local farmers should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project. • Where feasible a training and skills development programmes for local workers should be initiated prior to the initiation of the construction phase. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.	**Moderate (+)**	**Moderate (+)**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	Business • The proponent should liaise with the NKLM and NDM with regards the establishment of a database of local companies, specifically B-BBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work. • Where possible, the proponent should assist local B-BBEE companies to complete and submit the required tender forms and associated information. • The NKLM and NDM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project. Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.		
Impacts associated with the presence of construction workers on local communities (including an increase in alcohol and drug use; an increase in crime levels; and increase in teenage and unwanted pregnancies and an increase in prostitution and STDs, including HIV).	• Where possible the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories. • The proponent should consider the need for establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from the NKLM, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community and farm workers	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	associated with construction workers. • The proponent and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation. • The proponent and contractor (s) should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. • The contractor should provide transport to and from the site on a daily basis for low and semi-skilled construction workers. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site. • Where necessary, the contractors should make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks. • It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.		
Impacts related to the potential influx of job-seekers on local communities. Potential impact on family structures, social networks	It is not possible to prevent job seekers from coming to the area in search of a job. However, due to the location of the site the potential influx of job seekers to the area as a result of the proposed Komas WEF will be low. In addition: • The proponent should implement a “locals first” policy, specifically	**Low**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
and community services.	with regard to unskilled and low skilled opportunities.		
Increased risks to safety, livestock and farming infrastructure and operations associated with the construction related activities and presence of construction workers on the site.	• The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase proven to be associated with the construction activities for the WEF will be compensated for. The agreement should be signed before the construction phase commences. • Contractors appointed by the proponent should provide daily transport for workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties. • The proponent should consider the option of establishing a MF that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site. • The proponent should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below). • The EMPr should outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	ingested. • Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms. • Contractors appointed by the proponent must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation. • The housing of construction workers on the site should be limited to security personnel.		
Increased risk of grass fires associated with construction related activities.	• The proponent should enter into an agreement with the local farmers in the area whereby losses associated with fires that can be proven to be associated with the construction activities for the WEF will be compensated for. The agreement should be signed before the construction phase commences. • Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. • No smoking should be permitted on site, except in designated areas. • Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the higher-risk dry, windy summer months. • Contractor to provide adequate fire-fighting equipment on-site;	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	• Contractor to provide fire-fighting training to selected construction staff. • No construction staff, with the exception of security staff, to be accommodated on site overnight. • As per the conditions of the Code of Conduct, in the event of a fire proven to be caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.		
Noise, dust, waste and safety impacts of construction related activities and vehicles.	• As far as possible, the transport of components to the site along the N7 should be planned to avoid weekends and holiday periods. • The contractor should inform local farmers and representatives from the NLM and NDM Tourism of dates and times when abnormal loads will be undertaken. • The contractor must ensure that damage caused by construction related traffic to the gravel public roads and local, internal farm roads is repaired on a regular basis throughout the construction phase. The costs associated with the repair must be borne by the contractor. • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis, adhering to speed limits and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. • All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. • The Contractor should ensure that workers are informed that no waste can be thrown out of the windows while being transported to	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	and from the site. Workers who throw waste out windows should be fined. • The Contractor should be required to collect waste along access roads on a weekly basis. • Waste generated during the construction phase should be transported to the local permitted landfill site. • EMPr measures (and penalties) should be implemented to ensure farm gates are closed at all times. • EMPr measures (and penalties) should be implemented to ensure speed limits are adhered to at all times.		
Impacts on productive farmland due to construction activities.	• The location of wind turbines, access roads, laydown areas etc. should be informed by the findings of the Agriculture and Terrestrial Biodiversity (flora) study. In this regard areas of sensitive vegetation and soils of high agriculture potential should be avoided. • The footprint areas for the establishment of individual wind turbines should be clearly demarcated prior to commencement of construction activities. All construction related activities should be confined to the demarcated area and minimised where possible. • An ECO should be appointed to monitor the establishment phase of the construction phase. • All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase. The rehabilitation plan should be informed by input from the soil scientist and discussed with the local farmer. • The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed.	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	• The implementation of the Rehabilitation Programme should be monitored by the ECO. • All workers should receive training/ briefing on the reasons for and importance of not driving in undesignated areas. • EMPr measures (and penalties) should be implemented to strictly limit all vehicle traffic to designated roads and construction areas. Under no circumstances should vehicles be allowed to drive into the veld. • Disturbance footprints should be reduced to the minimum. • Compensation should be paid by the Project Developer to farmers that suffer a permanent loss of land due to the establishment of the WEF. Compensation should be based on accepted land values for the area.		
OPERATIONAL PHASE: DIRECT IMPACTS			
Establishment of clean renewable energy infrastructure.	Should the project be approved the proponent should: • Implement a skills development and training program aimed at maximizing the number of employment opportunities for local community members. • Maximise opportunities for local content, procurement and community shareholding. • Consider establishing a visitor centre.	**High (+)**	**High (+)**
Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training.	The enhancement measures listed above, i.e. to enhance local employment and business opportunities during the construction phase, also apply to the operational phase. In addition: • The proponent should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of	**Low (+)**	**Moderate (+)**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
	South African's and locals employed during the operational phase of the project. • The proponent, in consultation with the NKLM and NDM, should investigate the options for the establishment of a Community Development Trust (see below).		
Benefits associated with the establishment of a Community Trust.	• The NKLM and NDM should be consulted as to the structure and identification of potential trustees to sit on the Trust. The key departments in the NKLM and NDM that should be consulted include the Municipal Managers Office, IDP Manager and LED Manager. • Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community. • Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from the WEF.	**Moderate (+)**	**High (+)**
Benefits for affected landowners through the generation of income.	• Implement agreements with affected landowners.	**Moderate (+)**	**Low (+)**
The visual impacts and associated impact on sense of place and rural character of the landscape.	• The recommendations contained in the VIA should be implemented. • Recommended that the Project Applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact.	**Moderate**	**Low**
Impact on property values and operations.	• The recommendations contained in the VIA should be implemented. • Recommended that the Project Applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact.	**Low**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
Impact on tourism.	• The recommendations contained in the VIA should be implemented.	**Low (-) & (+)**	**Low (-) & (+)**
DECOMMISSIONING PHASE: DIRECT IMPACTS			
Social impacts associated with retrenchment including loss of jobs, and source of income.	• The proponent should ensure that retrenchment packages are provided for all staff retrenched when the WEF is decommissioned. • All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning. • The proponent should investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20-year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure. Alternatively, the funds from the sale of the WEF as scrap metal should be allocated to the rehabilitation of the site.	**Moderate**	**Low**
CUMULATIVE IMPACTS			
OPERATIONAL PHASE: INDIRECT IMPACT			
Visual impacts associated with the establishment of more than one WEF and the potential impact on the area’s rural sense of place and character of the landscape.	• The recommendations contained in the VIA should be implemented.	**Moderate**	**Low**
Impact on local services and accommodation. The establishment	• The Northern Cape Provincial Government, in consultation with the NKLM and NDM and the proponents involved in the development	**Moderate**	**Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
of a number of renewable energy facilities in the NKLM will place pressure on local services, specifically medical, education and accommodation.	renewable energy projects in the area should consider establishing a Development Forum to co-ordinate and manage the development and operation of REFs in the area, with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues should be addressed in the Integrated Development Planning process undertaken by the NKLM and NDM.		
Impact on local economy. The establishment of a number of wind energy facilities in the NKLM will create employment, skills development and training opportunities, creation of downstream business opportunities.	• The proposed establishment of suitably sited renewable energy facilities within the NKLM and NDM should be supported.	**Moderate (+)**	**High (+)**

D.2.9.5 Comparative assessment of alternatives

Two BESS and on-site SS complex site Alternatives (i.e. Option 1 and Option 2) have been identified for assessment as part of the BA process. Option 1 and Option 2 have been assessed and both alternatives are found to be acceptable from a socio-economic perspective and may proceed as none are fatally flawed.

D.2.9.6 Assessment of No-Go Alternative

The No-Go Development alternative would represent a lost opportunity for South Africa to supplement is current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost. The No-Go Development alternative also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) associated with the proposed Komas WEF and the benefits associated with the establishment of a Community Trust. This also represents a negative social cost.

However, at a provincial and national level, it should be noted that the proposed Komas WEF development is not unique. In this regard, a significant number of other renewable energy developments are currently proposed in the Northern Cape and other parts of South Africa. Foregoing the proposed establishment of WEFs would therefore not necessarily compromise the development of REFs in the Northern Cape Province and or South Africa. However, the socio-economic benefits for local communities in the NKLM would be forfeited. Given the decline in the role played by mining and the limited economic opportunities in the NKLM, the No-Go Development Alternative would represent a significant lost opportunity for the area and is not supported by the findings of the Socio-Economic Assessment. The No-Go Development alternative is rated as High Negative.

D.2.9.7 Concluding Statement

The findings of the Socio-Economic Assessment indicate that the development of the proposed Komas WEF and associated infrastructure will create employment and business opportunities for locals during both the construction and operational phase of the project. The establishment of a Community Trust will also benefit the local community. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated with a coal based energy economy and the challenges created by climate change, represents a significant positive social benefit for society as a whole. The findings of the Socio-Economic Assessment also indicate that the REIPPPP has resulted in significant socio-economic benefits, both at a national, a local and community level. These benefits are linked to FDI, local employment and procurement and investment in local community initiatives.

The establishment of Community Trusts associated with renewable energy projects also have the potential to create significant benefits for local rural communities. These benefits should be viewed within the context of the limited economic opportunities in the area and the impact of the decline in the mining sector on the local economy. The proposed Komas WEF site is also located within a REDZ. The area has therefore been identified as suitable for the establishment of renewable energy facilities.

It is recommended that the establishment of the proposed Komas WEF is strongly supported by the findings of the Socio-Economic Assessment.

D.2.10 Noise Specialist Assessment

The Noise Specialist Assessment was undertaken by Morné De Jager of Enviro-Acoustic Research cc inform the outcome of this BA from a noise perspective. The Noise Specialist Assessment was undertaken in terms of the requirements of the Noise Protocol as per GN 320 published on 20 March 2020 in GG No. 43110. The complete Noise Assessment is included in Appendix C.9 of this report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Noise Assessment. The information below is extracted from De Jager (2020) (Appendix C.9 of the BA Report).

D.2.10.1 Approach and Methodology

This Noise Specialist Assessment considered local and international guidelines, using the Terms of Reference (ToR) as proposed by SANS 10328:2008 and as proposed by the requirements specified in the Assessment Protocol for Noise that were published on 20 March 2020, in Government Gazette 43110, Government Notice (GN) 320. Based on the Protocol for Noise Assessment, a Noise Specialist Assessment was conducted as parts of the proposed development footprint fall within an area of "very high" sensitivity from a noise perspective.

The potential noise impact associated with the construction, operation and decommissioning of the proposed Komas WEF was evaluated using a sound propagation model. Conceptual scenarios were developed for the construction and operational phases.

D.2.10.2 Relevant Project Aspects relating to Noise Impacts

The following project aspects are related to noise impacts:

- Various construction activities taking place simultaneously during the day may increase ambient sound levels due to air-borne noise.
- Various construction activities taking place simultaneously at night may increase ambient sound levels due to air-borne noise.
- Various construction vehicles passing close to potential noise-sensitive receptors may increase ambient sound levels and create disturbing noises.
- Wind turbines operating simultaneously during the day. Increases in ambient sound levels due to air-borne noise from the wind turbines.
- Wind turbines operating simultaneously at night. Increases in ambient sound levels due to air-borne noise from the wind turbines.
- Various decommissioning activities taking place simultaneously during the day may increase ambient sound levels due to air-borne noise.

D.2.10.3 Potential Impacts

The potential impacts identified in the Noise Assessment include:

<u>Construction Phase:</u>

- Potential increase in ambient sound levels due to construction activities during the day;
- Potential increase in ambient sound levels due to construction activities at night;

- Potential increase in ambient sound levels due to construction of roads; and
- Potential increase in ambient sound levels due to day-time construction traffic.

The construction phase will entail a number of activities which may have a noise impact on the surrounding area. There will be a short-term increase in noise in the vicinity of the site during construction as the ambient level will be exceeded. The impact during construction will be difficult to mitigate. The impact of low frequency noise and infra-sound will be negligible and there is no evidence to suggest that adverse health effects will occur as the sound power levels generated in the low frequency range are not high enough to cause physiological effects. Construction activities will take place during the day, while night-time construction activities are not envisaged, there may be times when activities may take place after 22:00 at night, or before 06:00 in the morning. Considering potential delays' relating to civil works (especially concrete pouring that must be undertaken in one go), the potential significance due to night-time construction activities was assessed.

The significance of the impact due to an increase in ambient sound levels due to construction activities during the day was rated as very low during the day and low at night following mitigation.

<u>Operational Phase:</u>

- Potential increase in ambient sound levels due to air-borne noise from the wind turbines operating simultaneously during the day; and
- Potential increase in ambient sound levels due to air-borne noise from the wind turbines operating simultaneously at night.

The proposed development would be designed to have an operational life of up to 20 years with the possibility to further expand the lifetime of the WEF. The only development related activities on-site will be routine servicing (access roads and light traffic) and unscheduled maintenance. The potential noise impact from maintenance activities is insignificant, with the main noise source being the wind turbine blades and the nacelle (components inside).

Noise emitted by operating wind turbines can be associated with two types of noise sources. These are aerodynamic sources due to the passage of air over the wind turbine blades and mechanical sources which are associated with components of the power train within the turbine, such as the gearbox and generator and control equipment for yaw, blade pitch, etc. These sources normally have different characteristics and can be considered separately. In addition, there are other noise sources of lower levels, such as the substations and traffic (maintenance).

Typically, daytime noise impacts are less than the night-time noise impact due to higher acceptable noise limits and the probability of a noise impact occurring being less. With no potential NSD living within 500 m from any wind turbines, the significance of the daytime noise impact is less than the night-time impact.

The significance of the noise impact associated with the operating WTGs during the day was rated to be of very low significance during the day and of low significance during the night following mitigation.

<u>Decommissioning Phase:</u>

- Potential increase in ambient sound levels due to air-borne noise from various decommissioning activities taking place simultaneously during the day.

Final decommissioning activities will have a noise impact lower than either the construction or operational phases. This is because decommissioning and closure activities normally take place during the day using minimal equipment (due to the decreased urgency of the project). While there may be various activities, there is a very small risk for a noise impact. The significance of any noise impact associated with the proposed decommissioning activities during the day would be very low, similar to the construction noise impact.

Cumulative Impact:

- Increase in ambient sound levels due to air-borne noise from the wind turbines from various WEFs operating at night.

Considering the contribution from the Komas WEF on total cumulative noises, if the Namas, Zonnequa, Kleinzee, Gromis, Project Blue and Kap Vley WEFs are to be developed, is well less than 3 dBA. The potential significance of the cumulative noise impact from these WEFs operating simultaneously at night is assessed to be very low following mitigation.

Indirect cumulative impacts were identified.

D.2.10.4 Impact Assessment

The table below includes an assessment of the potential **direct noise impacts** identified for the proposed Komas WEF and associated infrastructure for the construction, operational and decommissioning phases. It also includes an assessment of the potential cumulative impacts.

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Increase in ambient sound levels due to construction activities during the day.	• None. Significance of noise impact is very low for the scenario as conceptualised.	**Very Low**	**Very Low**
Increase in ambient sound levels due to construction activities at night.	• The Project Developer should investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction activities are taking place; and • The Project Developer should minimise night-time construction traffic if the access road is closer than 150 m from any NSD, alternatively, the access road must be relocated further than 150 m from NSDs (night-time traffic passing occupied houses).	**Low**	**Low**
Increase in ambient sound levels due to construction of roads.	• The Project Developer should investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction activities are taking place; and • The Project Developer should minimise night-time construction traffic if the access road is closer than 150 m from any NSD, alternatively, the access road must be relocated further than 150 m from NSDs (night-time traffic passing occupied houses).	**Very Low**	**Very Low**
Increase in ambient sound levels due to day-time construction traffic.	• It is recommended that new roads not be constructed within 150 m from occupied dwellings used for residential purposes at night.	**Very Low**	**Very Low**

Impact	Mitigation measures	Significance before mitigation	Significance after mitigation
OPERATIONAL PHASE: DIRECT IMPACTS			
Increase in ambient sound levels due to air-borne noise from the wind turbines operating simultaneously during the day.	• No mitigation required or recommended for daytime operational activities.	**Very Low**	**Very Low**
Increase in ambient sound levels due to air-borne noise from the wind turbines operating simultaneously at night.	• The Project Developer should investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where operational activities are taking place.	**Low**	**Low**
DECOMMISSIONING PHASE: DIRECT IMPACT			
Increase in ambient sound levels due to air-borne noise from various decommissioning activities taking place simultaneously during the day.	• No mitigation required or recommended for decommissioning activities.	**Very Low**	**Very Low**
CUMULATIVE IMPACT			
OPERATIONAL PHASE: INDIRECT IMPACT			
Increase in ambient sound levels due to air-borne noise from the wind turbines from various WEFs operating at night.	• The Project Developer should investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where operational activities are taking place.	**Very Low**	**Very Low**

D.2.10.5 Comparative Assessment of Alternatives

Two BESS and on-site SS complex site alternatives were proposed for assessment (Option 1 and Option 2). There is no difference in the potential noise impact associated with Option 1 and Option 2. Therefore, both alternatives (Option 1 and Option 2) are acceptable from a noise perspective.

D.2.10.6 Assessment of No-Go Alternative

The ambient sound levels will remain as is (relatively low).

D.2.10.7 Concluding statement

The Noise Assessment is based on a predictive model to estimate potential noise levels due to the various activities and to assist in the identification of potential issues of concern. The Noise Specialist Assessment was undertaken in terms of the requirements of the Noise Protocol as per GN 320 published in GG No. 43110 on 20 March 2020.

Considering the low to very low significance of the potential noise impacts (with mitigation, inclusive of cumulative impacts) for the proposed Komas WEF and associated infrastructure, it is recommended that the proposed Komas WEF and associated infrastructure be authorised from a noise perspective.

D.2.11 Transport Impacts

The Transport Impact Assessment was undertaken by Adrian Johnson of JG AFRIKA (Pty) Ltd to inform the outcome of this BA from a transport perspective. The complete Transport Impact Assessment is included in Appendix C.10 of this report The information below is extracted from Johnson (2020) and provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Transport Impact Assessment.

D.2.11.1 Approach and Methodology

The Transport Impact Assessment identifies and assesses the potential traffic impact on the surrounding road network in the vicinity of the site during the construction of the access roads, installation of the turbines during the operational phase, and the potential removal of the turbines during the decommissioning phase of the proposed Komas WEF.

The Transport Impact Assessment included the following tasks:

<u>Site Visit and Project Assessment</u>

- An initial meeting with the client to gain sound understanding of the project;
- Overview of project background information including location maps, component specifications and any resulting abnormal loads to be transported; and
- Research of all available documentation and information relevant to the proposed WEF and SS.

Correspondence with Authorities

- Correspondence with the relevant Authorities dealing with the external road network, such as the South African National Roads Agency SOC Ltd (SANRAL) and the Northern Cape Provincial Department of Transport and Public Works.

Traffic and Route Assessment

- Trip generation and potential traffic impact;
- Possible haul routes between port of entry / manufacturing location and sites in regards of
    - National route;
    - Local route;
    - Site access route (internal roads); and
    - Road limitations due to abnormal loads.

- Construction and maintenance (operational) vehicle trips
    - Generated vehicles trips;
    - Abnormal load trips;
    - Access requirements;
    - Possible damaging effects on road surface; and
    - Scheduling of transport (i.e. during night).
- Station data will be obtained as far as available from SANRAL for the closest national roads.
- Investigation of the impact of the development traffic generated during construction and operation and decommissioning phases of the project.

Access and Internal Roads Assessment

- Assessment of the proposed access points including:
    - Feasible location of access points;
    - Motorised and non-motorised access requirements;
    - Queuing analysis and stacking requirements if required;
    - Access geometry; and
    - Sight distances and required access spacing.
- Assessment of the proposed internal roads on site.
- Assessment of internal circulation of trucks and proposed roads layout in regard to turbine positions and turbine laydown areas.

Report

- Reporting on all findings and preparation of the report.

D.2.11.2 Relevant Project Aspects relating to Transport Impacts

The relevant project aspects relating to traffic impacts are linked to the vehicles that need to access the project site for various reasons. It is understood that traffic will be generated as a result of turbine components and infrastructure, building materials and construction workers being transported to and from site. Turbine components, including the nacelle, blades, tower sections, turbine hub and rotary units, cranes and transformers will be transported to site. Abnormal load trucks permits will need to be applied for in terms of Section 81 of the National Road Traffic Act (Act 93 of 1996). The imported turbine components may be transported from the Port of Entry to the nearby turbine laydown area.

Mobile cranes will be required at these turbine laydown areas to position the respective components at their temporary storage location.

In addition to transporting the wind turbine components and specialised lifting equipment, the normal Civil Engineering construction materials, plant and equipment will need to be brought to the site (e.g. sand, stone, cement, concrete batching plant, gravel for road building purposes, excavators, trucks, graders, compaction equipment, cement mixers, transformers in the SS, cabling, transmission pylons etc.). Other components, such as electrical cables and SS transformers, will also be transported to site during construction. The transportation of these items will generally be conducted with normal heavy loads vehicles. In addition, construction workers will also be transported to and from site during the construction phase and this add to the potential transport impacts.

D.2.11.3 Potential Impacts

The potential impacts identified in the Transport Impact Assessment are listed below:

Construction Phase:

- Increased traffic due to the construction of the proposed Komas WEF and associated infrastructure including the transportation of turbine components to site;
- Increased traffic due to the transportation of construction staff, equipment and materials to site;
- The increased traffic due to the construction activities would lead to noise and dust pollution; and
- Increased traffic due to the construction of roads, excavations of turbine foundations, trenching for electrical cables and other ancillary construction works that will temporarily generate the most traffic.

Traffic generated by the construction of the proposed Komas WEF will have an impact of high significance on the surrounding road network before mitigation measures are implemented.

All further components will be transported with normal limitations haulage vehicles. With approximately 14 abnormal load trips (as specified above in Section A), the total trips to deliver the components of 50 steel tower turbines to the WEF site will be around 700 trips (14 trips x 50 turbines). This would amount to approximately 1.3 vehicle trip per day (700 trips / 24 months / 22 working days per month) to site for a typical construction period of 24 months.

The concrete tower sections are typically delivered in 2-4 precast segments, which are then assembled on-site to form the respective tower section. It was assumed that the first 140 m sections will be precast in four segments each and the last 60 m sections in two segments each. The total number of abnormal load trips for a concrete turbine is approximately 34 trips. For concrete tower sections, the 20 m sections of the 200 m tower will be split into 4 segments (1 trip per segment), except for the last 60 m of the tower which would have 2 segments per section. The calculation is therefore – 140 m of the tower / 20 m section = 7 sections, 7 sections x 4 segments = 28 segments (trips). The remaining 60 m of the tower (3 sections of 20m) will consist of 2 segments each = 6 segments. Therefore, the total number of abnormal trips to deliver the concrete towers is 28 + 6 segments = 34 segments or trips. The total trips to deliver the components of 50 turbines to the WEF site will be around 1 700 trips (34 trips x 50 turbines). This would amount to approximately 3.2 vehicle trips per day (1 700 trips / 24 months / 22 working days per month) to site for a typical construction period of 24 months.

The exact number of trips generated during construction will be determined by the haulage company transporting the components to site, the turbine model, the staff requirements and where equipment is sourced from.

However, the duration of this phase is short-term i.e. the potential impact of the traffic generated during the construction phases of the proposed Komas WEF traffic on the surrounding road network is temporary. The significance of impact can therefore be reduced to a moderate impact following mitigation.

Additionally, the construction of the WEF will create dust and noise pollution that will have an impact of low significance (short-term) during the construction and decommissioning phases.

Operational Phase:

During operation, it is expected that staff including security personnel will periodically visit the site. It is assumed that approximately ten (20) full-time employees will be stationed on site. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.

Decommissioning Phase:

- Construction related traffic; and
- Noise and dust pollution.

The decommissioning phase will result in the same impact as the Construction Phase as similar trips are expected. The potential traffic impact will be of high significance before mitigation measures during the construction and decommissioning phases. However, considering that this is temporary and short-term in nature, the impact can be mitigated to an acceptable level of moderate significance.

Cumulative impacts:

- Traffic congestion/delays on the surrounding road network; and
- Noise and dust pollution.

To assess the cumulative impact, it was assumed that all wind farms within 50 km currently proposed and authorized, would be constructed at the same time. This is the precautionary approach as in reality; these projects would be subject to a highly competitive bidding process and not all the projects may be selected to enter into a PPA with Eskom. There are currently nine approved WEFs and three approved solar PV facilities. A separate BA will be undertaken for the proposed Gromis WEF. The Klipdam and Nigramoep solar PV applications are in progress. Even if all the facilities are constructed and decommissioned at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.

The construction and decommissioning phases of a WEF are the only significant traffic generators. The duration of these phases is short term i.e. the potential impact of the traffic generated during the construction and decommissioning phases of the proposed Komas WEF traffic on the surrounding road network is temporary and WEFs, when operational, do not add any significant traffic to the road network. The cumulative impacts were assessed to be of high significance before mitigation and moderate significance after mitigation.
No indirect impacts have been identified.

D.2.11.4 Impact Assessment

The table below includes an assessment of the potential **direct impacts** identified for the proposed Komas WEF and associated infrastructure for the **construction, operational and decommissioning phases**. It also includes an assessment of cumulative impacts.

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE			
Traffic congestion and delays. Noise and dust pollution.	• Stagger turbine component delivery to site. • Reduce the construction period. • Stagger the construction of the turbines. • The use of mobile batch plants and quarries in close proximity to the site would decrease the impact on the surrounding road network. • Staff and general trips should occur outside of peak traffic periods, where possible. • Maintenance of haulage routes. • Design and maintenance of internal roads. • Dust suppression.	**High**	**Moderate**
OPERATIONAL PHASE			
The traffic generated during this phase will be minimal and will have a nominal impact on the surrounding road network.			
DECOMMISSIOING PHASE			
Traffic congestion and delays. Noise and dust pollution	• Stagger turbine component transportation. • Reduce the construction period. • Stagger the construction of the turbines. • Staff and general trips should occur outside of peak traffic periods. • Maintenance of haulage routes and internal roads. • Dust suppression.	**High**	**Moderate**

CUMULATIVE IMPACTS			
Traffic congestion and delays. Noise and dust pollution.	• Stagger turbine component transportation. • Reduce the construction period. • Stagger the construction of the turbines. • Staff and general trips should occur outside of peak traffic periods. • Dust suppression.	**High**	**Moderate**

D.2.11.5 Comparative Assessment of Alternatives

It should be noted that there is no difference between the BESS and on-site SS complex area Option 1 and Option 2 alternatives from a transport perspective. Both alternatives are deemed acceptable and may proceed as none are fatally flawed.

Specialist	**Option 1**	**Option 2**
Transport	No Preference	No Preference
	There is no difference between the alternatives from a Transport perspective. Both alternatives are acceptable.	

D.2.11.6 Assessment of No-Go Alternative

The No-Go alternative implies that the proposed development of the Komas WEF will not proceed. This would mean that there will be no negative environmental impacts and no traffic impact on the surrounding network during the construction and decommissioning phases of the proposed Komas WEF. However, this would also mean that there would be no socio-economic benefits to the surrounding communities, and it will not assist government in meeting its' targets for renewable energy. **Hence, the No-Go alternative is not a preferred alternative.**

D.2.11.7 Concluding Statement

Based on the findings of this assessment, the potential increase in traffic and the associated noise and dust pollution have been rated as high before mitigation during the construction and decommissioning phases of the proposed Komas WEF. However, the phases will be short-term and the traffic volumes are expected to be low. Therefore, the significance of the impacts can be reduced to moderate after mitigation. It is envisaged that most materials, water, plant, services and people will be procured within a 60 km radius from the proposed Komas WEF. **The potential impacts associated with proposed Komas WEF and associated infrastructure are acceptable from a transport perspective and it is therefore recommended that the proposed facility be authorised, provided that the proposed recommendations and mitigation measures are adhered to.**

D.2.12 Geotechnical Impact Assessment

The Geotechnical Impact Assessment was undertaken by Robert Leyland of WSP Environmental (Pty) Ltd to inform the outcome of this BA from a Geotechnical perspective. The complete Geotechnical Impact Assessment is included in Appendix C.11 of this BA Report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Geotechnical Impact Assessment. The information below is extracted from the Geotechnical Impact Assessment (Appendix C.11 of the BA Report). It should be noted that a detailed complete engineering geotechnical study will be undertaken during design phase.

D.2.12.1 Approach and Methodology

The scope of works is limited to a desktop review and interpretative reporting on the findings. All interpretations are presented in light of the proposed development and are therefore project specific. The most significant geotechnical condition that will affect the development is the expected hard excavation conditions.

D.2.12.2 Relevant Project Aspects relating to Geotechnical Impacts

The assessment considers the entire development but the main parts of the development, i.e. the large structures, namely turbines, cable trenches and access roads are the primary consideration. Aspects related to the Geotechnical impacts during the construction phase include soil erosion, disturbance of development areas, slope stability and seismic activity. Aspects during the decommissioning phase include soil erosion, disturbance of development areas and slope stability and seismic activity.

D.2.12.3 Potential Impacts

The potential Geotechnical impacts are listed below:

Construction Phase:

- Potential topsoil degradation;
- Potential disturbance of fauna and flora;
- Potential erosion and slope instability around structures; and
- Potential damage/destruction of the proposed development.

The construction phase will entail excavations for turbine foundations. The majority of the proposed Komas WEF site is expected to have hard excavation difficulties for any excavations deeper than 1m. This is due to the occurrence of calcrete or silcrete horizons at shallow depths. The thickness of these horizons should be investigated during further geotechnical investigations. Isolated areas where aeolian sand deposits have accumulated may have deeper soils but excavation conditions are expected to be generally hard.

The conditions at the proposed Komas WEF site are such that the use of shallow foundation solutions is feasible and will prevent the need for excessive excavations in pedocretes or hard rock. The proposed structures are however very tall and subject to high moments which require the foundations to prevent overturn. The use of a foundation anchoring system will therefore be required as an alternative to deep excavated bases. The proposed base footprints will require detailed geotechnical investigations to ensure the foundation design accounts for the geotechnical characteristics of the predocrete and bedrock conditions. Along the servitude line the use of shallow foundations for grid infrastructure with similar foundations anchoring systems is recommended to prevent the need for excessive excavations.

The proposed geotechnical impacts were rated to be of very low significance before and after mitigation during the construction phase.

Decommissioning Phase:

- Potential topsoil degradation;
- Potential disturbance of fauna and flora; and
- Potential erosion and slope instability in areas where structures are removed.

No indirect impacts have been identified; and no impacts were identified during the operational phase.

D.2.13 Wake Effect Assessment

In addition to the environmental assessments that were undertaken as indicated above, a Wake Effect Assessment was also commissioned by the Project Applicant.

At the second pre-application meeting with DEFF on 7 October 2020 (Appendix H.3), DEFF requested that a Wake Effect assessment be conducted to determine the potential wake effect on the adjacent proposed WEFs, i.e. the Kap Vley (proposed by Kap Vley Wind Farm (Pty) Ltd), Namas (proposed by Genesis Namas Wind (Pty) Ltd) and Zonnequa (proposed by Genesis Zonnequa Wind (Pty) Ltd) and Gromis WEFs (proposed by Genesis ENERTRAG Gromis Wind (Pty) Ltd). A Wake Effect Assessment was therefore commissioned by the Project Applicant and has been undertaken by Mr. Kennett Sinclair of DNV GL South Africa (Pty) Ltd as part of the BA process. Please refer to Appendix J.2 for the Wake Effect Assessment. A summary of the Wake Effect Assessment is provided in Appendix D. The Project Applicant is currently liaising with the project developer of the adjacent proposed Zonnequa WEF, Genesis Zonnequa Wind (Pty) Ltd to reduce the potential wake loss on the proposed Zonnequa WEF. As the results of the Wake Effect assessment are based on several assumptions and there is a significant level of uncertainty in the assessment, it is recommended that a detailed Wake Effect assessment be undertaken by a mutually agreed independent service provider to verify the impact and determine appropriate mitigation measures once the turbine layout and model's have been finalised for both the Komas and Zonnequa WEFs. All mitigation measures to reduce the wake effects would be incorporated into the Final layout and Final EMPr prior to submission to DEFF for approval. Various options are currently being discussed and an approach amenable to both the Project Applicant and Genesis Zonnequa Wind (Pty) Ltd will be sought prior to construction commencing following detailed modelling studies.

The results from the study to predict the magnitude of the external wake loss of the Komas WEF on the energy production of the neighbouring proposed WEFs are provided below.

Table: Predicted external wake loss due to the Komas WEF (extracted from DNV GL, 2021)

Neighbouring wind farm	Komas Turbine Model	
	GE-5.5-158	SG-170-6.2 M01[1]
Klap Vley	0.6%	0.7%
Namas	0.4%	0.5%
Zonnequa	3.3%	3.6%
Gromis	0.4%	0.5%

1. This scenario considers the SG-170-6.2 M01 model supplied for the Klap Vley wind farm instead of the GE-5.5-158 model to demonstrate the sensitivity of the external wake loss on the turbine model used.

DNV GL developed a model to estimate the wind farm level blockage effects, as described in DNV GL's 2018 Methodology Refinements White Paper /17/. Due to the preliminary nature of the analysis and the level of assumptions made regarding wind farm layouts, turbine models and hub heights, DNV GL has not estimated the effect of blockage on the wind farms under consideration.

The results of the wake effects assessment show that the proposed Zonnequa WEF will experience the highest potential wake loss at 3.3 % compared to the other neighbouring WEFs. The wake effects assessment notes that given the location of the proposed Komas WEF upstream of the neighbouring proposed Zonnequa WEF in the direction of the prevailing wind, it is unlikely that any single wake mitigation strategy will be effective. Further layout optimisation of the most northern turbines which are closest to the Zonnequa wind farm could be investigated, as well as other potential mitigation approaches including wind sector management strategies.

The Project Applicant has engaged with and will continue to engage with Genesis Zonnequa Wind (Pty) Ltd and an approach amenable to both parties will be sought prior to construction commencing.

D.2.13.1 Impact Assessment

The table below includes an assessment of the potential **direct geotechnical impacts** identified for the proposed Komas WEF and associated infrastructure for the **construction and decommissioning phases**.

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE: DIRECT IMPACTS			
Topsoil degradation.	Maintain vegetation cover as far as possible; strip, stockpile and re-spread topsoil. Proper construction management.	**Very Low**	**Very Low**
Disturbance of fauna and flora.	Foundation design to avoid blasting and deep excavation into sound rock.	**Very Low**	**Very Low**
Erosion and slope instability around structures.	Avoid steep slope areas, design any cuts slopes according to detailed geotechnical analysis.	**Very Low**	**Very Low**
Damage/destruction of the proposed development: Seismic activity	Design according to expected peak ground acceleration.	**Very Low**	**Very Low**
OPERATIONAL PHASE			
No impacts have been identified during the operational phase.			
DECOMMISSIOING PHASE: DIRECT IMPACTS			
Topsoil degradation.	Maintain vegetation cover as far as possible; strip, stockpile and re-spread topsoil, proper decommissioning management.	**Very Low**	**Very Low**
Disturbance of fauna and flora.	Foundation design to avoid blasting and deep excavation into sound rock.	**Very Low**	**Very Low**
Erosion and slope instability in areas where turbines are removed.	Fill any excavations or flatten any slopes that may form due to/during removing infrastructure.	**Very Low**	**Very Low**
CUMULATIVE IMPACTS			

Impact	Mitigation measure	Significance before mitigation	Significance after mitigation
Topsoil degradation	Maintain vegetation cover as far as possible; strip, stockpile and re-spread topsoil. Proper construction and decommissioning management.	**Very Low**	**Very Low**
Disturbance of fauna and flora	Foundation design to avoid blasting and deep excavation into sound rock in the construction and decommissioning phases.	**Very Low**	**Very Low**
Erosion and slope instability around existing and removed structures	Avoid steep slope areas, design any cuts slopes according to detailed geotechnical analysis during the construction phase.	**Very Low**	**Very Low**
Damage/destruction of the proposed development: Seismic activity	Design according to expected peak ground acceleration during the construction phase.	**Very Low**	**Very Low**

D.2.13.2 Comparative Assessment of alternatives

There is no preferred alternative between the BESS and on-site SS complex area Option 1 or Option 2 with respect to the geotechnical impact assessment. Both alternatives are favourable.

D.2.13.3 Assessment of No-Go Alternative

Should the proposed Komas WEF not be developed, there will be no geotechnical impacts associated with the proposed development.

D.2.13.4 Concluding Statement

The most significant geotechnical condition that will affect the development is the expected hard excavation conditions. It is therefore recommended that shallow foundations that are anchored to the bedrock are considered. This will require a detailed study of the rock mass and pedocrete properties at the wind turbine locations. The excavation conditions will also affect the trench excavation costs negatively.

Minimal slope stability issues are expected as slope areas are minimal. No other problem soils or problem geotechnical conditions are expected on site. Access roads can be developed as gravel road with suitable wearing-course to protect the subgrade likely being obtained from local calcrete deposits. The impacts of the development have been assessed and all geotechnical impacts are considered to have a very low significance.

The completed desktop assessment of the geotechnical conditions at the proposed development site of the Komas WEF has shown the site to be generally suitable for the proposed development. The proposed development should, from a geotechnical impact perspective, be authorised.

D.2.14Impacts relating the BESS

The specialists have assessed the BESS as part of the proposed project components. None of the specialists have identified any specific impacts or concerns relating to the BESS. However, to ensure that all aspects and impacts are covered, additional potential impacts relating to the Lithium-ion BESS have been identified by the EAP.

D.2.14.1 Potential Impacts and Recommended Mitigation Measures

In addition to the impacts identified and assessed by the specialists, the following potential impacts have been identified by the EAP relating to the BESS:

- Risk of fire, explosion or release of toxic gas;
- Spillage of electrolytes; and
- Waste generation.

Risk of fire, explosion or release of toxic gas:

The electrolytes contained within the sealed and fully integrated BESS are slightly corrosive but the risk of fire or an explosion or release of gas occurring is not considered highly probable. The lithium-ion BESS will be located outside in sealed containers. Provided that the lithium-ion BESS is assembled and operated in line with the relevant specifications of the manufacturer or supplier, especially from a Health and Safety perspective, it is not expected that the BESS will pose any significant fire, explosion or release of toxic gas risks. Nevertheless, risks are possible especially if there is mismanagement or abuse of the equipment. The following mitigation measures have been recommended:

- Ensure that adequate research is undertaken to select the supplier with the best technology and which has substantial environmental and safety mechanisms built in to the design of the BESS. Reputable suppliers that comply with the necessary legislation and regulations must be selected.
- Engage with a Risk Assessment specialist prior to construction to advise on any additional mitigation measures that need to be considered from a fire, explosion or release of toxic gas perspective.
- Ensure that the responsibilities of the various parties are defined clearly for the life cycle of the BESS, such as when the BESS is being transported to site, when it reaches site, during operations, during transport off site in the event of malfunction or any technical issues.
- Adhere to the appropriate international standards and South African National Standards (SANS) requirements in terms of the assembly and operation of the BESS.
- Ensure that the BESS is assembled and operated in line with the specifications of the supplier or manufacturer.
- Ensure that the BESS is located in a clearly demarcated area in order to prevent unnecessary access.
- Ensure that the operational staff are trained on the risks associated with fire, explosion and release of toxic gas, and how to react under these situations.
- Ensure that the contact details for the supplier of the BESS is kept readily available and sign-posted on site, should they need to be contacted during emergency situations.
- Ensure that the contact details of the local municipality and emergency response officials are kept on file and clearly sign-posted on site.
- A fire management plan must be compiled and implemented during the construction, operational and decommissioning phases, which must include an action plan for fires and emergency response specifically relating to the BESS.
- To ensure the safety of the workers, appropriate Personal Protective Equipment (PPE) (appropriate gloves, safety glasses/face shield, appropriate clothing) should be worn in the vicinity of the BESS.

Spillage of electrolytes:

The spillage of electrolytes is not identified as a significant impact because of the type of BESS being considered. As noted above, a lithium-ion BESS is being proposed as part of the proposed project. Lithium-ion BESS's do not require any above ground storage tanks for the storage and blending of electrolytes. The lithium-ion BESS is instead a fully integrated and sealed system; and the chances of spilled electrolytes are very remote if the BESS is assembled and operated in line with the relevant specifications of the manufacturer or supplier, especially from a Health and Safety perspective. The BESS will be remained sealed during operations. Nevertheless, risks are possible especially if there is mismanagement or abuse of the equipment. The following mitigation measures have been recommended:

- Ensure that adequate research is undertaken to select the supplier with the best technology and which has substantial environmental and safety mechanisms built in to the design of the BESS. Reputable suppliers that comply with the necessary legislation and regulations must be selected.

- Ensure that the responsibilities of the various parties are defined clearly for the life cycle of the BESS, such as when the BESS is being transported to site, when it reaches site, during operations, during transport off site in the event of malfunction or any technical issues.
- Adhere to the appropriate international standards and SANS requirements in terms of the assembly and operation of the BESS.
- Ensure that the BESS is assembled and operated in line with the specifications of the supplier or manufacturer.
- Ensure that the BESS is located in a clearly demarcated area in order to prevent unnecessary access.
- Ensure that the operational staff are trained on the risks associated potential spillages, and how to react under these situations.
- Ensure that the contact details for the supplier of the BESS are kept readily available and sign-posted on site, should they need to be contacted during emergency situations.
- Ensure that the contact details of the local municipality and emergency response officials are kept on file and clearly sign-posted on site.
- To ensure the safety of the workers, appropriate PPE (appropriate gloves, safety glasses/face shield, appropriate clothing) should be worn in the vicinity of the BESS.
- Ensure that the BESS is placed on an impermeable surface (e.g. concrete surface) which has adequate containment mechanisms to collect contaminated storm water.
- Any spill or leakage from the BESS must be attended to and cleaned immediately and must be disposed of at an appropriate licensed waste disposal facility. Waybills must be obtained and retained on file.
- The Project Applicant must develop a Spill Contingency Plan and Emergency Response Action Plan that deals with all potential spills and emergency response, specifically relating to the BESS.

Waste Generation:

The BESS will be fully pre-assembled off site and transported to site for placement. There will be no maintenance of the BESS on site. If there are any mechanical or technical issues with the BESS, it will not be fixed on site; and it will instead be disconnected from the system, and replaced. Usually, the operational lifespan of the BESS is aligned with that of the WEF. If the BESS needs to be replaced during the operational lifespan, it will be removed and disassembled and recycled offsite by the respective BESS supplier in line with relevant regulations. Therefore, waste generation as a result of the BESS assembly and operation is regarded as insignificant. Nevertheless, risks are possible and the following mitigation measures have been recommended:

- Ensure that the responsibilities of the various parties are defined clearly for the life cycle of the BESS, such as when the BESS is being transported to site, when it reaches site, during operations, during transport off site in the event of malfunction or any technical issues.
- Ensure that the BESS is dissembled in line with the specifications of the supplier or manufacturer.
- Ensure that the contact details for the supplier of the BESS are kept readily available and sign-posted on site, should they need to be contacted during emergency situation.
- Used batteries must be transported off site inside containers via suitable vehicles by the supplier of the BESS.
- The transport vehicle should be designated with relevant health and safety symbols.
- A set of equipment necessary to combat any spillage or leakage should be provided and the transport team trained on how to use it.
- Ensure that there is no maintenance of the BESS on site; and that old BESS's are removed from the site by the supplier or manufacturer.

- Ensure that adequate measures are put in place to verify that the pre-assembled BESS is in good working order before it gets transported to site to prevent any unnecessary risks.

D.2.15 Environmental Sensitivity Mapping

Based on the impact assessment undertaken and the relevant environmental sensitivities identified, the preferred site layout of the Komas WEF has been identified and shown in Figure D.13 and Appendix A.2 of this BA Report.

The direct footprint impacts from the proposed Komas WEF on various biodiversity features applicable offset ratios, and final offset requirements are indicated in the table below.

Feature impacted by Komas	*Area (ha)*	*add 5%*	*Total (ha)*	*Ratio*	*Offset (ha)*
Namaqualand Strandveld	79	4	83		
- of which NNP Expansion Footprint	30	2	32	1:20	
- CBA2 (overlaps entirely with above)	31	2	33	1:20	660
- ESA	28	2	30	1:5	150
Total area of offset					**810**

Based on the specialist studies, the key environmental features that have been avoided in terms of the layout of the facility are listed below:

- **Terrestrial Biodiversity**
  - Based on the Northern Cape CBA map, the southern parts of the proposed Komas WEF site lie within a Tier 2 CBA with a small portion of Tier 1 CBA in the south-eastern corner of the site (Figure D.6). This indicates that the site occurs within an area of recognised biodiversity significance.
  - The CBA 1 in the south-eastern corner of the site must be excluded. Under the final layout assessed, there are no turbines or other infrastructure proposed within the CBA 1.
  - The low-lying area in the far west of the site consisting of short Strandveld on calcareous soils is considered to represent the most sensitive part of the site from an ecological perspective and is not considered suitable for development. This area is excluded from the proposed development of the Komas WEF.
  - There are also some areas of mobile dunes and rocky outcrops which should also be avoided (as has been achieved under the final layout).

Refer to Figure D.6 of the Terrestrial Biodiversity Impact Assessment for the ecology sensitivity map.

The loss of 31 ha of habitat within the CBA 2 represents less than 2% of the area of CBA within the proposed Komas WEF study area only and significantly less of the whole affected CBA. As a result, this is highly unlikely to compromise the ecological functioning of the CBA, given that it has not been identified as being of particular significance for broad-scale ecological processes. Consequently, the overall impact of the development on CBAs and broader scale ecological processes is considered to be relatively low and no major impacts to dispersal ability or faunal movement patterns are likely to be generated by the development.

- **Aquatic Biodiversity**
  - No watercourses were encountered within the Komas WEF study area. Therefore, no aquatic features need to be avoided by the proposed development of the Komas WEF and associated infrastructure.

The Aquatic Biodiversity Compliance Statement that was undertaken rates the aquatic sensitivity to be of very low sensitivity. Therefore, the rating of very high significance as identified by the National Web-Based Environmental Screening Tool is disputed based on the evidence collected during the site visit and as motivated in Aquatic Compliance Statement (Appendix C.2 of this BA Report).

- **Avifauna**
  - **Very High sensitivity or No-Go areas**: The Avifauna Impact Assessment (Appendix C.3) did not identify **areas of Very High sensitivity or No-Go areas within the proposed Komas WEF site.**
  - **High-risk**: The Avifauna Impact Assessment notes that there were no areas observed during the 12-month pre-construction avifauna monitoring where two Red Data species overlapped or where numerous flights of any one Red Data species occurred. Where this occurred for Ludwig's Bustards the specialist down-graded them to medium-risk (indicated below) because in the Komas site they never flew within the BSA. **Therefore, no high-risk areas were identified within the proposed Komas WEF site.**
  - **Medium-risk:** Five areas arose within the proposed Komas WEF site from the overlap of two or more non-threatened priority species, particularly the Black-chested Snake Eagles and Booted Eagles. Areas where a low frequency of flights of Red Data Verreaux's Eagles or Ludwig's Bustards occurred were included as medium-risk areas as these Red Data species were either infrequently recorded (the eagles) or were never recorded flying in the BSA (Ludwig's Bustard). Turbines are allowed to be placed within the medium-risk areas.

Refer to Figure D.7 for the avifauna sensitivity map.

- **Bats**
  - **Very High sensitivity or No-Go areas**:

The following features, which could be bat conducive, either at present, or in future, have been buffered with a 200 m buffer at the proposed Komas WEF site. If two or more points of interest are in close vicinity, they are linked to form one sensitivity zone:

- Open water sources, such as water troughs for livestock. Some of these are historic, but could be used in future;
- Reservoirs;
- Dams;
- Diggings; and
- Pans.

In the southern area of the proposed Komas WEF site crevices were discovered with some bat rests, indicating bat presence in the area. Although no bats have been physically observed, these could serve as roosts. The static recorder situated in the south also recorded the highest bat activity if compared to the other monitoring systems on site. The contour of the hilly area in the south, also indicating the border of the proposed Komas WEF site, were followed to create this high sensitivity zone. This area has been excluded from the proposed development of the Komas WEF.

- **Medium to high sensitivity zones**: The Bat Impact Assessment (Appendix D.4) notes that initially this zone was classified as of medium sensitivity, but when hourly mean bat activity was calculated taking all monitoring data into account, it was clear that bat activity is higher than the threshold provided by the South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments – Pre-construction (Sowler et. al, 2017). It seems as if Namaqualand Salt Pans vegetation zone (SANBI, 2012), supports higher bat presence, and the border of this vegetation zone had been used for the sensitivity zone. Due to the high bat activity, if taking the threshold into account, the medium zone was changed to a medium to high sensitivity zone.

- **Medium sensitivity zone:** The remaining part of the site was initially classified as of Low sensitivity, but when data from the static recorders were considered, the rest of the site was changed to a medium sensitivity zone.

Refer to Figure D.8 for the bat sensitivity map.

- **Visual**

  - **No-Go areas:** The following No-Go areas have been avoided by the proposed layout of the Komas WEF (access roads are permissible in these areas):
    - Topographic features: Feature
    - Steep slopes: Slopes > 1:4
    - Ridges: Ridges within the proposed Komas WEF development area should be precluded from the development footprint.
    - Farmsteads: 500 m exclusion zone should be placed around any farmstead located on, or within 500 m of the proposed Komas WEF development area.
    - Arterial routes: within 250 m

Two turbines are located in an area demarcated as "Very High Sensitivity: Ridges", however the VIA report notes that these are not No-Go areas and do not preclude development but rather should be viewed as zones where the number of turbines should be limited where possible.

Refer to Figure D.9 for the visual sensitivity map.

- **Heritage (Archaeology and Cultural Landscape)**

  - **Very High sensitivity or No-Go areas:** The archaeological sites as identified in Figures 27 and 29 of the HIA (Appendix C.6 of this BA Report) should be avoided with a 50 m buffer. The proposed Komas WEF are situated outside of these buffer areas.

Refer to Figure D.10 for the heritage sensitivity map.

- **Palaeontology**
  - There are no specific fossil sites that must be avoided by the proposed Komas WEF development.
- **Agriculture**
  - The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. However, the agricultural uniformity and low agricultural potential of the environment, means that the exact positions of all infrastructure will make no material difference to agricultural impacts. Therefore, no areas of very high or high agricultural potential were identified on the proposed Komas WEF site.
- **Socio-Economic**
  - Sensitivity maps in terms of areas to avoid are not applicable for the Socio-Economic Assessment.
- **Noise**
  - **Very High sensitivity or No-Go areas**: 500 m from NSDs. The Noise Assessment (Appendix C.9 of the BA report) confirms that there are no potential NSDs within 500 m from any proposed wind turbines.
- **Traffic**
  - Sensitivity maps in terms of areas to avoid are not applicable for the Transport Impact Assessment.
- **Geotechnical**
  - Sensitivity maps in terms of areas to avoid are not applicable for the Geotechnical Impact Assessment.

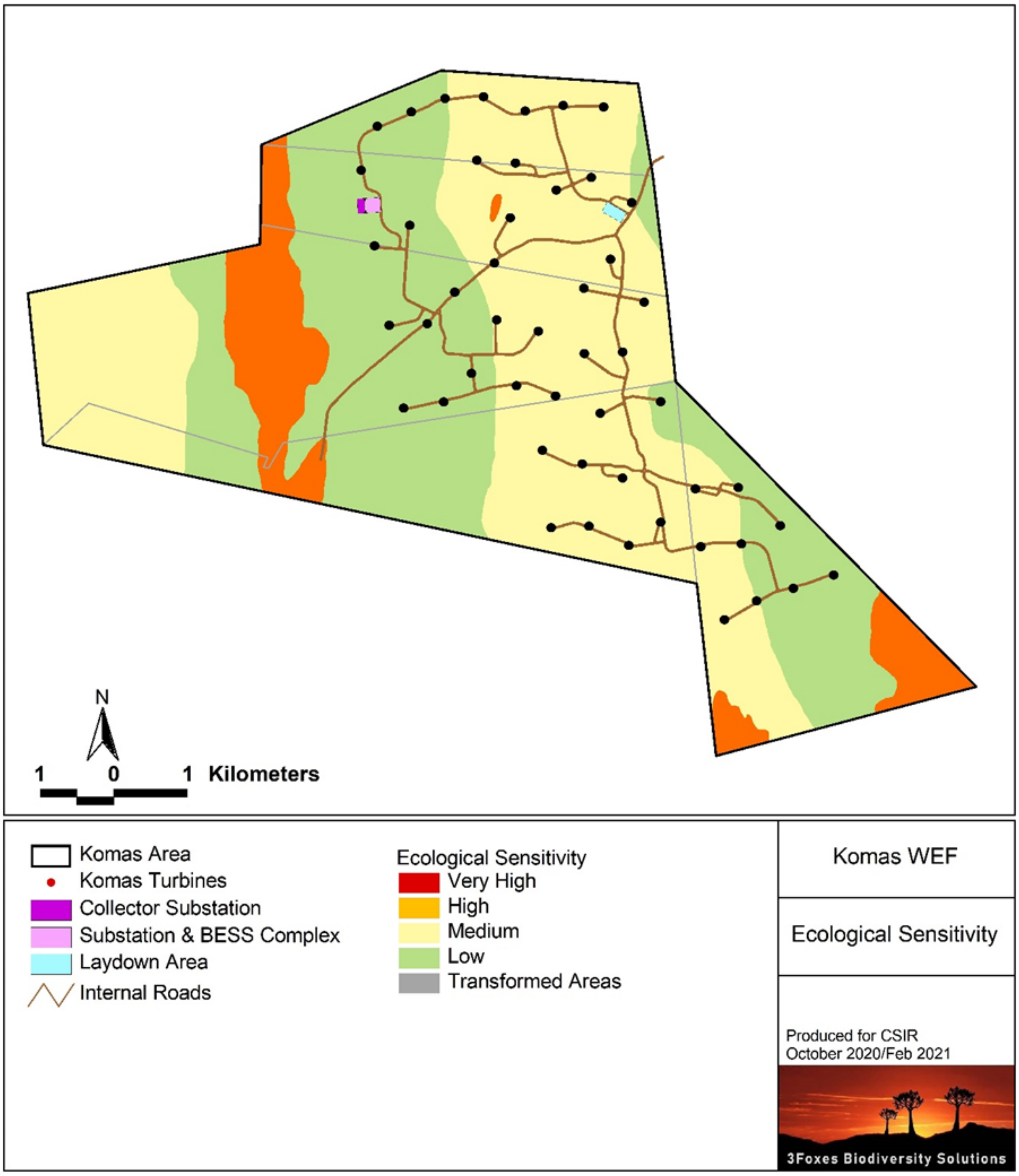


Figure D.6: Sensitivity Map for Terrestrial Biodiversity at the proposed Komas WEF site.

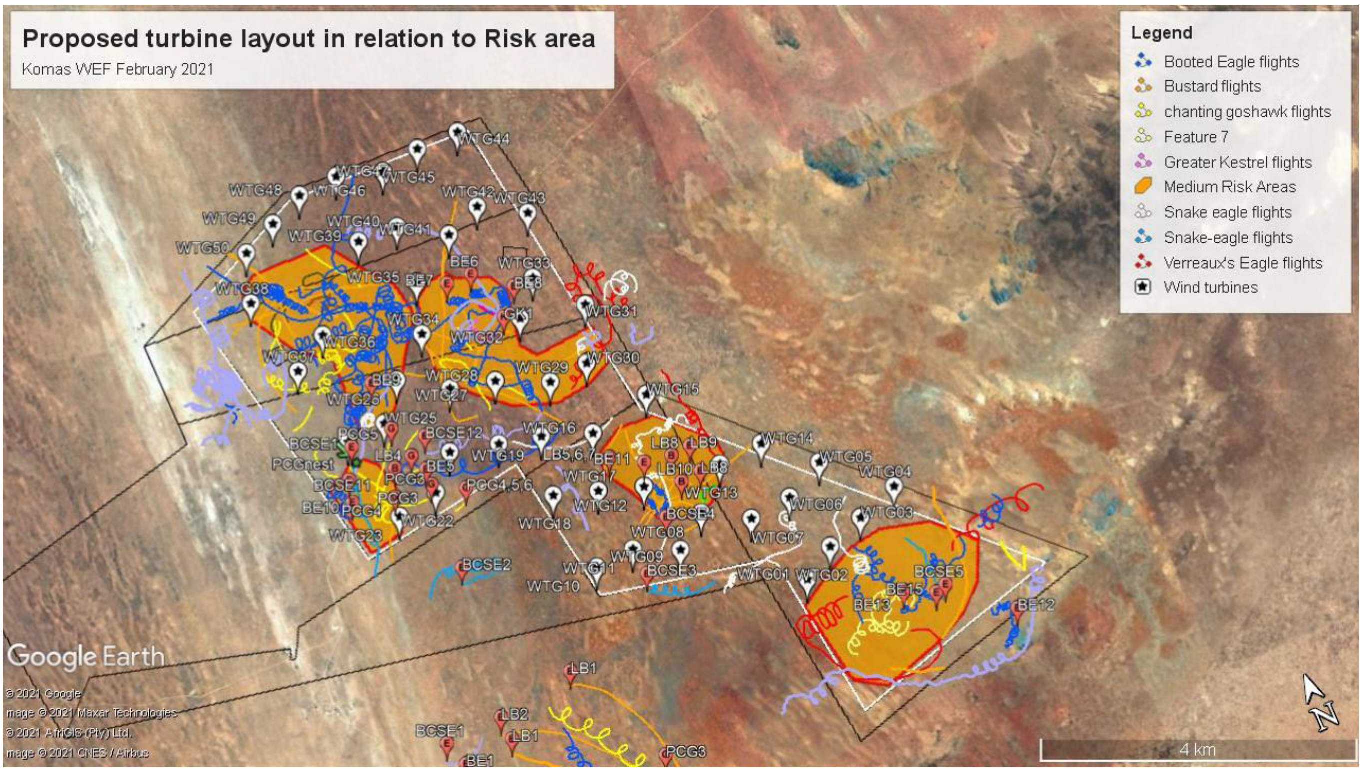


Figure D.7: Sensitivity Map for Avifauna at the proposed Komas WEF site.

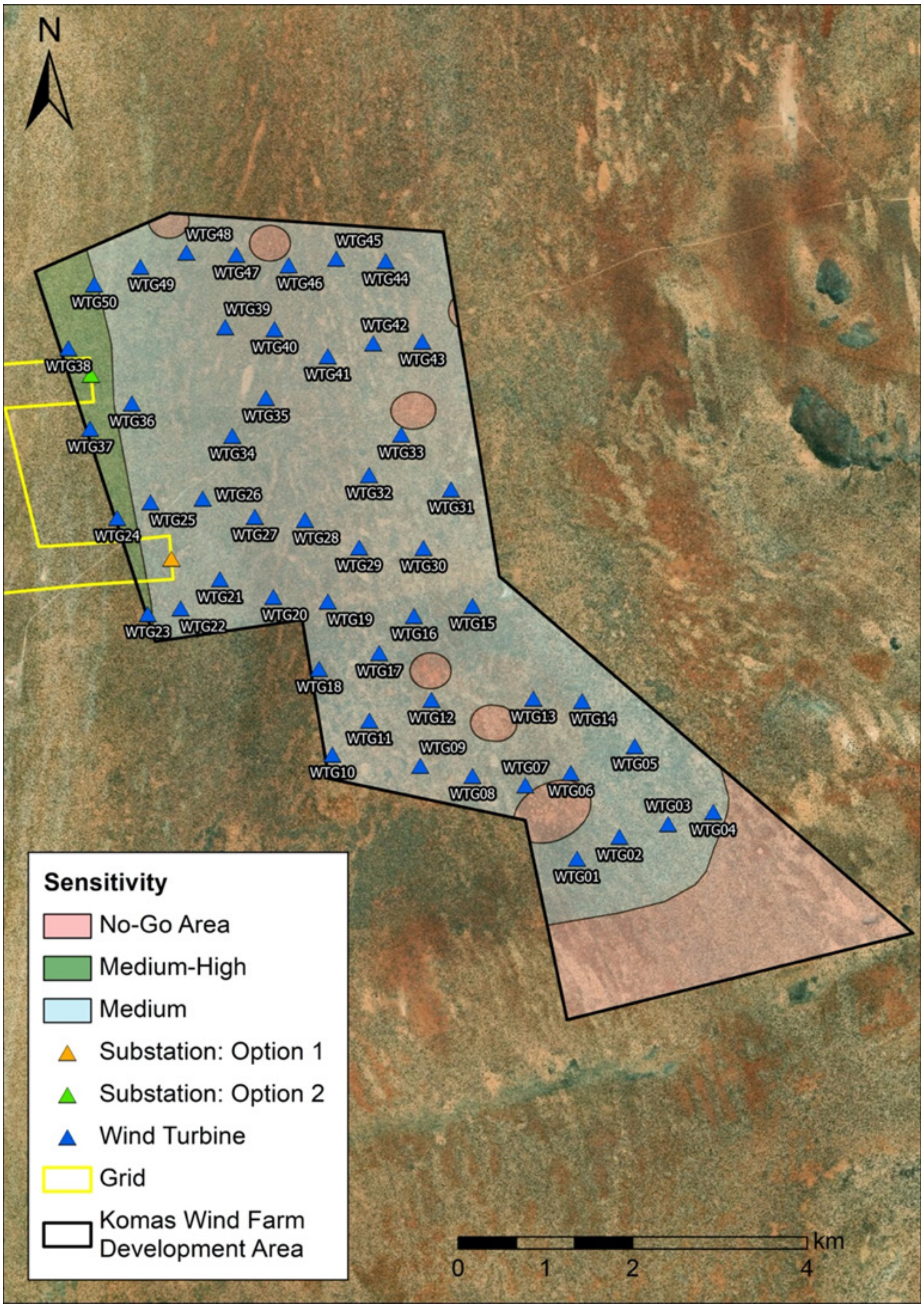


Figure D.8: Sensitivity Map for Bats at the proposed Komas WEF site.

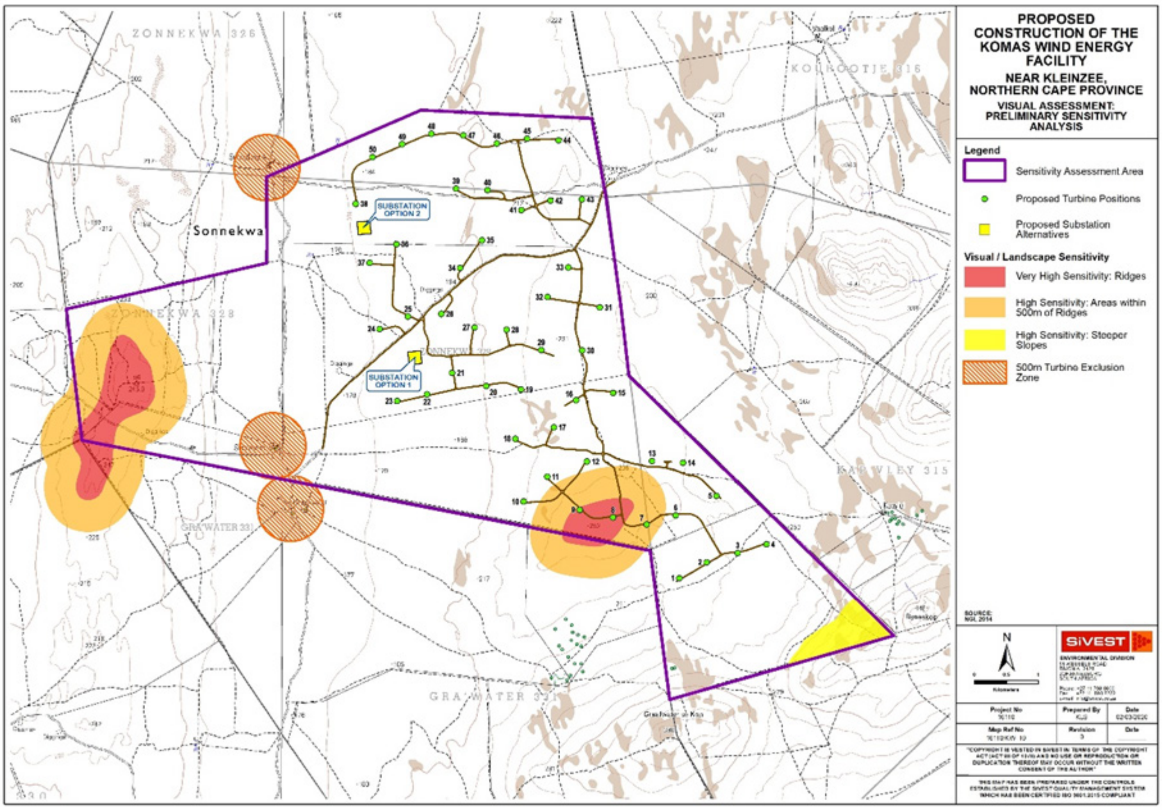


Figure D.9: **Sensitivity Map for Visual Aspects: Visual sensitivity analysis at the proposed Komas WEF site.**

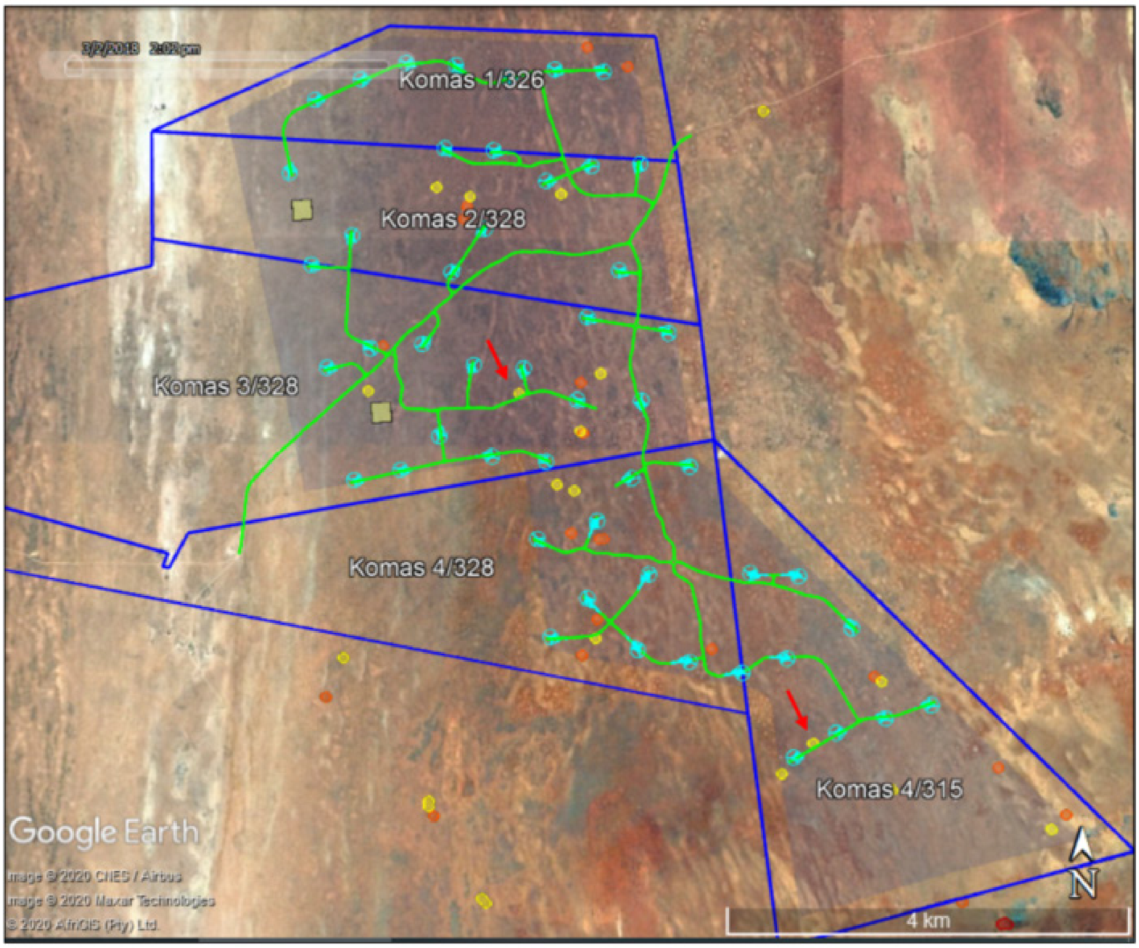


Figure D.10. Sensitivity Map for Heritage at the proposed Komas WEF site: Aerial view of the Komas study area showing the distribution of archaeological sites by grade and including their buffers. Orange = GPB, yellow = GPC. [12]All waypoints are buffered by 50 m which allows for the size of the site plus at least a 30 m buffer. The proposed Komas WEF components are shown by green lines (roads) and turquoise symbols (turbines). The two locations where buffers are intersected are highlighted by red arrows.

[12] The archaeological resources on site are deemed to have low-medium cultural significance for their scientific value. Those more important sites are assigned a field rating of 'GPB', but many others are considered to be 'GPC'. No archaeological sites were rated 'GPA'.

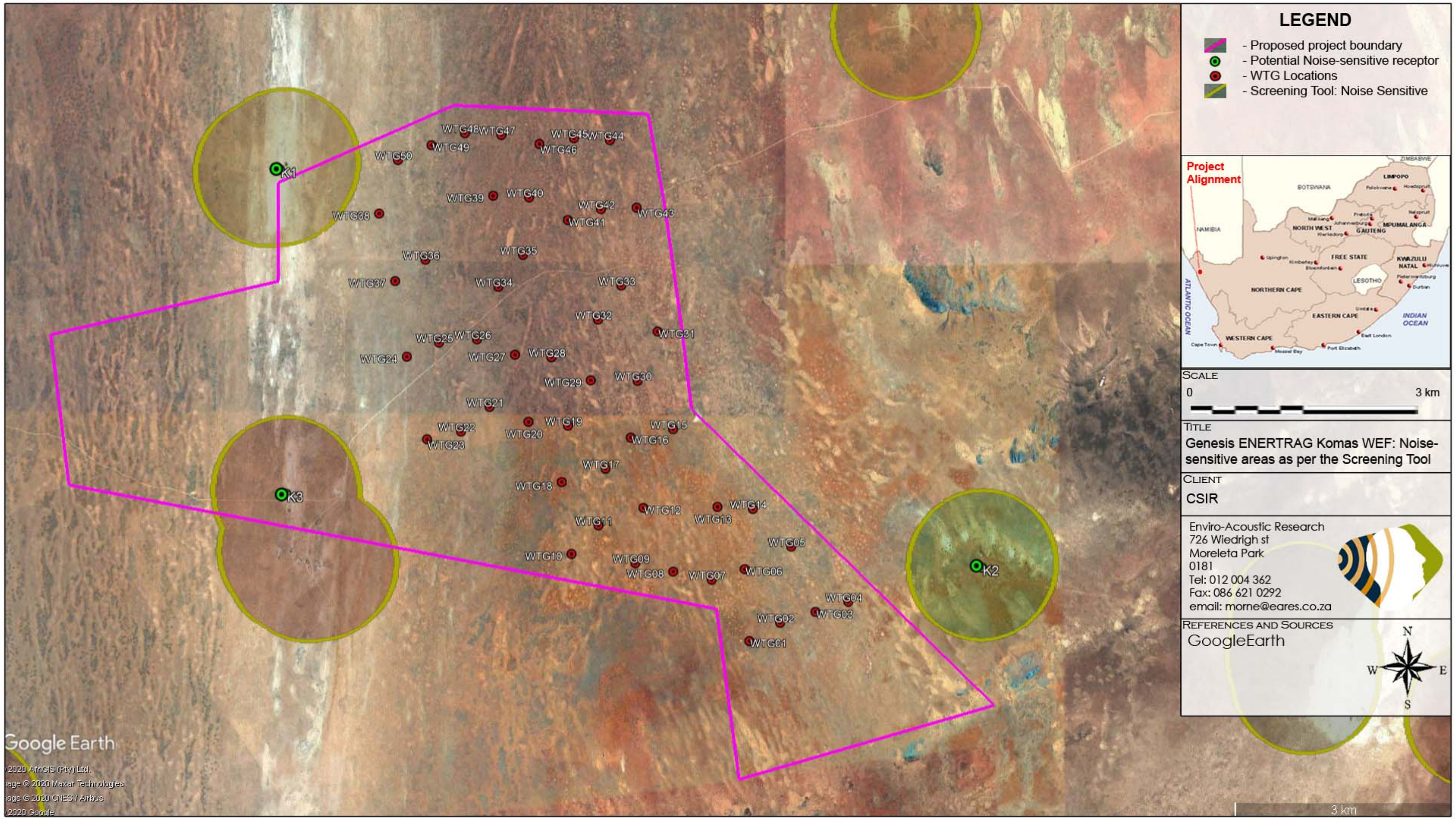


Figure D.11. Sensitivity Map for Noise at the proposed Komas WEF site: indicating closest identified Noise Sensitive Developments

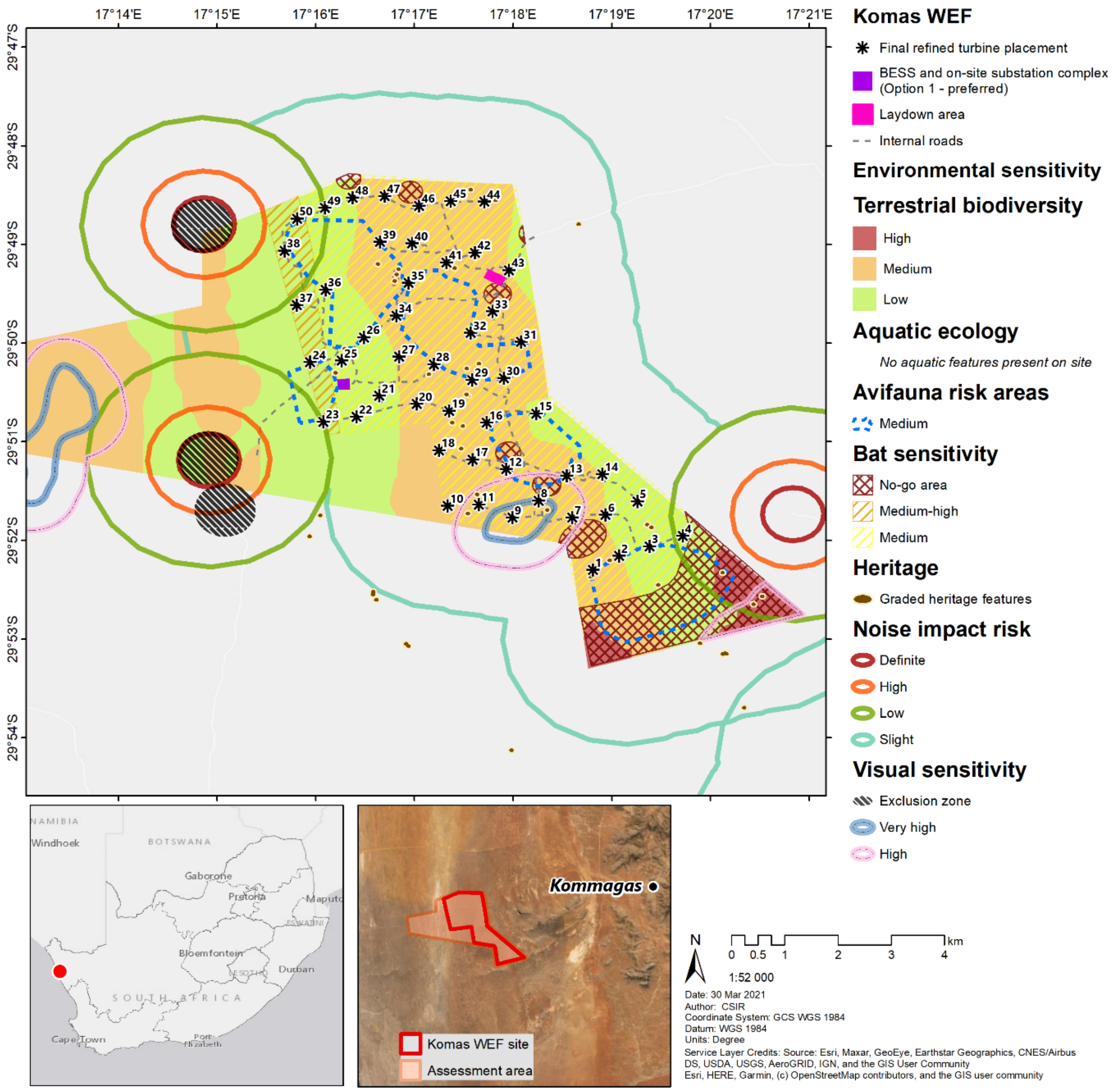


Figure D.12. Combined Sensitivity Map for the proposed Komas WEF project

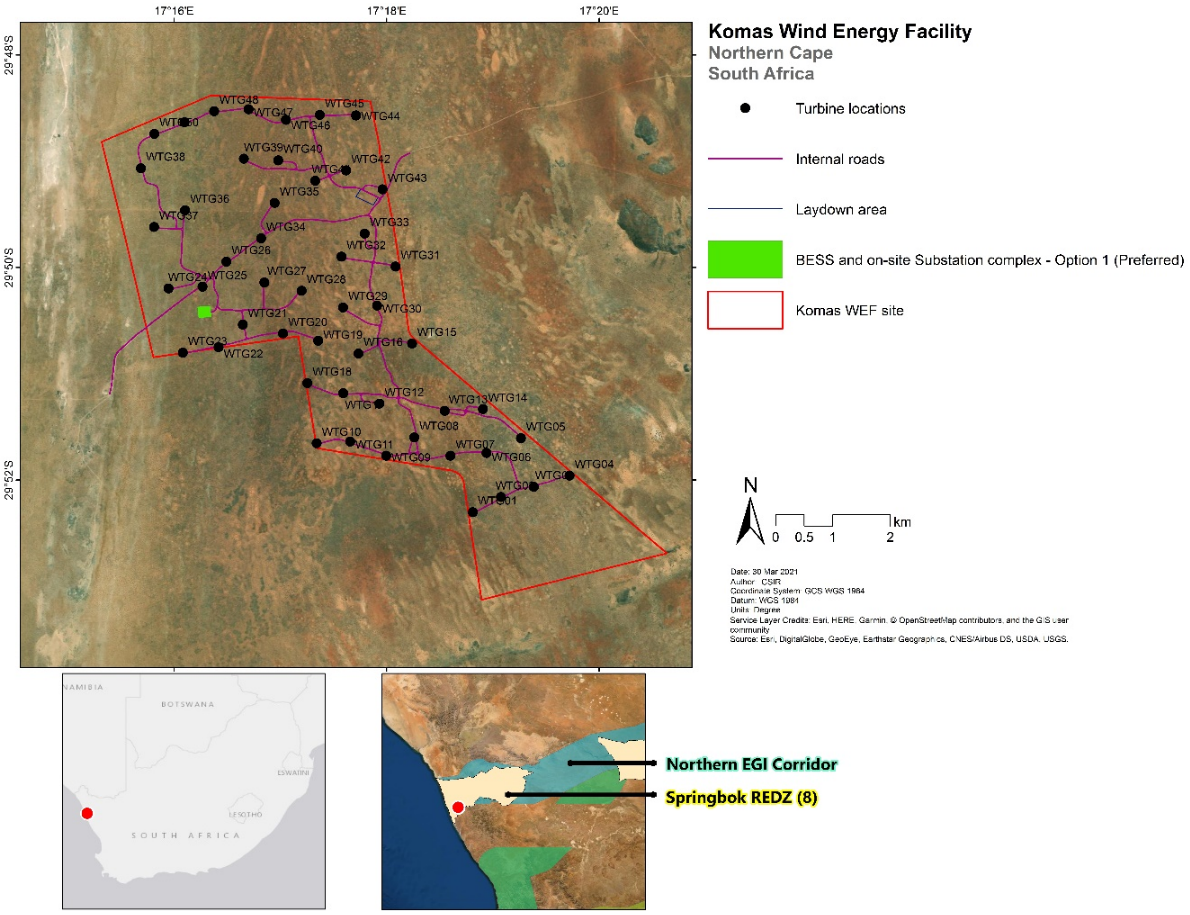


Figure D.13. Preferred layout for the proposed Komas WEF project and associated infrastructure

SECTION E: RECOMMENDATION OF ENVIRONMENTAL ASSESSMENT PRACTITIONER & ENVIRONMENTAL IMPACT STATEMENT

This BA Report has investigated and assessed the significance of potential positive and negative direct, indirect and cumulative impacts associated with the proposed construction, operation and decommissioning of the proposed Komas WEF and associated infrastructure**.** No negative impacts have been identified within this BA that, in the opinion of the EAP who has conducted this BA process, should be considered “fatal flaws” from an environmental perspective, and thereby necessitate substantial re-design or termination of the project.

Section 24 of the Constitutional Act states that “everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”. Based on this, this BA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures, and monitoring requirements. These measures will be undertaken to promote conservation by avoiding the sensitive environmental features present on site and through appropriate monitoring and management plans (refer to the EMPrs in Appendix G of this BA Report).

It is understood that the information contained in this BA Report and appendices is sufficient to make a decision in respect of the activity applied for. It is recommended that the EA be valid for a period of 10 years.

Alternatives

As noted above, in Section A of this report, the preferred activity was determined to be the development of a renewable energy facility on site using wind energy as the preferred technology. In terms of the preferred location of the site, even though location alternatives were not assessed the layout was designed after provision of sensitivity data by the specialists to ensure that it would have the least possible overall environmental impact. The land assessed to develop the proposed Komas WEF extends approximately 5 070 ha. The area identified for the proposed Komas WEF site within the affected farms is approximately 2 725 ha. However, the footprint of the proposed Komas WEF within the WEF site is only approximately 90 ha (excluding access roads to the site).

The specialists identified No-Go and areas of very high sensitivity within the 2 725 ha which have been excluded from the current layout. The specialists considered desktop data, field work, existing literature and the National Web-based Environmental Screening Tool to inform the identification of sensitivities at the proposed Komas WEF site. The location and preferred layout of the proposed Komas WEF project have been informed by the outcomes of the specialist assessments and technical feasibility, as well as landowner requirements. The initial layout went through several iterations to avoid No-Go or areas of higher environmental sensitivity. The preferred layout is therefore a culmination of all the specialist inputs and outcomes to ensure that the proposed Komas WEF footprint avoids all No-Go areas and that the project is developed in an environmentally sustainable manner. Based on this a sensitivity map was compiled (Figure D.12) and a preferred layout was subsequently determined for the Komas WEF and associated infrastructure (Figure D.13 and Appendix A.2 of this BA Report). This layout avoids the features on site that have been identified as No-Go areas, as explained in Section B and Section D. The layout will still need to be micro-sited (the turbines and access roads) prior to the commencement of construction. This micro-siting will be informed by *inter alia* a pre-construction walk-through of the development footprint to further refine the layout and further reduce impacts on SCC.

The Project Applicant provided two site alternatives for assessment for the BESS and on-site SS complex, i.e. Option 1 and Option 2. Both alternatives are deemed feasible by all the specialists and can be implemented (see Table E.1). However, the preferred alternative selected by the Project Applicant is Option 1 as the site is in an optimal location in relation to the proposed turbine layout (see Figure D.13). The Visual specialist also confirmed that Option 1 is their preferred alternative as Option 2 is closer to the nearest receptor.

Table E.1. Assessment of BESS and on-site SS complex alternatives (Option 1 and Option 2) by the specialists

(green)	Preferred	(yellow)	No Preference	(white)	Favourable

	Option 1	**Option 2**
Terrestrial Biodiversity	✓	✓ (Preferred)
Aquatic Biodiversity	✓ (No Preference)	✓ (No Preference)
Avifauna	✓	✓ (Preferred)
Bats	✓ (No Preference)	✓ (No Preference)
Visual	✓ (Preferred)	✓
Heritage (including Archaeology, Cultural Landscape and Palaeontology)	✓ (No Preference)	✓ (No Preference)
Socio-Economic	✓ (No Preference)	✓ (No Preference)
Agriculture	✓ (No Preference)	✓ (No Preference)
Noise	✓ (No Preference)	✓ (No Preference)
Transport	✓ (No Preference)	✓ (No Preference)
Geotechnical	✓ (No Preference)	✓ (No Preference)

Need and Desirability of the Proposed Project

This BA considered the nature, scale and location of the proposed development as well as the wise use of land (i.e. is this the right time and place for the development of the proposed Komas WEF project). This proposed project is located in the Springbok REDZ (REDZ 8) which is a geographical area that has been identified on a strategic planning level to have reduced negative environmental impacts but high commercial attractiveness (due to its proximity to, *inter alia*, the national grid) and socio-economic benefit to the country. The proposed Komas WEF is therefore aligned with national planning initiatives for the placement of WEFs in South Africa. The development of a WEF is important for South Africa to reduce its overall environmental footprint from coal power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability.

On a municipal planning level, the proposed project supports the objectives of the NDM's IDP (2017-2022) which state that an opportunity exists to utilise wind energy more widely and lessen the dependence on wood and gas as energy sources for cooking in households. This opportunity has been identified because of the increasing backlog in electricity provisioning in the municipal area. Even though this WEF will not supply electricity directly to the local or district municipality, the energy produced by the proposed Komas WEF will feed into the national grid.

The IDP has also identified embarking on renewable energy and upgrading electricity supply to water pump stations and incorporation of Eskom electricity network to address the electricity needs in the Komaggas area; this depicts a need for an alternative source of energy.

One of the economic priority issues identified within the NDM IDP (2017– 2022) is the high levels of unemployment. The IDP further states that the majority of the adult population within the NKLM have low skills levels and need employment. The proposed project will create job opportunities, undertake skills training and create economic spin offs during the construction and operational phases (if an EA is granted by the DEFF). It is difficult to specify the actual number of employment opportunities that will be created at this stage; however approximately 200 – 250 employment opportunities are expected to be created during the construction phase. It is anticipated that approximately 55% (136) of the employment opportunities will be available to low skilled workers (construction labourers, security staff etc.), 30% (76) to semi-skilled workers (drivers, equipment operators etc.) and 15% (38) for skilled personnel (engineers, land surveyors, project managers etc.).

The projected operations are expected to provide several services and added economic spin offs (as highlighted in Section D of this BA Report). Approximately 20 permanent employment opportunities (skilled and unskilled) will be created during the operational phase of the project. Of this total, approximately 12 will be low skilled workers, 6 semi-skilled and 2 skilled workers.

The **proposed Komas WEF project is therefore** aligned with the vision and goals of the District and Local Municipality.

Summary of Key Impact Assessment Findings

Based on the findings of the specialist studies, the proposed project is considered to have an <u>overall low negative environmental impact and an overall low to moderate positive socio-economic impact</u> (with the implementation of respective mitigation and enhancement measures). Table E.2 below provides a summary of the impact assessment for each phase of the proposed project **post mitigation for direct impacts**. Table E.3 provides the same information for the **cumulative impacts**.

As indicated in Table S.4, it is clear that the majority of the **direct negative impacts** were rated with a **<u>low to very low</u> post mitigation impact significance** for the **construction phase**, with only the Avifauna, Cultural Landscape and Transport impacts being rated with a **moderate significance**. In terms of the operational phase, the majority of the **direct negative impacts** were rated with a **<u>low</u> post mitigation impact significance**, with only the Avifauna, Bats and Visual impacts being rated with a **moderate significance**. The majority of the **direct negative impacts** for the decommissioning phase were rated with a **<u>low</u> post mitigation impact significance**, with only the Avifauna, Heritage

(Archaeology and Cultural Landscape) and Transport impacts being rated with a **moderate significance.** In terms of **positive impacts**, the Socio-Economic impacts are rated as of **moderate significance** for the construction phase; and **moderate to high** for the operational phase.

Based on Table E.3, the majority of the **cumulative negative impacts** were rated with a **low post mitigation impact significance** for the **construction phase**, with only the Heritage (Cultural Landscape) and Transport impacts being rated with a **moderate significance**. The majority of the impacts for the **operational phase** are rated as **insignificant to low significance**, with visual and Heritage (Archaeology and Cultural Landscape) impacts being rated with a **moderate significance, and Avifauna and Bats** rated as **high significance**. During the decommissioning phase, cumulative impacts were not identified and/or were considered insignificant, however for those that were rated, it resulted in an overall **neutral and very low post mitigation impact significance**. In terms of **positive impacts**, the Socio-Economic impacts are rated with a **moderate significance** and Palaeontology impacts are rated with a low significance for the construction phase. For the operational phase, the Socio-Economic impacts are rated with a **moderate to high significance** and the Agriculture impacts are rated with a **low significance**.

Table E.2. Overall Impact Significance with the Implementation of Mitigation Measures for Direct Negative and Positive Impacts for the Komas WEF Project

Specialist Assessment	Construction Phase	Operational Phase	Decommissioning Phase
DIRECT NEGATIVE IMPACTS			
Terrestrial Biodiversity	Low	Low	Low
Aquatic Biodiversity	Low	Low	Low
Avifauna	Moderate	Moderate	Moderate
Bats	Low	Moderate	Very Low
Visual	Low	Moderate	Low
Heritage (Archaeology and Cultural Landscape)	Archaeology and graves: Very Low Cultural Landscape: Moderate	Low	Moderate
Palaeontology	Low	Insignificant and/or not identified and/or not applicable (N/A)	Insignificant and/or not identified and/or N/A
Agriculture	Low	N/A	Low
Socio-Economic	Low	Low	Low
Noise	Very Low	Very Low Low	Very Low
Transport	Moderate	Insignificant	Moderate
Geotechnical	Very Low	No impacts identified	Very Low
DIRECT POSITIVE IMPACTS			

Specialist Assessment	Construction Phase	Operational Phase	Decommissioning Phase
Agriculture	Not applicable	Low (+)	Not applicable
Palaeontology	Low (+)	Insignificant and/or not identified and/or N/A	Insignificant and/or not identified and/or N/A
Socio-Economic	Moderate (+)	Moderate (+) High (+)	N/A

Table E.3. Overall Impact Significance with the Implementation of Mitigation Measures for Cumulative Negative and Positive Impacts for the Komas WEF Project

Specialist Assessment	Construction Phase	Operational Phase	Decommissioning Phase
CUMULATIVE NEGATIVE IMPACTS			
Terrestrial Biodiversity	Low	Low	Neutral
Aquatic Biodiversity	N/A	N/A	N/A
Avifauna	Insignificant and/or not identified and/or N/A	High	Insignificant and/or not identified and/or N/A
Bats	Low	Low High	Insignificant and/or not identified and/or N/A
Visual	Low	Moderate	Insignificant and/or not identified and/or N/A
Heritage (Archaeology and Cultural Landscape)	Archaeology and graves: Very Low Cultural Landscape: Moderate	Moderate	Insignificant and/or not identified and/or N/A
Palaeontology	Low	Insignificant and/or not identified and/or N/A	Insignificant and/or not identified and/or N/A
Agriculture	Very Low	Insignificant and/or not identified and/or N/A	Insignificant and/or not identified and/or N/A
Socio-Economic	Low	Low	Insignificant and/or not identified and/or N/A
Noise	Insignificant and/or not identified and/or N/A	Very Low	Insignificant and/or not identified and/or N/A
Transport	Moderate	Insignificant	Insignificant
Geotechnical	Very Low	Very Low	Very Low

CUMULATIVE POSITIVE IMPACTS			
Palaeontology	**Low (+)**	**Insignificant and/or not identified and/or N/A**	**Insignificant and/or not identified and/or N/A**
Agriculture	**N/A**	**Low (+)**	**N/A**
Socio-Economic	**Moderate (+)**	**Moderate (+)** **High (+)**	**Insignificant and/or not identified and/or N/A**

All of the specialists have recommended that the proposed project receives EA, if the recommended mitigation measures are implemented.

Overall Environmental Impact Statement

Taking into consideration the findings of the BA process, as well as the fact that the proposed **Komas WEF project** will be located within the Springbok REDZ (REDZ 8), it is the opinion of the EAP, that the project benefits outweigh the costs and that the project will make a positive contribution to sustainable infrastructure development in the NKLM and the NDM area. **Provided that the specified mitigation measures are applied effectively, it is recommended that the proposed project receives EA in terms of the NEMA EIA Regulations, 2014, as amended.**

Cumulative Environmental Impact Statement

The cumulative impacts have been assessed by all the specialists on the project team. The cumulative assessment included approved renewable energy projects (wind and solar PV) within a 50 km radius of the proposed Komas WEF project site, as well as renewable energy projects which have submitted an application for EA with the competent authority at the time when the project was commissioned. A BA process will also likely be conducted for the proposed Gromis WEF and the cumulative impacts of this project were also considered in the cumulative assessment. No cumulative impacts have been identified that were considered to be fatal flaws. The specialists recommended that the project receives EA in terms of the NEMA EIA Regulations, 2014, as amended, including consideration of cumulative impacts. It is also important to note that the proposed project site is located within the Springbok REDZ (REDZ 8) which supports the development of large scale wind and solar energy developments. The proposed project is therefore aligned with the national planning vision for wind and solar development in South Africa.

Conditions to be included in the EA

In order to ensure the effective implementation of the mitigation and management actions, a draft EMPr has been compiled and is included in Appendix G of this BA Report. The mitigation measures necessary to ensure that the proposed project is planned and carried out in an environmentally responsible manner are listed in these draft EMPrs. The EMPrs includes the mitigation measures noted in this report and the specialist studies. The EMPrs are dynamic documents that should be updated as required and provide clear and implementable measures for the proposed project.

Listed below are the **main** recommendations that should be considered for inclusion in the EA (should such authorisation be granted by the DEFF). These main recommendations as well as additional recommendations are included in the EMPrs and BA Report.

- **Terrestrial Biodiversity Impacts**

  - Construction Phase:

    Vegetation and Plant Species of Conservation Concern:

    - No development of turbines, roads or other infrastructure within No-Go areas identified in Figures D.6 and D.12 in Section D of the BA report.
    - Pre-construction walk-through of the development footprint to further refine the layout and reduce impacts on SCC through micro-siting of the turbines and access roads.
    - Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna.

    Fauna

    - Avoidance of identified areas of high faunal importance at the design stage.
    - Ensure that laydown areas and other temporary infrastructure is located within medium- or low- sensitivity areas (as identified in Figure D.6 in Section D of the BA report), preferably previously transformed areas if possible.
    - Search and rescue for reptiles and other vulnerable species during construction, before areas are cleared.
    - During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.
    - 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.
    - All construction vehicles should adhere to a low speed limit (40 km/h for cars and 30 km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits should apply within the facility as well as on the public gravel access roads to the site.
    - If any parts of the site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which should be directed downwards.

  - Operational Phase:

    Soil erosion

    - Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan (included in the EMPrs in Appendix G of the BA report).
    - All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk.
    - Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project.

- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.
- All cleared areas should be revegetated with indigenous perennial species from the local area.
- Avoid areas of high wind erosion vulnerability as much as possible.
- Use net barriers, geotextiles, active rehabilitation and other measures during and after construction to minimise sand movement at the site.

Alien plant invasion

- Alien management plan to be implemented during the operational phase of the development, which makes provision for regular alien clearing and monitoring.
- Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species.
- Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. Problem woody species such as *Acacia cyclops* are already present in the area and are likely to increase rapidly if not controlled.
- Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems.
- Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.

Fauna

- Open space management plan for the development, which makes provision for favourable management of the facility and the surrounding area for fauna.
- Limiting access to the site to staff and contractors only.
- 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 20 cm of the ground as tortoises become stuck against such fences and are electrocuted to death.
- If 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 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 (40 km/h max) to avoid collisions with susceptible species such as snakes and tortoises.

Critical Biodiversity Areas

- Minimise the development footprint as far as possible, which includes locating temporary-use areas such as construction camps and lay-down areas in previously disturbed areas.

- Avoid impact to restricted and specialised habitats such as pans or active dune fields.
- Implement a management plan for the site which takes cognisance of the ecological value of the area and is favourable for the maintenance of fauna and flora in the area.

- Decommissioning Phase:

Soil erosion

- All hard infrastructure should be removed and the footprint areas rehabilitated with locally-sourced perennial species.
- The use of net barriers, geotextiles, active rehabilitation and other measures after decommissioning to minimise sand movement and enhance revegetation at the site.
- Monitoring of rehabilitation success at the site for at least three years after decommissioning or until the rehabilitation benchmarks and criteria have been met.
- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.

Alien plant invasion

- Alien management plan to be implemented during the decommissioning phase of the development, which makes provision for regular alien clearing and monitoring for at least three years after decommissioning.
- Active rehabilitation and revegetation of previously disturbed areas with indigenous species selected from the local environment.
- Wherever excavation is necessary for decommissioning, topsoil should be set aside and replaced after decommissioning activities are complete to encourage natural regeneration of the local indigenous species.
- Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned.
- Regular monitoring for alien plants within the disturbed areas for at least three years after decommissioning or until alien invasives are no longer a problem at the site.
- Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.

- **Terrestrial Biodiversity Offset**

Conditions to be included to the EA (should it be granted) as proposed in the Biodiversity Offset Report (February 2021) prepared by Mr. Mark Botha of Conservation Strategy, Tactics and Insight:

- **Condition 1:**

  The applicant must secure an area, in at least as good condition as the impact site, of at least 810 ha of Namaqualand Strandveld (or an adjacent and related vegetation type) as a protected area declared in perpetuity. This area must be substantially within the Expansion Footprint of the Namaqua National Park, and where possible secure the most important areas of that footprint, or the Critical Biodiversity Areas as adopted for the Northern Cape, and be suitable for inclusion in the National Park in the medium term. The applicant is responsible for all costs related to its protection and management for a period of 30 years from commencement.

- **Condition 2:**

  The applicant may not commence with construction of the listed activity, until such time as suitable evidence of ability, intent and commitment to comply with the offset condition above has been submitted to this department. An implementation arrangement(s) or agreement(s) concluded with a suitable service provider(s) or organ of state, setting out as a minimum, the requisite offset outcomes, management requirements, roles and responsibilities, financial and institutional measures, and provisions for rectifying breaches of the agreement, is sufficient for this purpose.

- **Condition 3:**

  Should the applicant fail to satisfy this offset requirement, or be in un-rectified breach of the offset implementation agreement(s) referred to above for a period of greater than 1 year, then this authorisation will be automatically suspended.

- **Avifauna Impacts**
  - Avoid the medium-risk areas as identified in Figure 15 of the Avifauna Impact Assessment (Appendix C.2 of the BA Report) and in Figures D.7 and D.12 of Section D of the BA Report.
  - Conduct construction phase avifauna monitoring to monitor the effect of the construction itself on priority birds as per the recommendations of the Avifauna specialist/and or the latest .
  - Conduct post-construction avifauna monitoring according to the Best Practice Guidelines for assessing and monitoring the impacts of wind energy facilities in southern Africa, produced by BirdLife South Africa and the Endangered Wildlife Trust (Jenkins et al. 2015) or later versions of the guidelines valid at the time of monitoring, as well as other relevant South African guidelines as applicable during the monitoring period.

- **Bat Impacts**
  - The final layout should adhere to the sensitivity map, as provided in Section 7 of the Bat Impact Assessment (Appendix C.4) and in Figures D.8 and D.12 of Section D of this BA report.
  - Apart from mitigation by turbine placement, freewheeling should be prevented to an extent that bat mortality is avoided below cut-in speed, and feathering applied to all turbine blades during periods when no power is generated for the duration of the project to prevent bat mortality.

- A mitigation scheme will be required for turbines situated within the medium to high sensitivity zone, as indicated in table below (A), which should be implemented when the turbines start to turn. Please also refer to Table 7 in Section 9.2 of the Bat Impact Assessment Report (Appendix C.4 of this BA Report). If the number of turbines are reduced, the developer could consult with the operational bat specialist as to whether curtailment could also be reduced, after more data becomes available.
- Further mitigation measures, if necessary, are indicated in the second table below (B) and should be applied and adapted by the bat specialist to be appointed at the start of the operational phase, as required. Please also refer to Table 8 in Section 9.2 of the Bat Impact Assessment Report (Appendix C.4 of this BA Report).
- Mitigation measures in the EMPr (Appendix G of the BA report) must be adhered to.
- A minimum of two years' operational bat monitoring as per the latest Best Practice Guidelines (Sowler et al., 2017) of the SABAA should be conducted (or the latest and relevant Bat Guidelines applicable at the time of the monitoring).
- Mitigation measures could be adapted as per the recommendations of the operational bat specialist as more information becomes available through operational bat monitoring.

A. MITIGATION FOR TURBINE NUMBERS WTG23, WTG24, WTG37, WTG38 and WTG50			
Months	**Time periods**	**Temperature (°C)**	**Wind speed (m/s)**
February	19:00 – 02:00	Between 14 and 19 °C	Between 2.5 and 9 m/s
March	19:00 – 02:00	Between 14 and 19 °C	Between 2.5 and 9 m/s
April	19:00 – 02:00	Between 14 and 19 °C	Between 2.5 and 9 m/s

B. MITIGATION FOR TURBINE NUMBERS WTG23, WTG24, WTG37, WTG38 and WTG50, or as advised by the bat specialist			
Months	**Time periods**	**Temperature (°C)**	**Wind speed (m/s)**
September	19:00 – 02:00	Between 14 and 22 °C	Between 2.5 and 9 m/s
December	19:00 – 02:00	Between 14 and 22 °C	Between 2.5 and 9 m/s
January	19:00 – 02:00	Between 14 and 22 °C	Between 2.5 and 9 m/s

- **Visual Impacts:**
  - Design Phase:
    - Ensure that the design of the WEF takes the sensitivity mapping of the visual specialist into account (see Figure D.9 in Section D in the BA report).
    - Ensure that no turbines are placed within 500 m of the existing dwellings and potentially sensitive receptor locations.
    - Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity.
    - Turbine colours should adhere to SACAA requirements.
    - Where possible, the O&M buildings must be consolidated to reduce visual clutter.

- The O&M buildings must be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces must be utilised where possible.

- Construction Phase:

  - Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.
  - Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
  - Vegetation clearing should take place in a phased manner.
  - Make use of existing gravel access roads where possible.
  - Limit the number of vehicles and trucks travelling to and from the proposed site, where possible.
  - Ensure that dust suppression techniques are implemented:
    - on all access roads;
    - in all areas where vegetation clearing has taken place;
    - on all soil stockpiles.
  - Maintain a neat construction site by removing litter, rubble and waste materials regularly.

- Operational Phase:

  - Inoperative turbines must be repaired promptly.
  - If turbines need to be replaced for any reason, they must be replaced with the same model, or one of equal height and scale.
  - Light fittings for security at night must reflect the light toward the ground and prevent light spill.
  - Where possible, operation and maintenance buildings must not be illuminated at night.
  - Cables must be buried underground where feasible.
  - The O&M buildings must be painted with natural tones that fit with the surrounding environment and non-reflective surfaces must be utilized where possible.
  - Dust suppression techniques must be implemented on all access roads.

- Decommissioning Phase:

  - Carefully plan to reduce the decommissioning period.
  - Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
  - Maintain a neat decommissioning site by removing rubble and waste materials regularly.
  - Make use of existing gravel access roads where possible.
  - Dust suppression techniques must be implemented on all gravel access roads.

- **Heritage Impacts (Archaeology and Cultural Landscape):**

  - A chance fossil finds procedure needs to be incorporated into the EMPrs.
  - A pre-construction survey should be commissioned to check for any remaining archaeological sites that might have been missed during the original survey. Mitigation would then be suggested if required.
  - Landscape scarring must be kept to an absolute minimum.

- 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.

- **Palaeontological Impacts**

  - The ECO and construction workers should be made aware of the possibility of important fossil remains (bones, teeth, petrified wood, plant-rich horizons, fossil termitaria etc.) being found or unearthed during the construction phase of the development.
  - Monitoring for fossil material of all major surface clearance and deeper (>1m) excavations by the ECO on an on-going basis during the construction phase is recommended.
  - Inform the ECO and construction workers of the Fossil Finds Procedure to be followed in the event of fossil occurrences Appendix 4 of the Palaeontological Impact Assessment.
  - Significant fossil finds should be safeguarded and reported at the earliest opportunity to the relevant heritage authority, i.e. SAHRA for recording and sampling by a professional palaeontologist.
  - The palaeontologist must obtain a Fossil Collection Permit from SAHRA for the fossil finds collection should resources be discovered.

- **Agriculture Impacts**

The conclusion of the Agricultural Compliance Statement is that the proposed project is acceptable and the recommendation for its approval is not subject to any conditions, other than the recommended mitigation measures.

(Note: The recommended mitigation measures regarding stormwater run-off control, maintenance of vegetation cover and to strip, stockpile and re-spread topsoil have been incorporated into the EMPrs of this BA Report (Appendix G)).

- **Socio-Economic Impacts**

  - <u>Construction Phase:</u>

    Employment

    - Where reasonable and practical the proponent should appoint local contractors and implement a ‘locals first’ policy, especially for semi and low-skilled job categories;
    - Where feasible, efforts should be made to employ local contactors that are compliant with B-BBEE criteria;
    - Before the construction phase commences the proponent should meet with representatives from the NKLM and NDM to establish the existence of a skills database for the area. If such a database exists, it should be made available to the contractors appointed for the construction phase;
    - The local authorities, relevant community representatives and local farmers should be informed of the final decision regarding the project and the potential job

opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project;

- Where feasible a training and skills development programmes for local workers should be initiated prior to the initiation of the construction phase; and
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

- The proponent should liaise with the NKLM and NDM with regard to the establishment of a database of local companies, specifically B-BBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work;
- Where possible, the proponent should assist local B-BBEE companies to complete and submit the required tender forms and associated information; and
- The NKLM and NDM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.
- The proponent should consider the need for establishing a MF in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from the NKLM, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community and farm workers associated with construction workers;
- The proponent and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation; and
- The proponent and contractor (s) should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.

o <u>Operational Phase:</u>

- The Project Applicant should implement a skills development and training programme aimed at maximising the number of employment opportunities for local community members.
- Maximise opportunities for local content, procurement and community shareholding.
- The enhancement measures listed above, i.e. to enhance local employment and business opportunities during the construction phase, also apply to the operational phase.
- The proponent should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme

should be to maximise the number of South African's and locals employed during the operational phase of the project.
- The proponent, in consultation with the NKLM and NDM, should investigate the options for the establishment of a Community Development Trust (see below).
- The NKLM and NDM should be consulted as to the structure and identification of potential trustees to sit on the Trust. The key departments in the NKLM and NDM that should be consulted include the Municipal Managers Office, IDP Manager and LED Manager.
- Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community.
- Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from the WEF.

- <u>Decommissioning Phase:</u>

- The proponent should ensure that retrenchment packages are provided for all staff retrenched when the WEF is decommissioned.
- All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning.
- The proponent should investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20-year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure. Alternatively, the funds from the sale of the WEF as scrap metal should be allocated to the rehabilitation of the site.

- **Noise Impacts**

- The Project Developer however should investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction or are taking place or from the operational wind turbines. A complaints register must be kept on site.
- The potential noise impact must be evaluated again should the layout be revised where any wind turbines are located closer than 1,000 m from a confirmed NSD.
- The potential noise impact must be evaluated again should the Project Developer make use of a wind turbine with a maximum sound power emission level exceeding 108.5 dBA re 1 pW.

- **Transport Impacts**

- The delivery of wind turbine components to the site or the removal of components from the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- Dust suppression of gravel roads to be implemented during the construction and decommissioning phases, as required.

- Regular maintenance of gravel roads by the Contractor during the construction and decommissioning phases.
- The use of mobile batch plants and quarries near the site would decrease the impact on the surrounding road network.
- Staff and general trips should occur outside of peak traffic periods as far as possible.
- Any low hanging overhead lines (lower than 5.1 m) e.g. Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.
- The preferred route should be surveyed to identify problem areas e.g. intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, that may require modification. After the road modifications have been implemented, it is recommended to undertake a "dry-run" with the largest abnormal load vehicle, prior to the transportation of any turbine components, to ensure that the delivery of the turbines will occur without disruptions. This process is to be undertaken by the haulage company transporting the components and the contractor, who will modify the road and intersections to accommodate abnormal vehicles. It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.
- Design and maintenance of internal roads. The internal gravel roads will require grading with a road grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage. This process is to be undertaken by a civil engineering consultant or a geometric design professional. The road designer should take cognizance that roads need to be designed with smooth, relatively flat gradients to allow an abnormal load vehicle to ascend to the top of a hill.

- **Geotechnical Impacts**
  - The foundation design to avoid blasting and deep excavation into sound rock.
  - Maintain vegetation cover as far as possible.
  - Strip, stockpile and re-spread topsoil.
- **Wake loss effect**
  - Given the preliminary nature of the current configurations and the limited information available at this time, DNV GL recommends more detailed wake loss effect investigations are carried out when more information is available.

Minnelise Levendal

NAME OF EAP

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April 2021

SIGNATURE OF EAP | DATE