MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 1 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report

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May 2018

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Scoping and Environmental Impact Assessment for the proposed development of the Kuruman Phase 1 Wind Energy Facility near Kuruman in the Northern Cape

DRAFT SCOPING REPORT

May 2018

Prepared for:
Mulilo Renewable Project Developments (Pty) Ltd

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REPORT DETAILS

Title:	**Scoping and Environmental Impact Assessment for the proposed development of the Kuruman Phase 1 Wind Energy Facility near Kuruman in the Northern Cape: DRAFT SCOPING REPORT**
Prepared for:	This Scoping Report forms part of a series of reports and information sources that are being provided during the Environmental Impact Assessment (EIA) Process for the proposed Kuruman WEF Phase 1 project. In accordance with the EIA Regulations, the purpose of the Scoping Report is to: • Provide a description of the proposed project, including a sufficient level of detail to enable stakeholders to identify relevant issues and concerns; • Describe the local environmental and development context within which the project is proposed, to assist further in identifying issues and concerns; and • Provide an overview of the process being followed in the Scoping Phase, in particular the Public Participation Process, as well as present the Plan of Study for EIA that would be followed in the subsequent EIA Phase. This Draft Scoping Report (DSR) is hereby released for a 30-day commenting period, ending on 21 June 2018. Comments on the DSR will be included in the Final Scoping which will be submitted to the national Department of Environmental Affairs for decision-making.
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EXECUTIVE SUMMARY

PROJECT OVERVIEW

Mulilo Renewable Project Developments (Pty) Ltd (hereafter "Mulilo") is proposing to construct two Wind Energy Facilities (WEFs), namely Kuruman Phase 1 WEF and Kuruman Phase 2 WEF and supporting electrical infrastructure, in the Ga-Segonyana Local Municipality and the John Taolo Gaetsewe District Municipality, 8 km and 37 km south west from Kuruman and from Kathu, respectively, in the Northern Cape Province. The proposed Kuruman WEF will be connected to the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman) and a collector substation, via a 132 kV powerline. This report comprises the Draft Scoping Report (DSR) for the development of **the Kuruman Phase 1 WEF.**

The proposed Kuruman Phase 1 WEF will be developed on the following land portions:

- Portion 2 of Farm Carrington 440;
- Portion 4 of Farm Carrington 440;
- Portion 1 of Farm Hartland 381;
- Remainder of Farm Woodstock 441; and
- Remainder of Farm Rossdale 382.

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA Environmental Impact Assessment (EIA) Regulations (as amended), promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017, a full Scoping and EIA Process is required for the construction of the proposed Kuruman Phase 1 WEF.

Mulilo has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the EIA Process in order to determine the biophysical, social and economic impacts associated with undertaking the proposed activities. Given that energy related projects have been elevated to national strategic importance in terms of the EIA Process, the proposed WEF requires authorisation from the National Department of Environmental Affairs (DEA) as the Competent Authority (CA), acting in consultation with other spheres of government.

NEED FOR THE PROJECT

The Integrated Resource Plan (IRP) for South Africa for the period 2010 to 2030 (referred to as "IRP2010") was released by government in 2010, and an updated report was published in 2013, which proposes to secure 17 800 MW of renewable energy capacity by 2030 (including wind, solar and other energy sources)., in August 2011, the Department of Energy (DOE) launched the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and invited potential IPPs to submit proposals for the financing, construction, operation and maintenance of the first 3 725 MW of onshore wind, solar thermal, solar photovoltaic (PV), biomass, biogas, landfill gas or small hydropower projects. 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 Government Gazette 39111. The additional target allocated for wind energy is 3 040 MW.

In terms of the REIPPPP, the submitted proposals are currently evaluated according to two main evaluation criteria for compliant proposals, which are price and economic development with a point allocation of 70/30 (DOE, 2013), with other selection criteria including technical feasibility and grid connectivity, environmental acceptability, black economic empowerment, community development, and local economic and manufacturing propositions. The bidders whose responses rank the highest (according to the aforementioned criteria) will have the greatest potential to be appointed as "Preferred Bidders" by the DOE. Mulilo intends to bid this project in the next bidding process to be potentially selected as an IPP. The establishment of the proposed WEF would strengthen the existing electricity grid for the area. Additionally, the project would contribute towards meeting the national energy target as set by the DOE and assist the government in achieving its proposed renewable energy target of 17 800 MW by 2030.

Should the proposed site and development identified by Mulilo be acceptable, it is considered viable that long term benefits for the community and society in the Kuruman/Kathu area would be realised. The towns in the Northern Cape are generally small with limited job opportunities, and the proposed project will provide an opportunity for additional employment in an area where job creation is identified as a key priority. Approximately 420 employment opportunities will be created during the construction and 35 during the operational period (including 25 permanent employees) of the proposed Kuruman Phase 1 WEF. The proposed project would also have international significance as it contributes to South Africa being able to meet some of its international obligations by aligning domestic policy with internationally agreed strategies and standards as set by the United Nations Framework Convention on Climate Change (UNFCCC), The Paris Agreement on climate Change, Kyoto Protocol, and United Nations Convention on Biological Diversity (UNCBD), all of which South Africa is a signatory to. Renewable energy is critical to South Africa as this source of energy is recognised as a major contribution to climate protection, has a much lower environmental impact, as well as advancing economic and social development.

PROJECT DESCRIPTION

A summary of the key components of the proposed project is described below.

The proposed Kuruman Phase 1 WEF will consist of the following components:

- ***Wind turbines:***

  - A number of 20 - 47 turbines;
  - Hub height of 80 - 140 m and rotor diameter of 100 - 160 m;
  - Blade length of 50 – 80 m;

- Reinforced concrete foundation: 20 m x 20 m (0.04 ha per turbine);
- Crane platform: 50 m x 50 m (0.25 ha) for each turbine; and
- Turbine capacity: 4.5 MW.

- ***Collector substation:***

  - 22/33 kV to 132 kV collector substation of approximately 2 ha to receive, convert and step up electricity from the WEF to the 132 kV grid suitable supply. The substation will be 5 m high. The facility will house control rooms and grid control yards for both Eskom and the IPP, as well as a communication tower of up to 32 m.

- ***Operations and Maintenance building:***

  - Operations and Maintenance (O&M) building of approximately 1 ha. This building will comprise the following:
    - Parking area, reception area, offices and ablution facilities for operational staff, security and visitors;
    - Workshops, storage areas for materials and spare parts;
    - Water storage;
    - Septic tanks and sewer lines to service ablution facilities;
    - Central waste collection and storage area; and
    - The buildings and other infrastructure, including a communication tower, will be less than 32 m high.

- ***Construction site office area and laydown area (used during construction and rehabilitated thereafter):***

  - Three construction laydown areas (yards) will be established. It is anticipated that each construction yard will comprise an area of approximately 2 ha (6 ha in total) and will consist of the following:
    - Canteen;
    - Ablution facilities;
    - Site offices;
    - Changing room;
    - Meeting rooms;
    - Parking area;
    - Storage areas including bunded fuel areas, oil storage areas, general stores (containers) and skips; and an
    - On-site concrete batching plant: 50 m x 50 m (0.25 ha).

- ***Access road:***

  - The proposed main route will be along the R31 (Voortrekker Road) and the N14 (Hoof Street). The proposed turbine and internal road layout indicates that the main access road to the WEF will be constructed on D3441, located to the east of the site, approximately 3 km from the N14. No existing access road currently exists along D3441 to the proposed WEF site. An additional option for access to the Phase 1 area would be via gravel road D3420, located south of the site and accessed via the R31. This is also the proposed access for the Kuruman Phase 2 WEF. This option, however, is dependent on the approval of Phase 2 in conjunction with Phase 1 and that the main access road of Phase 2 be constructed in advance.

- ***Service roads:***

  - New roads will be constructed with a width of approximately 5 m and will connect all turbines. The existing roads to be used will be extended to a width of 8 m.

- ***Other infrastructure:***

  - Fencing of 5 m high around the O&M building and the on-site substation;
  - Cabling (22/33kV internal reticulation lines) between turbines to be laid underground where practical, which will connect to an on-site substation; and
  - Stormwater channels and culverts.

The proposed Kuruman Phase 1 WEF will connect to the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman) and a collector substation via a 132 kV overhead transmission line. The proposed transmission line will extend over 50 km to the Ferrum substation or 10 km to the Segame substation. Note that this transmission infrastructure will be assessed under a separate BA process that will be undertaken.

NEED FOR AN ENVIRONMENTAL IMPACT ASSESSMENT

As noted above, in terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA Environmental Impact Assessment (EIA) Regulations (as amended), promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017, a full Scoping and EIA Process is required for the construction of the proposed Kuruman Phase 1 WEF.

The need for the full Scoping and EIA is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

"The development of a 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".

Chapter 4 of this Draft Scoping Report contains the detailed list of activities contained in R327, R325, and R324 which may be triggered by the various project components and thus form part of the Scoping and EIA Process.

The purpose of the EIA is to identify, assess and report on any potential impacts the proposed project, if implemented, may have on the receiving environment. The environmental assessment, therefore, needs to show the CA, the DEA, and the project applicant, Mulilo, what the consequences of their choices will be in terms of impacts on the biophysical and socio-economic environment and how such impacts can, as far as possible, be enhanced or mitigated and managed as the case may be.

PURPOSE OF THE SCOPING REPORT

The Scoping Phase of the EIA refers to the process of determining the spatial and temporal boundaries for the EIA. In broad terms, the objectives of the Scoping Process in terms of the 2014 NEMA EIA Regulations (GN R325) are to:

- Confirm the process to be followed and opportunities for stakeholder engagement;
- Clarify the project scope to be covered;
- Identify and confirm the preferred activity and technology alternative;
- Identify and confirm the preferred site for the preferred activity;
- Identify the key issues to be addressed in the impact assessment phase and the approach to be followed in addressing these issues; and
- Confirm the level of assessment to be undertaken during the impact assessment.

This is achieved through parallel initiatives of consulting with:

- The lead authorities involved in the decision-making for this EIA application;
- The public to ensure that local issues are well understood; and
- The EIA specialist team to ensure that technical issues are identified.

The Scoping Process is supported by a review of relevant background literature on the local area. Through this comprehensive process, the environmental assessment can identify and focus on key issues requiring assessment.

The primary objective of the Scoping Report is to present key stakeholders (including affected organs of state) with an overview of the project and key issues that require assessment in the EIA Phase and allow the opportunity for the identification of additional issues that may require assessment. Issues raised in response to this Draft Scoping Report (currently being released for a 30-day comment period) will be captured in an Issues and Responses Trail as an appendix to the Final Scoping Report, which will be submitted to the National DEA for decision-making (i.e. approval or rejection). This approval is planned to mark the end of the Scoping Phase after which the EIA Process moves into the impact assessment and reporting phase.

IDENTIFICATION OF ISSUES

The list below indicates the main issues identified thus far during the Scoping Phase and to be addressed during the EIA Process.

TERRESTRIAL AND FRESHWATER ECOLOGY IMPACTS:

The proposed development will result in the loss of approximately 100 ha of vegetation during the construction phase. The proposed development site will also have an impact on Species of Conservation Concern (SCC) and fauna through habitat loss and mortality. The proposed development will also result in a number of actions including:

- Impact on Critical Biodiversity Area (CBA) 2;
- Impact on Ecological Support Area (ESA);
- Impact on plant Species of Conservation Concern (SCC);
- Direct and indirect faunal impacts;

- Increased alien plant invasion;
- Increased erosion; and
- Cumulative impact on habitat loss and broad-scale ecological processes.

The potential impacts identified during the scoping phase of the terrestrial and freshwater ecology assessment are outlined below:

Construction Phase

- Physical disturbance and destruction of aquatic features and major drainage lines;
- Altered drainage patterns, increased runoff and sedimentation of related ecosystems;
- Impairment of water quality;
- Impact on vegetation and plant SCC; and
- Direct and indirect faunal impacts.

Operational Phase

- Physical disturbance and destruction of aquatic features and major drainage lines;
- Alteration of the natural hydrological regime;
- Increased soil erosion;
- Increased alien plant invasion;
- Impacts on fauna; and
- Impacts on CBA 2 and ESA.

Decommissioning Phase

- Degradation of aquatic features and major drainage lines;
- Impairment of water quality;
- Increased alien plant invasion;
- Increased soil erosion; and
- Direct and indirect impacts on fauna.

VISUAL IMPACTS:

The activities that will be undertaken as part of the construction and operation phases of the proposed Kuruman Phase 1 WEF project that will result in potential visual impacts are discussed below. The potential visual issues identified by the specialists during the scoping phase of this EIA process include the following:

- Potential scarring in the landscape caused by site clearance and earthworks for access roads and assembly platforms, particularly on the steeper slopes;
- Potential visual clutter in the landscape of the on-site substation, operational and maintenance structures, and connecting powerlines;
- Potential visual intrusion and increased dust emissions during construction from heavy machinery and truck traffic;
- Visual effect of wind turbines on the ridge skylines; and
- Cumulative visual impact from several other renewable energy facilities in the broader area could potentially alter the sense of place and visual character of the area.

The potential impacts identified during the scoping phase of the visual assessment are outlined below:

Construction Phase

- Potential visual intrusion, dust and noise caused by heavy construction vehicles and cranes;
- Potential visual effect of construction camp and material stockpiles;
- Potential visual scarring caused by earthworks for roads and platforms, as well as site clearance and borrow-pits; and
- Potential visual pollution caused by littering and wind-blown packaging materials.

Operational Phase

- Potential visual intrusion of the rural landscape resulting from large-scale wind turbines located on ridge lines and higher plateaus;
- Potential visual clutter caused by substation and operations/maintenance structures and overhead powerlines;
- Potential alteration of the visual character of the area;
- Potential alteration of the night time visual environment as a result of operational, navigation and security lighting, as well as navigational lighting on top of the wind turbines; and
- Potential visual effect on surrounding farmsteads and the Oryx Trail Game Lodge.

Decommissioning Phase

- Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;
- Potential impacts of increased dust emissions from decommissioning activity activities and related traffic; and
- Potential visual effect of remaining infrastructure such as roads, platforms and concrete slabs on the landscape after decommissioning of the WEF.

HERITAGE, ARCHAEOLOGY, CULTURAL LANDSCAPE AND PALAEONTOLOGY:

Both direct (destruction through the proposed project activities) and indirect (destruction through unintended consequences or deviations from the authorised work and footprint, and through visual intrusion into a sensitive area) impacts may occur during the construction, operation and decommissioning of the proposed WEF.

The potential impacts identified during the construction, operational and decommissioning phases of the proposed project in the scoping assessment are:

- The destruction or disturbance of archaeological sites and their immediate contexts;
- The destruction of palaeontological resources (mainly of Precambrian stromatolites);
- The destruction or disturbance of graves or burial sites;
- The destruction or disturbance of built heritage resources; and
- Visual intrusion into the cultural landscape which might erode its association with intangible heritage.

BAT IMPACTS:

Direct impacts to bats will be limited to species that make use of the airspace in the rotor-swept zone of the wind turbines.

The following impacts to bats have been identified in the scoping phase:

Construction Phase

- Roost disturbance;
- Roost destruction; and
- Habitat modification i.e. destruction of foraging habitat.

Operational Phase

- Bat mortality during commuting and/or foraging and during migration by colliding with the operational wind turbines and/or due to barotrauma;
- Cave ecosystem collapse due to bat mortalities of cave dwelling bat populations; and
- Displacement and reduced foraging opportunities for bats due to light pollution;
- Cumulative impact of increased area of potential bat mortality by turbine blades due to proposed neighbouring Kuruman WEF Phase 2.

BIRD IMPACTS:

The main impacts of WEFs and their associated infrastructure have been identified as displacement through disturbance and habitat destruction, mortality through collisions with turbines and/or powerlines and electrocution on live power infrastructure.

Construction Phase

- Displacement of priority species due to habitat transformation / destruction; and
- Displacement of priority species due to disturbance and noise associated with the construction activities.

Operational Phase

- Bird mortality due to collisions with operational wind turbines;
- Displacement of priority species due to habitat transformation; and
- Disruption of local bird movement patterns.

Decommissioning Phase

- Displacement of priority species due to disturbance and noise associated with decommissioning activities.

SOILS AND AGRICULTURAL POTENTIAL:

The following key issues, based on the project aspects (construction, operation and decommissioning phase) have been identified:

Construction Phase

- Loss of agricultural land use due to direct occupation by the infrastructural footprint of the proposed development for the duration of the project. This will take affected portions of land out of agricultural production;
- Soil erosion as the result of wind or water. This may be due to alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources;

- Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's capability for supporting vegetation; and
- Degradation of veld vegetation beyond the direct facility footprint due to constructional disturbance and potential trampling by vehicles.

Operational Phase

- Loss of agricultural land use due to direct occupation by the infrastructural footprint of the development for the duration of the project. This will take affected portions of land out of agricultural production;
- Soil erosion as the result of wind or water. This may be due to alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources;
- Additional land use income will be generated by the farming enterprise through the leasing agreements with land owners. This provides the farming enterprise with increased cash flow and rural livelihood thus improving financial sustainability; and
- Regional loss of agricultural land use due to cumulative occupation by the infrastructural footprint of all renewable energy developments within 50 km from the proposed development area. This will take affected portions of land out of agricultural production, but the cumulative impact is low because of the limited agricultural potential of all land in the area.

Decommissioning Phase

- Loss of agricultural land use due to direct occupation by the infrastructural footprint of the development for the duration of the project. This will take affected portions of land out of agricultural production;
- Soil erosion as the result of wind or water. This may be due to alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources;
- Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's capability for supporting vegetation; and
- Degradation of veld vegetation beyond the direct facility footprint due to constructional disturbance and potential trampling by vehicles.

SOCIO-ECONOMIC ISSUES:

The following key issues, based on the project aspects (construction, operation and decommissioning phase) have been identified:

Construction phase

- Increase in production and GDP-R due to capital expenditure;
- Temporary employment creation due to construction activities;
- Skills development and enhancement due to construction activities;
- Household income attainment due to employment opportunities;
- Increased demand for housing and social facilities due to influx of migrant labour and job seekers;
- Possible Health Risks for employees due to Asbestos prevalence in region;

- Potential increase in theft related crimes due to high unemployment rate, social ills, and increased movement of people in area; and
- Change in sense of place due to construction activities (visibility of WEF infrastructure and impact on tourism and surrounding property values).

Operational phase

- Increase in production and GDP-R due to operating expenditure (diversification of land-use for other income streams to landowner);
- Long-term employment creation due to operation and maintenance activities of the WEF;
- Skills development and enhancement due to operation activities at the WEF;
- Household income attainment due to employment opportunities;
- Increase in local government revenue due to rates and taxes;
- Possible Health Risks for employees due to Asbestos prevalence in region;
- Benefits from community development plans and income for other local sectors; and
- Change in sense of place due to visual impact of operational wind turbines.

Decommissioning phase

- Local economy stimulation due to decommissioning costs;
- Temporary employment creation as a result of decommissioning activities (influx of people);
- Possible Health Risks for employees due to Asbestos prevalence in region; and
- Change in sense of place due to removal of wind turbines (increase in tourism and surrounding property values).

TRANSPORTATION IMPACTS:

The potential transportation or traffic related issues identified during the scoping phase of this EIA process include:

Construction, operational and decommissioning phases

- Noise, dust and exhaust pollution due to the increased vehicle traffic on the internal on-site roads and local unsurfaced access roads owing to transportation of people, construction materials, water and equipment to and from the development site, excavations of turbine footings, trenching for electrical cables and other ancillary construction works, as well as abnormal trucks delivering turbine components to the site; and
- Noise, dust, exhaust pollution and increased traffic congestion and/or delays on the surrounding road network (i.e. N14 and R31) due to construction vehicles and abnormal trucks transporting turbine components.

NOISE IMPACTS:

The following potential noise impacts have been identified during the scoping phase:

Construction Phase

- Increase in ambient sound levels as a result of construction activities during the day.

Operational Phase

- Increase in ambient sound levels as result of operational wind turbines at night.

Decommissioning Phase

- Increase in ambient sound levels as a result of construction activities during the day; and
- Ambient sound levels to return to pre-construction levels as a result of turbines which ceased operations.

GEOHYDROLOGY IMPACTS:

The following potential impacts to the groundwater and geohydrological resources have been identified during the scoping phase:

- **Construction Phase**
  - Potential impact on the groundwater as a result of the construction of storage yards and temporary labour accommodation;
  - Potential impact of increased storm water outflows; and
  - Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.

- **Operational Phase**
  - Potential impact of increased storm water outflows;
  - Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages; and
  - Long term surface source pollution may lead to the formation of sinkholes in the Karst aquifer towards the north east of the WEF site, assuming the general groundwater flow direction is towards the north east.

- **Decommissioning Phase**
  - Potential impact on groundwater quality as a result of accidental oil spillages and fuel leakages.

The Plan of Study for EIA (Chapter 7) presents the approach to the forthcoming EIA Phase. This includes the Terms of Reference for the various specialist studies that are proposed to address the issues raised, where necessary.

PROJECT TEAM

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Environmental Management Services (CSIR)		
Paul Lochner	CSIR	Technical Advisor and Quality Assurance (EAPSA) Certified
Minnelise Levendal	CSIR	EAP and Project Leader (*Pr. Sci. Nat.)*
Lizande Kellerman	CSIR	Project Manager (*Pr. Sci. Nat*)
Specialists		
Werner Marais	Animalia Consultants (Pty) Ltd	Bat Impact Assessment
Chris van Rooyen	Chris van Rooyen Consulting	Bird Impact Assessment
Natasha van de Haar	EnviroSwift (Pty) Ltd	Freshwater Impact Assessment
Julian Conrad	Geohydrological and Spatial Solutions International (Pty) Ltd	Geohydrology Impact Assessment

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Nicholas Wiltshire	Cedar Tower Services (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Morné de Jager	Enviro-Acoustic Research cc	Noise Impact Assessment
Dr John Almond	Private, sub-contracted by Cedar Tower Services (Pty) Ltd	Palaeontological Impact Assessment
Elena Broughton	Urban-Econ Development Economists (Pty) Ltd	Socio-Economic Impact Assessment
Johann Lanz	Private	Soils and Agricultural Potential Assessment
Simon Todd	3Foxes Biodiversity Solutions	Terrestrial Ecology (fauna and flora)
Adrian Johnson	JG Afrika (Pty) Ltd	Transportation Impact Assessment
Stephan Jacobs	SiVEST SA (Pty) Ltd	Visual Impact Assessment

PUBLIC PARTICIPATION

In order to notify and inform the public of the proposed project and invite I&APs to register on the project database, the project and EIA Process were advertised in one local newspaper (i.e. "Kathu Gazette" dated 24 February 2018), proof of which can be seen in Appendix D of the Draft Scoping Report. The newspaper advertisement also provided the details of the project website (i.e. https://www.csir.co.za/environmental-impact-assessment) where information available on the project, could be downloaded from.

In addition to the newspaper advertisement, letters regarding the Scoping and EIA Processes were mailed to all pre-identified key stakeholders on the database (see Appendix C for the database), allowing I&APs to register their interest on the project database and comment on the Background Information Document.

Regulation 41 (2) (a) of the 2014 EIA Regulations, as amended, requires that a notice board providing information on the project and EIA 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. To this end, site notice boards were placed at the farm gates and at various locations in Kathu and Kuruman as reflected in Appendix D of this Draft Scoping Report.

This DSR is currently being released for a 30-day commenting period ending on 21 June 2018. Comments on the DSR will be included in the Final Scoping Report which will be submitted to DEA for decision-making.

GLOSSARY

AC	Alternating Current
ADU	Animal Demography Unit
AGIS	Agricultural Geo-Referenced Information System
ASL	Above Sea Level
BA	Basic Assessment
BGIS	Biodiversity Geographic Information System
BLSA	BirdLife South Africa
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
CPV	Concentrated Photovoltaic
CSIR	Council for Scientific and Industrial Research
CWAC	The Coordinated Waterbird Count
DAFF	National Department of Agriculture, Forestry and Fisheries
DC	Direct Current
DEA	National Department of Environmental Affairs
DENC	Northern Cape Department of Environment and Nature Conservation
DM	District Municipality
DMR	National Department of Minerals Resources
DOE	Department Of Energy
DOT	National Department of Transport
DSR	Draft Scoping Report
DWAF	Department of Water Affairs and Forestry
DWS	National Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
ECO	Environmental Control Officer
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EO	Environmental Officer
ES	Ecological Sensitivity
EWT	Endangered Wildlife Trust
FEPA	Freshwater Ecosystem Priority Area
FSR	Final Scoping Report
GA	General Authorization
GDP	Gross Domestic Product
GG	Government Gazette
GIS	Geographical Information Systems
GNR	Government Notice Regulation

GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IAIR	Avifaunal Impact Assessment Report
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IFC	International Financial Corporation
IKA	Index of Kilometric Abundance
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
KZN	KwaZulu-Natal
LED	Local Economic Development
LM	Local Municipality
LUDS	Land Use Decision Support Tool
MAP	Mean Annual Precipitation
MetMast	Meteorological Mast
MW	Megawatt
NCPAES	Northern Cape Protected Expansion Strategy
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NEMPA	National Environmental Management: Protected Areas Act
NFA	National Forest Act
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act (Act 25 of 1999)
NP	National Park
NPAES	National Protected Areas Expansion Strategy
NWA	National Water Act (Act No. 36 of 1998)
O&M	Operation and Maintenance
PES	Present Ecological State
PoS	Plan of Study
PPA	Power Purchasing Agreement
PPP	Public Participation Process
PSDF	Provincial Spatial Development Framework
PSEIA	Plan of Study for Environmental Impact Assessment
PTY LTD	Proprietary Limited
PV	Photovoltaic
REDZs	Renewable Energy Development Zones
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
S&EIR	Scoping and Environmental Impact Reporting
SABAP1	South African Bird Atlas Project 1
SABAP2	South African Bird Atlas Project 2
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SALA	Subdivision of Agricultural Land Act (Act 70 of 1970)
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

SKA	Square Kilometre Array
SEA	Strategic Environmental Assessment
SM	Short Mast
TIA	Transportation Impact Assessment
ToR	Terms of Reference
UNCBD	United Nations Convention on Biological Diversity
UNFCCC	United Nations Framework Convention on Climate Change
VIA	Visual Impact Assessment
VP	Vantage Point
WASA	Wind Atlas of South Africa
WEF	Wind Energy Facility
WMA	Water Management Area
WMS	Water Management Systems
WULA	Water Use License Application
WUL	Water Use License

MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 1 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report

CHAPTER 1:
Introduction

CONTENTS

TABLES

FIGURES

KEY INFORMATION TO THIS APPLICATION

Table 1.1: Summary of Project Description

Infrastructure	Footprint and dimensions
Location of the site	District Municipality – John Taolo Gaetsewe District Municipality
	Local Municipality - Ga-Segonyana Local Municipality
	Ward number - 11
Farm names and SG 21 Digit Codes:	
Portion 2 of Farm Carrington 440	C04100000000044000002
Portion 4 of Farm Carrington 440	C04100000000044000004
Portion 1 of Farm Hartland 381	C04100000000038100001
Farm Woodstock 441	C04100000000044100000
Farm Rossdale 382	C04100000000038200000
Number of turbines	20 - 47 turbines
Turbine Capacity	4.5 MW
Hub Height	80 - 140 m
Rotor Diameter	100 - 160 m
Blade length	50 - 80 m
Project Size	50 - 225 MW
Area occupied by on-site substation	2 ha
Height of substation	5 m
Capacity of on-site substation	132 kV
Area occupied by construction lay down areas (including construction camp)	6 ha (3 construction lay down areas required of 2 ha each)
Internal access roads	50 km of internal road linking a maximum of 47 turbine locations 8 m in width
Concrete batching plant	50 m x 50 m (on-site batching)
O&M Building	1 ha
General temporary Hardstand Area (boom erection, storage, and assembly area)	15 ha
Turbines	Reinforced Concrete Foundation – 20 x 20 m (0.04 ha per turbine) Crane Platform/Pad – 50 m x 50 m (0.25 ha)
Site Access	The proposed main route will be along the R31 (Voortrekker Road) and the N14 (Hoof Street). The proposed Kuruman Phase 1 WEF can be accessed via the D3441. No existing access road currently exists along D3441 to the proposed WEF site. The proposed turbine and internal road layout indicates that the main access road to the WEF will be constructed on D3441, located to the east of the site, approximately 3 km from the N14. An additional option for access to the Phase 1 area would be via gravel road D3420, located south of the site and accessed via the R31. This is also the proposed access for the Kuruman Phase 2 WEF. This option, however, is dependent on the approval of Phase 2 in conjunction with Phase 1 and that the main access road of Phase 2 be constructed in advance.
Proximity to grid connection	The proposed Kuruman WEF will link to the Ferrum substation (10 km) or to the Segame substation (50 km).
Fencing	Fencing will be required around the O&M Building and on-site substation and will be a maximum of 5 m high.

IMPORTANT NOTICE

The Scoping and Environmental Impact Report process required by the National Environmental Management Act (Act. 107 of 1998) (NEMA) consists of two phases: (1) scoping and (2) a detailed impact assessment phase (i.e. the EIA Phase).

The scoping phase is very important to any project, as it is the first stage of the proposed development to be introduced to the public and that they have the opportunity to contribute valuable local knowledge and help identify significant issues. This information is then used to define the Terms of Reference (i.e. Plan of Study for EIA) for the EIA phase, by identifying the approach, critical issues to address, , the scope of work for detailed specialist assessments and preliminary mitigation measures (DEAT, 2002).

However, the current 2014 NEMA EIA Regulations (as amended, Government Notice No. R 326 of 2017, specifically Appendix 2 to these regulations), requires the Scoping Report to include much more detailed information, such as the identification of impacts, the preferred site, and mitigation measures. These were previously only required in the EIA phase in terms of the 2006 and 2010 EIA Regulations. In order to meet these current requirements, specialists provided the scoping phase inputs included in Appendix E of this Final Scoping Report.

All Interested and Affected Parties (I&APs) should note that despite the above-mentioned changes to Scoping Report requirements, they still have the opportunity to raise issues that would define the terms of reference for the EIA Phase. All concerns raised during the Scoping phase will be addressed appropriately and incorporated, where relevant, to guide the EIA phase. If additional specialist assessments are required, based on the concerns raised and/or comments received by the Department of Environmental Affairs (DEA), the additional studies will be undertaken during the EIA phase.

I&APs should note that only one version of the Scoping Report and one version of the Environmental Impact Report will be made available for public comment in terms of the 2014 NEMA EIA Regulations (as amended). Therefore the Scoping and Environmental Impact Report made publically available should be viewed as final reports.

NEMA REQUIREMENTS WITH REFERENCE TO RELEVANT SECTIONS OF THIS REPORT

The Environmental Impact Assessment (EIA) process undertaken to date has culminated in the production of this Scoping Report (SR), which provides information relevant to the project and establishes the potential impacts of the project and the methodologies and impacts that will be assessed in detail during the impact assessment phase.

Table 1.2 illustrates how the structure of the SR addressed applicable requirements for information in terms of National Environmental Management Act (Act No. 107 of 1998) (NEMA).

Table 1.2: Requirements of a Scoping Report as defined in terms of Appendix 2 of GN R326

Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326)	Section	Page
Appendix 2 - (1)(a)	Details of - i. the EAP who prepared the report; and ii. the expertise of the EAP, including a curriculum vitae;	Section 1.6 to 1.7 and Appendix A	Pages 1-25 to 1-27 and A1-22
Appendix 2 - (1)(b)	The location of the activity, including - i. the 21 digit Surveyor General code of each cadastral land parcel; ii. where available, the physical address and farm name; iii. where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 1.0 and 3.1	Pages 1-2, and 3-3
Appendix 2 - (1)(c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or if it is - i. a linear activity, a description, and coordinates of the corridor in which the 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;	Section 1.0, 1.1 and 3.1	Pages 1-8 to 1-9 and 3-4
Appendix 2 - (1)(d)	A description of the scope of the proposed activity, including – i. all listed and specified activities triggered; ii. a description of the activities to be undertaken, including associated structures and infrastructure;	Section 2.1 and 4.1	Pages 2-3 to 2-9 and 4-3 to 4-7
Appendix 2 - (1)(e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	Section 4.1 and 4.2	Pages 4-3 to 4-16
Appendix 2 - (1)(f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 1.5	Pages 1-13 to 1-25
Appendix 2 - (1)(g)	A full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including -	Section 3.2, 3.3, 3.4; Section 5.1; Section 6.1 - 6.13	Pages 3-5 to 3-21, 5-3 to 5-

Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326)	Section	Page
	i. details of all the alternatives considered; ii. details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; iii. a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; iv. the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; v. the impacts and risks which have informed the identification of each alternative, including nature, significance, consequence, extent, duration, and probability of such identified impacts, including the degree to which these impacts – (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; vi. the methodology used in identifying and ranking the nature, significance, consequences, extent, duration, and probability of potential environmental impacts and risks associated with the alternatives; vii. positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; viii. the possible mitigation measures that could be applied and level of residual risk; ix. the outcome of the site selection matrix; x. if no alternatives, including alternative locations for the activity, were investigated, the motivation for not considering such and xi. a concluding statement indicating the preferred alternatives, including the preferred location of the activity;	and Section 7.3, 7.5, 7.6, 7.7, 7.8, 7.9 Appendix D3	14; 6-3 to 6-45; 7-5 to 7-7 and 7-8 to 7-35. Pages D1-28
Appendix 2 - (1)(h)	A plan of study for undertaking the environmental impact assessment process to be undertaken, including - i. a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; ii. a description of the aspects to be assessed as part of the environmental impact assessment process; iii. aspects to be assessed by specialists; iv. a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists; v. a description of the proposed method of assessing duration and significance; vi. an indication of the stages at which the competent authority will be consulted;	Section 7.1 - 7.9	Pages 7-3 to 7-35

Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326)	Section	Page
	vii. particulars of the public participation process that will be conducted during the environmental impact assessment process; and viii. a description of the tasks that will be undertaken as part of the environmental impact assessment process; ix. identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.		
Appendix 2 - (1)(i)	An undertaking under oath or affirmation by the EAP in relation to - i. the correctness of the information provided in the report; ii. the inclusion of comments and inputs from stakeholders and interested and affected parties; and iii. any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Appendix B	Pages B 1-2
Appendix 2 - (1)(j)	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Appendix B	Pages B 1-2
Appendix 2 - (1)(k)	Where applicable, any specific information required by the competent authority.	Not applicable at this stage	N/A
Appendix 2 - (1)(l)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	Not applicable at this stage	N/A

1. INTRODUCTION

Mulilo Renewable Project Developments (Pty) Ltd (hereafter, "Mulilo") is proposing to construct two Wind Energy Facilities (WEFs), namely Kuruman Phase 1 WEF and Kuruman Phase 2 WEF and supporting electrical infrastructure, in the Ga-Segonyana Local Municipality and the John Taolo Gaetsewe District Municipality, 8 km and 37 km south west from Kuruman and from Kathu, respectively, in the Northern Cape Province (see Figure 1.1). The proposed projects are being developed to generate electricity via wind energy which will feed into and supplement the national electricity grid. This report comprises the Draft Scoping Report (DSR) for the development of **the Kuruman Phase 1 WEF** (hereafter, "Kuruman WEF"). The proposed Kuruman WEF will be connected to the the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman) and a collector substation, via a 132 kV powerline.

The proposed Kuruman WEF will be developed on the following land portions:

- Portion 2 of Farm Carrington 440;
- Portion 4 of Farm Carrington 440;
- Portion 1 of Farm Hartland 381;
- Remainder of Farm Woodstock 441; and
- Remainder of Farm Rossdale 382.

This chapter provides an introduction (project overview) of the proposed Kuruman WEF, and includes the following:

- An overview of the of the proposed WEF;
- The legal requirements for an EIA;
- Information on the Project Applicant;
- Project Motivation;
- Need and Desirability;
- The EIA team;
- The objectives of the Scoping Report; and the
- Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326).

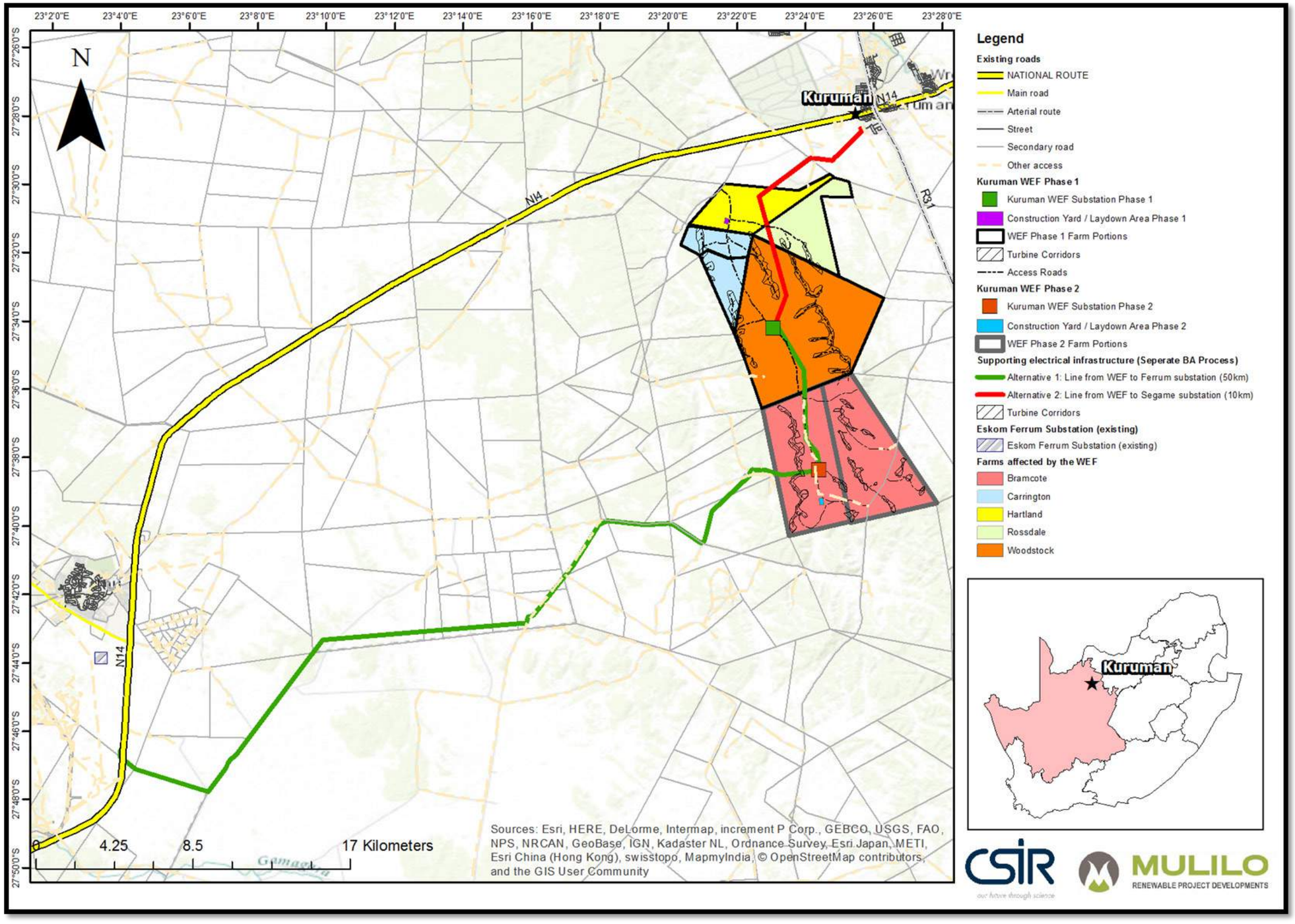

Figure 1.1: Locality map for the proposed Kuruman Phase 1 and Phase 2 Wind Energy Facilities near Kuruman in the Northern Cape.

1.1. An Overview of the Proposed Kuruman Wind Energy Facility

The proposed Kuruman WEF will comprise of a maximum of 47 turbines with a hub height and rotor diameter of 80 - 140 m and 100 - 160 m respectively. The blade length is 50 - 80 m. The development footprint of the proposed WEF will be approximately 580 ha. The key components of the Kuruman WEF are discussed in more detail in Chapter 2 of this DSR.

1.2. Legal Requirements for an EIA

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA Environmental Impact Assessment (EIA) Regulations (as amended), promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017, a full Scoping and EIA Process is required for the construction of the proposed Kuruman WEF.

The need for the full Scoping and EIA is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

"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 (a) within an urban area; or (b) on existing infrastructure".

Mulilo has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the EIA process in order to determine the biophysical, social and economic impacts associated with undertaking the proposed activities. Given that energy related projects have been elevated to national strategic importance in terms of the EIA Process, the proposed WEF requires Authorisation from the National Department of Environmental Affairs (DEA) as the Competent Authority (CA), acting in consultation with other spheres of government.

Chapter 4 of this Scoping Report contains the detailed list of activities contained in R327, R325, and R324 which may be triggered by the various project components and thus form part of the Scoping and EIA Process.

The purpose of the EIA is to identify, assess and report on any potential impacts the proposed project, if constructed and implemented, may have on the receiving environment. The environmental assessment therefore, needs to show the CA, what the biophysical and socio-economic impacts will be of the proposed WEF. It also needs to show the CA how such impacts can be, avoided, remedied, mitigated or managed and how positive impacts can be enhanced.

1.3. Project Applicant

Mulilo Renewable Project Developments (PTY) Ltd is a locally owned, South African based renewable energy developer that was formed in 2008. The company focuses on solar, wind and hydro technologies and works with landowners, project developers, technology providers, regulators and investors to source and develop renewable energy projects. Mulilo acts as the project interface, coordinating the research and studies, the site identification, the project structure, environmental impact assessments, selecting the strategic partners, arranging financing, ensuring bid compliance and bidding under the Department of Energy's (DoE) Renewable Energy Independent Power Producer Programme (REIPPP) and reaching financial closure. Mulilo's core activities are shown in Figure 1.2 below.

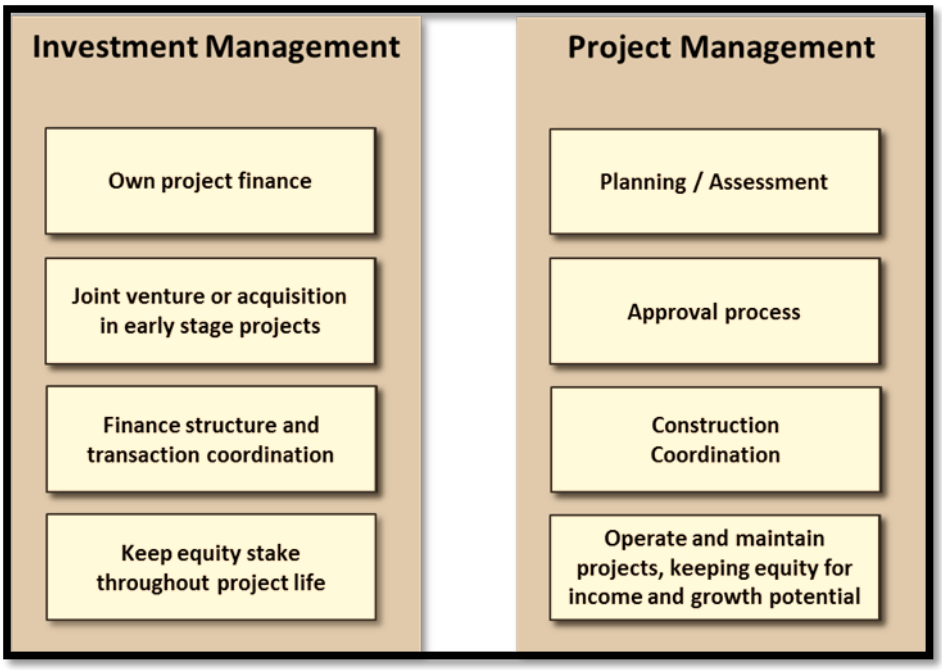

Figure 1.2: Mulilo's core business activities

In December 2011, Mulilo was successful in Round 1 of the DoE REIPPP, as they were identified as a preferred bidder for two Solar Photovoltaic (PV) Power Facilities of 10 MW and 20 MW located in Copperton and De Aar. In October 2013, during Round 3 of the REIPPP Mulilo was also identified as a preferred bidder for two wind farms with a combined capacity of 244 MW located in De Aar, and two 75 MW Solar PV Power Facilities located in Prieska. Furthermore, in February 2014, Mulilo was awarded the Selected Bidder for two 5 MW Solar PV Facilities under the DoE's Small Independent Power Producer Programme and subsequently achieved Preferred Bidder status for its Du Plessis Solar PV4 project in De Aar on the 3rd October 2015.

The Applicant is proposing to develop a facility with a possible maximum installed capacity of 225 MW. Once a Power Purchase Agreement (PPA) is awarded, the proposed facility will generate electricity for a minimum period of 20 years. It is proposed that Mulilo will implement the Self-Build Option for the additional electrical infrastructure to be constructed (which includes the 132 kV transmission line and additional feeder bay(s), busbar(s), 400/132kV transformer and a transformer bay at the Eskom Ferrum

or Segame substation). Following the construction phase, the proposed transmission line will either be transferred into the ownership of Eskom or remain in the ownership of Mulilo.

1.4. Project Motivation

The need for renewable energy is becoming increasingly apparent, in both local and international context, with South Africa becoming an integral part of the global transition towards renewable sources of electricity generation. The urgency behind this evolution can be appreciated considering that South Africa is the largest emitter of greenhouse gases in Africa, accounting for as much as 42% of the continent's total emissions, and is also estimated to rank amongst the top 20 largest emitters of greenhouse gases in the world. These emissions are largely a result of an energy-intensive economy and high dependence on coal-based electricity generation. The South African government is therefore committed to supplementing the existing generation capacity of thermal and nuclear power plants with renewable energy power generation, thus creating the framework that will lead to an increase in the supply of clean energy for the nation. The development of renewable energy is important for South Africa to reduce its overall environmental footprint from power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability.

The Integrated Resource Plan (IRP) for South Africa for the period 2010 to 2030 (referred to as "IRP2010") was released by government in 2010, and a draft of an updated report was published in 2013, which proposes to secure 17 800 MW of renewable energy capacity by 2030 (including wind, solar and other energy sources). As noted above, in August 2011, the DoE launched the REIPPPP and invited potential Independent Power Producers (IPPs) to submit proposals for the financing, construction, operation and maintenance of the first 3 725 MW of onshore wind, solar thermal, PV, biomass, biogas, landfill gas or small hydropower projects. 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 Government Gazette 39111. The additional target allocated for wind energy is 3 040 MW.

In terms of the REIPPPP, submitted proposals are then evaluated according to a DoE Request for Proposal (RfP). Currently, the two main evaluation criteria for compliant proposals are price and economic development with a point allocation of 70/30 (DoE, 2013), with other selection criteria including technical feasibility and grid connectivity, environmental acceptability, black economic empowerment, community development, and local economic and manufacturing propositions. The bidders whose responses rank the highest (according to the aforementioned criteria) will have the greatest potential to be appointed as "Preferred Bidders" by the DoE. Mulilo intends to bid this project in the next bidding process to be potentially selected as an IPP.

The establishment of the proposed WEF would strengthen the existing electricity grid for the area. Additionally, the project would contribute towards meeting the national energy target as set by the DoE and assist the government in achieving its proposed renewable energy target of 17 800 MW by 2030.

Should the proposed Kuruman WEF identified by Mulilo be acceptable, it is considered viable that long term benefits for the community and society in the Kuruman/Kathu area would be realised. The towns in the Northern Cape are generally small with limited job opportunities, and the proposed project will provide an opportunity for additional employment in an area where job creation is identified as a key priority. Approximately 420 employment opportunities will be created during the construction phase and 35 during the operational period (including 25 permanent employees) of the proposed Kuruman WEF. The proposed Kuruman WEF will make use of local labour as much as possible, and a minimum of 50% of the jobs (during the construction and operational phases) will be filled by the local communities.

The proposed project would also have international significance as it contributes to South Africa being able to meet some of its international obligations by aligning domestic policy with internationally agreed strategies and standards as set by the United Nations Framework Convention on Climate Change (UNFCCC), The Paris Agreement on climate Change, Kyoto Protocol, and United Nations Convention on Biological Diversity (UNCBD), all of which South Africa is a signatory to. Renewable energy is critical to South Africa as this source of energy is recognised as a major contributor to climate protection, has a much lower environmental impact, as well as advancing economic and social development.

1.5. Need and Desirability

It is an important requirement in the EIA Process to review the need and desirability of the proposed project. Guidelines on Need and Desirability were published in the Government Gazette 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 1.3 includes a list of questions based on the DEA's Guideline to determine the need and desirability of the proposed project. It should be noted this table will be informed by the outcomes of the Scoping and EIA Processes and will be updated, once the relevant impact assessment has been received.

Table 1.3: The Guideline on the Need and Desirability's list of 14 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	**The environmental sensitivities present on site will be assessed within the Ecological Impact Assessment to be included in the EIA Report.** **The specialist will identify all ecological sensitive areas on site that have to be avoided by the proposed development as well as ecologically sensitive areas and how to suitably develop within these areas so that the ecological integrity of the areas is maintained.** **The Ecology specialist has prepared scoping inputs and these inputs have been included in Appendix E of this Scoping Report. It is noted that the northern part of the site falls within a CBA 2 which forms a buffer area around the Billy Duvenhage Nature Reserve. The majority of the footprint of the development is however within an Ecological Support Area (ESA). The footprint within the CBA 2**

NEED	
Question	**Response**
1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	**area is low and a significant impact on the CBA is not likely. In addition, it is unlikely that the development would compromise the functioning of the ESA. The development of a WEF is considered compatible with the aims and objectives of ESAs, from a terrestrial biodiversity point of view.** **The preliminary outcome of the Scoping phase input is that the likely overall residual ecological impact after mitigation will be of low significance.** **The preliminary sensitivity map is included in Chapter 5 of this Scoping Report and will be further refined during the EIA Phase following assessments done by the specialists on the project team. The specialists provided scoping inputs which informed the current preliminary sensitivity map.**
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 such as threatened ecosystems and the CBA 2 present on site were identified by the Ecology specialist and were discussed in the Scoping inputs provided. A detailed Ecological Impact Assessment will be undertaken and will be included in the EIA Report. Based on the biodiversity screening and fine scale mapping that was done for the site, the specialist confirmed that the site falls within a CBA 2 and an ESA. The footprint within the CBA 2 area is low and a significant impact on the CBA is not likely. In addition, it is unlikely that the development would compromise the functioning of the ESA. The development of a WEF is considered compatible with the aims and objectives of ESAs, from a terrestrial biodiversity point of view.** **The specialist will identify all ecological sensitive areas on site that have to be avoided by the proposed development and propose mitigation measures to reduce or minimise impacts to ensure that the ecological integrity of the areas is maintained.** **The preliminary sensitivity map is included in Chapter 5 of this Scoping Report and will be further refined during the EIA Phase.** **Measures to avoid, remedy, mitigate and manage impacts will be included in the Environmental Management Programme (EMPr) that will be compiled during the EIA Phase and included within**

NEED	
Question	**Response**
	the EIA 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?	**Measures to avoid, remedy, mitigate or manage biophysical impacts will be included in the EMPr that will be compiled during the EIA Phase and included within the EIA 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?	**Waste will mostly be generated during the construction and decommissioning phases of the project. Measures to avoid, remedy, mitigate or manage waste will be included within the EMPr that will be compiled during the EIA Phase and included within the EIA Report. Waste generated on site will be disposed of at a licenced landfill site.**
1.5. How will this development disturb or enhance landscapes and/or sites 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 Heritage Impact Assessment (HIA) will be undertaken to assess potential archaeological, palaeontological and cultural impacts resulting from the proposed development during the EIA Phase. Scoping inputs have been provided by the heritage specialist and are included in Appendix E of this Scoping Report. It will be further refined during the EIA Phase and the full HIA will be included in the EIA Report.**
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?	**Measures to avoid, remedy, mitigate or manage impacts on non-renewable natural resources will be included in the EMPr that will be compiled during the EIA Phase and included within the EIA 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	**South Africa has heavily relied on coal as a source of electricity for decades. Due to the nature of coal as a non-renewable resource that causes major environmental degradation, there is therefore a need to identify alternative resources that could promote sustainable energy sources as well as cleaner energy production ways. The proposed project aims to harness the wind resource available in the area for the generation of electricity. This project is seen as a source of 'clean energy' and**

NEED	
Question	**Response**
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 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?	**reduces the dependence on non-renewable sources.** **The proposed project is a sustainable option for the area and the footprint will as far as possible avoid areas of very high environmental sensitivity. Where impacts cannot be avoided, the footprint will be placed to minimise, mitigate or manage potential impacts to the receiving environment.**
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 precautionary approach has been adopted for this study, i.e. assuming the worst-case scenario will occur and then identifying ways to mitigate or manage these impacts.** **Current gaps in knowledge include confirmation on the preferred turbine types to be used at this site. Ways in which these gaps are addressed are to consider the worst-case scenarios as noted above in terms of turbine size and generation capacity. A range of specifications have been provided as new technology may also come onto the market closer to the construction period (should the proposed Kuruman WEF be approved).**

NEED	
Question	**Response**
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?	**A detailed Socio-Economic Impact Assessment will be included in the EIA Report. A preliminary socio-economic profile is included in Chapter 3 of this Scoping Report and will be further refined during the EIA Phase. Scoping inputs have been provided by the Socio-Economics specialist and have been included in Appendix E of the Scoping Report.**
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.)?	**Linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area will be considered as part of the Socio-Economic Impact Assessment undertaken for this project and will be included within the EIA 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 will be considered as part of the Ecology Impact Assessment undertaken for this project and will be included within the EIA Report.**
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?	**Please refer to Chapter 5 of this Scoping Report where the alternatives are discussed.**
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?	**Please refer to Chapter 6 of this Scoping Report where the potential cumulative impacts are discussed for this project. Table 6.2 in Chapter 6 also contains a list of all the other renewable energy projects and powerline projects that are operational or are proposed for the area.**
2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?:	

NEED	
Question	**Response**
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 Gamagara Municipality Integrated The Ga-Segonyana Local Municipality Integrated Development Plan (IDP) (2017-2018) recognises renewable energy projects (with an emphasis on solar PV projects) as potential new economic development opportunities. The development of the Kuruman WEF will therefore also be in line with the vision of the municipality to diversity the job market by creating sustainable economic growth and development opportunities.** **One of the economic priority issues identified within the Ga-Segonyana Local Municipality Integrated Development Plan (IDP) (2017-2018) is the fairly high level of unemployment. Although close to three-quarters of the working age population in the Ga-Segonyana LM were employed in the formal sector and approximately 20% in the informal sector (Quantec Easy Data, 2017), the unemployment rate of 35% is much higher than the national unemployment rate. The IDP further states that the Local Municipality constitutes close to a quarter of the adult population with no schooling and are in need of employment opportunities. The proposed WEF project will create job opportunities and economic spin offs during the construction and operational phases (if an EA is granted by the DEA). It is estimated that approximately 420 employment opportunities will be created during the construction phase and approximately 35 during the operational phase. It should, however, be noted that employment during the construction phase will be temporary, whilst 25 employment opportunities being long-term during the operational phase.** **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 project will therefore be supportive of the IDP's objective of facilitating job creation to address the high unemployment rate.**
2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	**N/A- The proposed project is located within a rural area and the site is zoned for agricultural use.**

NEED	
Question	**Response**
2.1.3. Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.)	**As indicated above, the current land use on the site is agriculture, predominantly game farming. The impact of the proposed project on cultural/heritage areas (archaeology and palaeontology) will be assessed as part of the EIA Phase.** **Should the proposed project proceed, approximately 580 ha (comprising 8 % of the total farm area) of the land will be developed on and it is not expected that this will significantly threaten the agricultural activities present on site. A Soils and Agricultural Potential Study will be included within the EIA Report to reflect the impact of the proposed project in terms of the land use and agricultural potential. Scoping inputs have been provided by the specialist which indicate that the impact on agricultural resources on site is Low.** **As noted, an EMPr will be compiled for the proposed project to ensure that all potentially negative impacts identified are suitably managed and mitigated, and potential positive impacts are enhanced. The impact on the sense of place is difficult to predict and would potentially be ambiguous. This is due to the subjective nature of perceptions regarding the relative attraction or disturbance of the wind facility in a rural landscape. The visual impact and considerations will be further assessed as part of the Visual Impact Assessment to be undertaken as part of the EIA Phase of this project. A preliminary environmental sensitivity map was prepared during the Scoping phase based on the input obtained from the various scoping specialist studies. The map will be updated in the EIA Phase to ensure that sensitive features will be identified and avoided by the project layout.**
2.1.4. Municipal Economic Development Strategy ("LED Strategy").	**The LED Strategy will be considered and potential alignment will be discussed in the EIA Report.**
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?	**This will be addressed within the Socio-Economic Impact Assessment that will be included in the EIA Report.**

NEED	
Question	**Response**
2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	**These needs and interests of the relevant communities will be addressed within the Socio-Economic Impact Assessment that will be included in the EIA Report. Issues raised by I&APs to this effect will also be addressed in the relevant Issues and Responses Trail of the Scoping and/or the EIA Report.**
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 economically sustainable in the short- and long-term?	**This will be addressed in the Socio-Economic Impact Assessment that will be included in the EIA Report.**
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,	**Local employment opportunities will be provided as far as possible. Approximately 420 and 35 employment opportunities will be generated in the construction and operational phases respectively.**
2.5.2. reduce the need for transport of people and goods,	**N/A- the proposed project is located within a rural area and the development site is zoned for agricultural use.**
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),	**N/A -the proposed project is located within a rural area and the site is zoned for agricultural use. This project is a renewable energy project and not a transportation project.**
2.5.4. compliment other uses in the area,	**The preferred project site is currently being used for agricultural purposes. Should the proposed project proceed, approximately 580 ha of the land will be developed on and it is not expected that this will significantly threaten the agricultural activities undertaken on site. A Soils and Agricultural Potential Study will be included within the EIA Report to reflect the impact of the proposed project in terms of the land use and agricultural potential.**
2.5.5. be in line with the planning for the area,	
2.5.6. for urban related development, make use of the underutilised land available with the urban edge,	**N/A - 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 project will connect to the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman) and a collector substation via a 132 kV overhead transmission line.**
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	**N/A**

NEED		
Question		**Response**
	settlement),	
2.5.9.	discourage "urban sprawl" and contribute to compaction/densification,	**N/A**
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,	**N/A - the proposed project is located within a rural area and the site is zoned for agricultural use.**
2.5.11.	encourage environmentally sustainable land development practices and processes,	**The development of a renewable energy facility is a sustainable land development practice provided it is constructed and operated in an environmentally friendly manner.**
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.),	**Please refer to Chapter 5 for a description of the process undertaken to identify the site as a preferred site for a WEF.**
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),	**To be addressed within the Socio-Economic Impact Assessment that will be included within the EIA Report.**
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	**The impact of the proposed project on cultural/heritage areas (archaeology and palaeontology) and the sense of place will be assessed in the HIA and VIA which will be included in the EIA Report.**
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?	**Several Renewable Energy projects (particularly solar energy projects) are proposed and environmentally approved in the area, which lends itself potentially to a renewable energy development area.**
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)?	**To be addressed within the Socio-Economic Impact Assessment that will be included in the EIA Report.**
2.6.2.	What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic 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?	

NEED	
Question	**Response**
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?	**To be addressed within the Socio-Economic Impact Assessment that will be included in the EIA 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 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 that was undertaken as part of the Scoping phase to date and to be undertaken in the EIA process is included in Chapter 4 of the Draft Scoping Report. Various methods were employed to notify potential I&APs**
2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving	

NEED	
Question	**Response**
equitable and effective participation,	**of the proposed project and the opportunity to comment on the DSR, namely, through notices in the local newspaper, sites notices emails as well as notification letters.**
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,	**The EIA process will take cognisance of all interests, needs, and values espoused by all I&APs. Opportunity for public participation will be provided to all I&APs throughout the EIA process in terms of the 2014 NEMA EIA Regulations (as amended).**
2.13.5. ensure openness and transparency, and access to information in terms of the process,	**The Public Participation Process that was undertaken as part of the Scoping phase to date and to be undertaken in the EIA process is included in Chapter 4 of the Draft Scoping Report. Various methods were employed to notify potential I&APs of the proposed project and the opportunity to comment on the DSR, namely, through notices in the local newspaper, sites notices emails as well as notification letters.**
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,	**The EIA process will take cognisance of all interests, needs and values adopted by all I&APs.**
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.	**Public participation of all I&APs will be promoted and opportunities for engagement will be provided during the EIA process.**
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)?	**To be addressed within the Socio-Economic Impact Assessment that will be included within the EIA 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 taken to ensure that the right of workers to refuse such work will be respected and protected?	**An EMPr will be developed to address health and safety concerns. An Environmental Control Officer (ECO) will be appointed to monitor compliance.**
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	**To be addressed within the Socio-Economic Impact**

NEED	
Question	**Response**
permanent jobs that will be created,	**Assessment that will be included within the EIA 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,	**The different government departments have been listed as I&APs and are given the opportunity to comment on the DSR and will be given the opportunity to comment on the Draft EIA Report during the 30 day public participation period.**
2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	**To be determined during the EIA Phase (following the Public Participation Phase undertaken as part of the Scoping Phase).**
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 proposed WEF will adhere to the principles of environmental management. Measures taken to ensure adherence to the principles of NEMA will be determined during the EIA Phase.**
2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	**It would be premature to decide whether proposed mitigation measures of the WEF are realistic prior to the completion of the impact assessment phase of this EIA Process. Therefore the practicality of mitigation measures shall be determined during the EIA Phase. The proposed mitigation measures to be included in the EMPr that will be included in the EIA Report will be informed by the Specialist studies undertaken. This will include a detailed assessment of the environment as well as the impacts associated with the proposed development. WEFs 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.**
2.20. What measures were taken to ensure that he costs of remedying pollution, environmental degradation and consequent adverse health effects	**The EMPr (to be included in the EIA Report) of this proposed project must form part of the contractual agreement and be adhered to by both the**

NEED	
Question	**Response**
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?	**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?	**Agriculture on site is influenced by climatic variables and limitations. Renewable energy development is a suitable land use option for the site. The proposed WEF would be more robust in terms of economic viability and profitability while also being largely uninfluenced by climate change variables. The proposed project would also provide the farm owner with additional income by way of lease agreements (as explained above) and will also contribute to local socio-economic upliftment through job creation.**
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?	**The potential cumulative impacts resulting from the proposed project can only be objectively determined at the end of the EIA Process. These will be assessed as part of the EIA. The cumulative impacts of similar types of projects that are being undertaken or are proposed to be undertaken (e.g. other wind and solar energy projects within 30 km of the proposed project) will be assessed in the EIA report.**

1.6. EIA Team

As previously noted, the CSIR has been appointed by Mulilo to undertake the EIA required for the proposed project. Public participation forms an integral part of the EIA Process and assists in identifying issues and possible alternatives to be considered during the EIA Process. The CSIR is undertaking the Public Participation Process (PPP) for this EIA. Details on the PPP are included in Chapter 4 of this DSR.

The EIA team which is involved in this Scoping and EIA Process is listed in Table 1.4 below. This team includes a number of specialists who have extensive experience in conducting specialist studies for renewable energy projects in South Africa.

Table 1.4: The EIA Team

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Environmental Management Services (CSIR)		
Paul Lochner	CSIR	Technical Advisor and Quality Assurance (EAPSA) Certified
Minnelise Levendal	CSIR	EAP (*Pr. Sci. Nat.)*
Lizande Kellerman	CSIR	EIA Project Manager (*Pr. Sci. Nat.)*
Specialists		
Simon Todd	3foxes Biodiversity Solutions	Ecology Impact Assessment (Terrestrial Ecology including fauna and flora); Ecological Offset study
Chris van Rooyen	Chris van Rooyen Consulting	Bird Impact Assessment
Werner Marias	Animalia Consultants (Pty) Ltd	Bat Impact Assessment
Natasha van der Haar	Enviroswift (Pty) Ltd	Freshwater Impact Assessment
Julian Conrad	Geohydrological and Spatial Solutions International (Pty) Ltd	Geohydrological Impact Assessment
Stephan Jacobs	SiVEST SA (Pty) Ltd	Visual Impact Assessment
Nicholas Wiltshire	Cedar Tower Services (Pty) Ltd	Heritage Impact Assessment
Dr John Almond	Private, sub-contracted by Cedar Tower Services (Pty) Ltd	Palaeontological Impact Assessment
Johann Lanz	Private	Soils and Agricultural Potential Assessment
Elena Broughton	Urban-Econ Development Economists	Socio-Economic Impact Assessment
Morné de Jager	Enviro-Acoustic Research	Noise Impact Assessment
Adrian Johnson	JG Afrika	Transportation Impact Assessment

Please note that a Wake Effect Analysis is not required as there are no other WEFs in close proximity to the Kuruman WEF site.

1.7. Details and Expertise of the CSIR EIA Project Management Team

Paul Lochner (Technical Advisor and Quality Assurance (EAPSA) Certified:

Paul is the manager of the Environmental Management Services (EMS) Group at CSIR and has 22 years of experience in environmental assessment and management studies, primarily in the leadership and integration functions. This includes Strategic Environmental Assessments (SEAs), EIAs, BAs and EMPrs. In July 2003, he obtained certification as a registered EAP with the Interim Certification Board for EAPs of South Africa (EAPSA). He has been extensively involved in renewable energy projects over the last few years. He was the Project Leader for the Electrawinds BA and EIA project at the Coega Industrial Development Zone (IDZ), and was the Project Leader for the EIA for the Mainstream Kouga WEF (Phase 1) at Jeffrey's Bay. Phase 1 of this project was granted EA by the Eastern Cape Government in March 2009. He was part of the CSIR team that prepared the EIA and EMP for the Eskom wind energy demonstration facility at Klipheuwel (Western Cape), which was approved by the Western Cape provincial government. Paul was the Project Leader for the SEA for the location and placement of wind and solar energy projects

in South Africa. He has also led EIAs for Solar PV projects in the Free State and Northern Cape for Mainstream Renewable Energy, Solaire Direct and Mulilo. Paul has also authored several Guidelines for national and provincial government, such as the Guideline for EMPs published in 2005 by the Western Cape government.

Minnelise Levendal, Pri. Sci. Nat. registered, 117078 (EAP):

Minnelise is a Senior Environmental Assessment Practitioner (EAP) in the EMS Group of the CSIR and holds a Master's degree in Botany from the Stellenbosch University. She also 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 she joined 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 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 DoE. EAs for all the ten masts were obtained from DEA in 2010. Minnelise was also the Project Leader for seven solar PV facilities near Kenhardt for Mulilo in the Northern Cape in 2016. Minnelise is the Project Manager of the Special Needs and Skills Development Programme of DEA which provides *pro bono* environmental assessments (BAs) to applicants with special needs.

Minnelise is supported by the EIA Project Manager, Lizande Kellerman.

Lizande Kellerman (Pri, Sci. Nat. registered, 400046/10):

Lizande holds a Bachelor's degree in Zoology and Entomology, with an Honours and Masters both in Botany from the University of Pretoria. She also obtained a Postgraduate Certificate for Higher Education and Further Training from the University of South Africa. Lizande is currently completing her PhD in Plant Ecology specialising in natural restoration of degraded rangeland in the Succulent Karoo. For almost 15 years, Lizande spent teaching and mentoring, as a researcher and lecturer, numerous undergraduate and postgraduate students in subjects of biological, ecological and environmental sciences at University of Pretoria, University of South Africa and the Midrand Graduate Institute.

Following her academic career, Lizande has more than 10 years' experience in environmental assessment and management studies, primarily in planning, preparing, managing and conducting environmental impact assessments (BAs & EIAs), EMPs, environmental screening studies and fatal flaw assessments, as well as license applications for air emissions, water use, waste management, mining rights, ploughing rights, bioprospecting, biotrade and biodiversity permitting for numerous projects in the agricultural (including aquaculture), biodiversity, bioprospecting, construction and mining sectors.

Lizande has joined the CSIR in January 2012 as a Senior Enterprise Development Specialist in the Enterprise Creation for Development (ECD) unit in Pretoria. Her main responsibility was the planning, design, implementation, management and financial administration of various rural community-based government-funded agro-processing projects/enterprises in the following South African provinces; Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, Western Cape, Free State and KwaZulu-Natal. The focus was on the sustainable cultivation, harvesting and processing of essential oils and indigenous plant species with cosmetic, medicinal and nutritional value to enable community upliftment and poverty alleviation. She was also responsible for all authority liaison and stakeholder engagement, as well as for environmental screening and legal compliance of these projects, specifically relating to the application for and management of EIAs, Environmental Management Programmes

(EMPrs), water use and waste management licenses, ploughing rights, biodiversity and bioprospecting permitting, and the facilitation and coordination of specialist assessments. During this time, Lizande has also provided specialist input relating to aspects of environmental impact assessment requirements and legal compliance into the preparation of numerous proposals, tenders, feasibility studies, development strategies, business plans and socio-economic development enabling frameworks conducted by CSIR ECD.

Since April 2016, Lizande has been working as a Principal EAP in the EMS Group situated in Stellenbosch. She is currently managing the national-scale SEA for marine and freshwater aquaculture development in South Africa. Apart from managing the EIA processes for the proposed development of the Kuruman Phase 1 and 2 WEFs with supporting electrical infrastructure near Kuruman in the Northern Cape, Lizande is also part of a team that is presently undertaking the development of a Biodiversity Economy Transformation Strategy for the North West Province.

1.8. Objectives for this Scoping Report

The Scoping Phase of the EIA refers to the process of determining the spatial and temporal boundaries for the EIA. In broad terms, the objectives of the Scoping Process in terms of the 2014 NEMA EIA Regulations, as amended (GN R325) are to:

- Confirm the process to be followed and opportunities for stakeholder engagement;
- Clarify the project scope to be covered;
- Identify and confirm the preferred activity and technology alternative;
- Identify and confirm the preferred site for the preferred activity;
- Identify the key issues to be addressed in the impact assessment phase and the approach to be followed in addressing these issues; and
- Confirm the level of assessment to be undertaken during the impact assessment.

This is achieved through parallel initiatives of consulting with:

- The lead authorities involved in the decision-making for this EIA application;
- The public to ensure that local issues are well understood; and
- The EIA specialist team to ensure that technical issues are identified.

The Scoping Process is supported by a review of relevant background literature on the local area. Through this comprehensive process, the environmental assessment can identify and focus on key issues requiring further assessment during the EIA Phase.

The primary objective of the Scoping Report is to present key stakeholders (including affected organs of state) with an overview of the proposed project and key issues that require assessment in the EIA Phase and allows the opportunity for the identification of additional issues that may require assessment.

This DSR has been released for a 30-day commenting period. Issues that will be raised will be captured in the Issues and Responses Trail that will be included in the Final Scoping Report and Plan of Study for EIA. The Final Scoping Report will be submitted to the DEA for decision-making (i.e. approval or rejection) in line with Regulation 21 (1) of GN R325. This approval is planned to mark the end of the Scoping Phase after which the EIA Process moves into the impact assessment and reporting phase.

In terms of legal requirements, a crucial objective of the Scoping Report is to satisfy the requirements of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, as noted in Regulation 21 (3) of the GN

R326). This section regulates and prescribes the content of the Scoping Report and specifies the type of supporting information that must accompany the submission of the Scoping Report to the authorities. An overview of where the requirements of Appendix 2 of the 2014 NEMA EIA Regulations (as amended) are addressed in this Scoping Report is presented in Table 1.2.

Furthermore, this process is designed to satisfy the requirements of Regulations 41, 42, 43 and 44 of the 2014 NEMA EIA Regulations (as amended) relating to the PPP and, specifically, the registration of and submissions from I&APs.

MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 1 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report

CHAPTER 2:
Project Description

CONTENTS

TABLES

FIGURES

2. PROJECT DESCRIPTION

This chapter provides an overview of the conceptual project design and an overview of the site and technology selection process for the Kuruman WEF, as provided by Mulilo.

The purpose of this chapter is to present sufficient project information on the proposed Kuruman WEF (including the facility itself and the associated infrastructure) to inform the EIA Process in terms of design parameters applicable to the project.

As noted in Chapter 1 of this Scooping Report, Mulilo is proposing to develop the Kuruman WEF and associated infrastructure including a 132 kV distribution line and on-site substation near Kuruman in the Northern Cape. The associated transmission infrastructure is subject to a separate BA process that will be undertaken by Mulilo. While the exact type of the turbines is yet to be finalised, the turbines are expected to have a combined maximum generation capacity of 225 MW. The proposed Kuruman WEF will consist of a maximum of 47 individual turbines which will be positioned at strategic locations that have been informed by the scoping assessment inputs provided by the specialists on the project team. The proposed location of the Kuruman WEF is shown in Figure 1.1 in Chapter 1. Table 2.1 shows the co-ordinates of the preferred project site.

Table 2.1: Co-ordinates of the Corner Points of the Preferred Project Site

Site	Point	Latitude	Longitude
Kuruman WEF	North	27°30'5.63"S	23°21'38.16"E
	North East	27°30'10.95"S	23°25'17.49"E
	East	27°32'42.77"S	23°24'59.92"E
	South- West	27°36'32.70"S	23°22'46.18"E
	North-west	27°31'51.54"S	23°20'24.66"E

2.1 Key components of the proposed Kuruman WEF

A summary of the key components of the proposed project is described below. It is important to note 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 an EA, should such an authorisation be granted for the proposed project, and shortly before construction commences). In line with the precautionary approach and in order to ensure that any environmental impacts which may arise as a result of the project are adequately assessed during the EIA Phase, worst-case scenarios and estimates have been provided in this section. For example, the current project description is representative of a worst-case scenario in terms of the total number of turbines proposed for implementation, as it reflects the maximum number of wind turbines which may be implemented, i.e. 47 turbines. The hub height is 80 - 140 m, rotor diameter is 100 - 160 m and the blade length is 50-80 m.

The total physical footprint of the proposed project (i.e. maximum 47 turbines and supporting infrastructure) is estimated to be approximately 580 ha. As mentioned in Chapter 1 of this DSR once commercial operation date is achieved, the proposed facility will generate electricity for a minimum period of 20 years. The property on which the WEF is to be constructed will be leased by the project owner from the property owners for the life span of the project. As the proposed Kuruman WEF requires approximately 580 ha which comprises 8 % of the total affected farm area of approximately 7 239 ha, there is spatial scope to avoid major environmental constraints through optimisation of the final design. Figure 2.1 indicates the draft project layout, including the associated infrastructure.

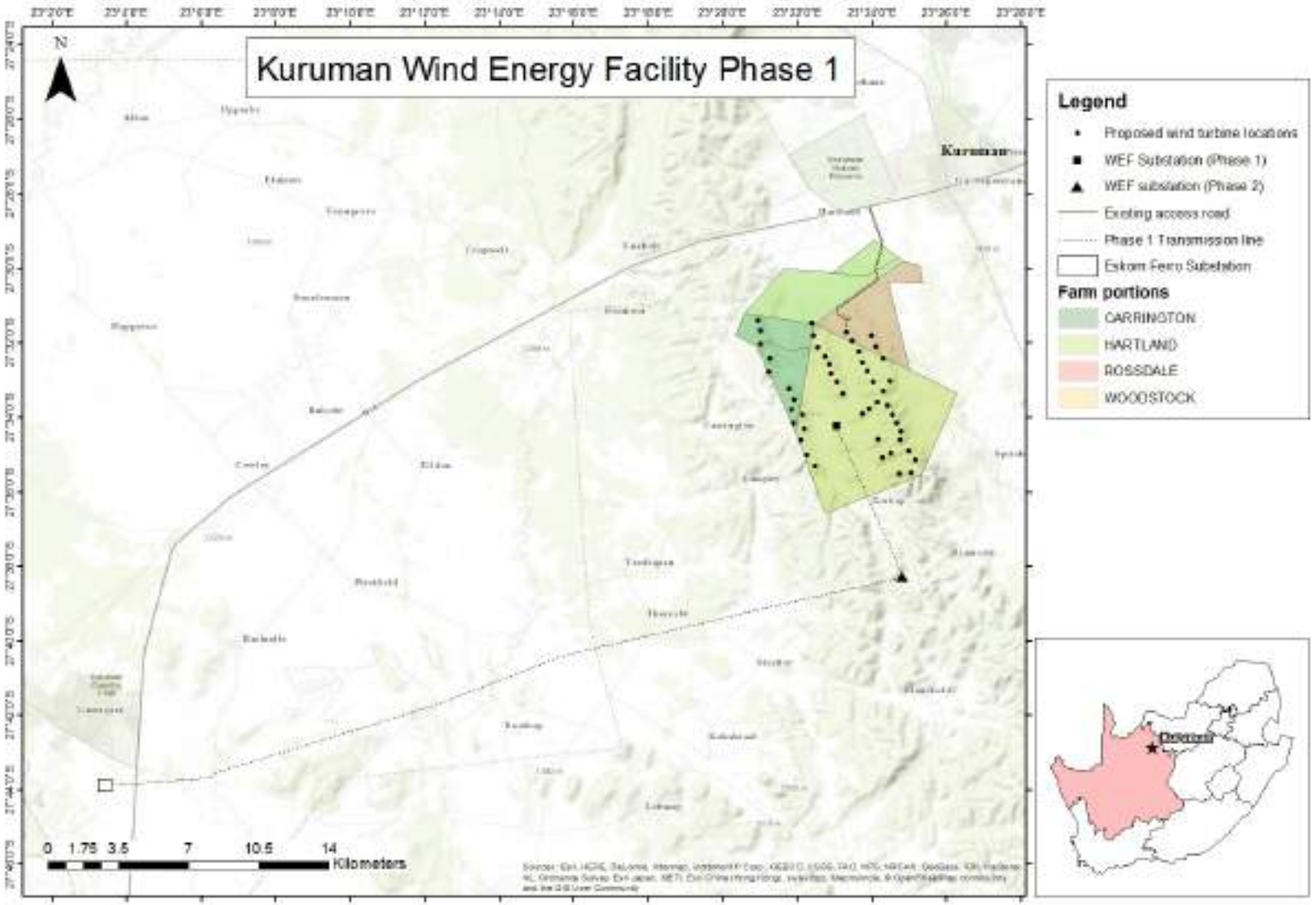

Figure 2.1: Proposed draft layout of the Kuruman WEF development area (Phase 1)

All high resource areas along the ridges of the relevant properties, as well as potential locations for all supporting infrastructure were assessed during the scoping phase. Based on the findings of the specialist studies, a preliminary environmental sensitivity map was prepared and is included in this Scoping Report (Chapter 3 and 5). This map shows the sensitivities on site (terrestrial, watercourses, and sensitive heritage features) within the larger site that was assessed. Based on this map, the preferred location for the Kuruman WEF, also known as the Development Envelope, avoids (where possible) the sensitive features that were identified by the specialists within the original assessed area.

A summary of the key components of the proposed project is described below. Furthermore, technical components forming part of the proposed WEF are discussed in detail in Sections 2.1.1 to 2.1.3 below.

- ***Wind turbines:***

  - Number of turbines: 20-47;
  - Hub height of 80 - 140 m and rotor diameter of 100 - 160 m;
  - Blade length of 50 - 80 m;
  - Reinforced Concrete Foundation – 20 m x 20 m (0.04 ha per turbine);
  - Crane platform: 50 m x 50 m (0.25 ha) for each turbine; and
  - Turbine capacity: 4.5 MW.

- ***Collector substation:***

  - 22/33 kV to 132 kV collector substation of approximately 2 ha to receive, convert and step up electricity from the WEF to the 132 kV grid suitable supply. The substation will be 5 m high. The facility will house control rooms and grid control yards for both Eskom and the IPP as well as a communication tower of up to 32 m.

- ***Operations and Maintenance building:***

  - Operations and Maintenance (O&M) buildings of approximately 1 ha. These buildings will comprise the following:
    - Parking area, reception area, offices and ablution facilities for operational staff, security and visitors;
    - Workshops, storage areas for materials and spare parts;
    - Water storage;
    - Septic tanks and sewer lines to service ablution facilities;
    - Central waste collection and storage area; and
    - The buildings and other infrastructure, including a communication tower, will be less than 32 m high.

- ***Construction site office area and laydown area (used during construction and rehabilitated thereafter):***

  - Three construction laydown areas (yards) will be established. It is anticipated that each construction yard will comprise an area of approximately 2 ha (6 ha in total) and will consist of the following:

    - Canteen;
    - Ablution facilities;
    - Site offices;
    - Changing room;

- Meeting rooms;
- Parking area;
- Storage areas including bunded fuel areas, oil storage areas, general stores (containers) and skips; and an
- On-site concrete batching plant: 50 m x 50 m (0.25 ha).

It is proposed that one of the laydown areas will be used as the site compound. Temporary single storey structures (prefab container-type offices) will be used. Approximately five buildings will be used for the main contractor and one or two buildings for sub-contractors. These may not necessarily all be at the same construction camp (i.e. the turbine erection crew may have a site camp on top of the plateau while the main construction site could be at the site access).

- ***Access road:***

  - The proposed main route will be along the R31 (Voortrekker Road) and the N14 (Hoof Street). The proposed turbine and internal road layout indicates that the main access road to the WEF will be constructed on D3441, located to the east of the site, approximately 3 km from the N14. No existing access road currently exists along D3441 to the proposed WEF site. An additional option for access to the Phase 1 area would be via gravel road D3420, located south of the site and accessed via the R31. This is also the proposed access for the Kuruman Phase 2 WEF. This option, however, is dependent on the approval of Phase 2 in conjunction with Phase 1 and that the main access road of Phase 2 be constructed in advance.

- ***Service roads:***

  - New roads will be constructed with a width of approximately 5 m and will connect all turbines. The existing roads to be used will be extended to a width of 8 m.

- ***Other infrastructure:***

  - Fencing of 5 m high around the O&M building and the on-site substation;
  - Cabling (22/33kV internal reticulation lines) between turbines to be laid underground where practical, which will connect to an on-site substation; and
  - Stormwater channels and culverts.

The proposed Kuruman WEF will connect to the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman) and a collector substation via a 132 kV overhead transmission line. The proposed transmission line will extend over 50 km to the Ferrum substation or 10 km to the Segame substation. Note that this transmission infrastructure is assessed under a separate BA process. The Kuruman WEF will consist of the components presented in Figure 2.2 below.

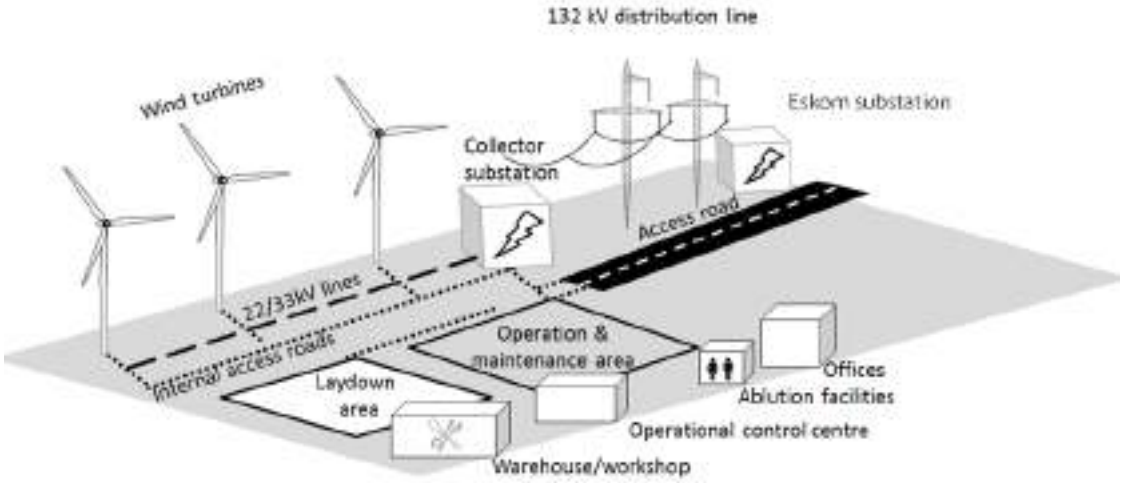

Figure 2.2: Components of the Kuruman WEF (*Source*: Tennessee Valley Authority, Wikimedia).

2.1.1 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 2.3 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 powerlines. 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 will have a hub height of 80 - 140 m, rotor diameter of 100 -160 m and the blade length will be 50 - 80 m.

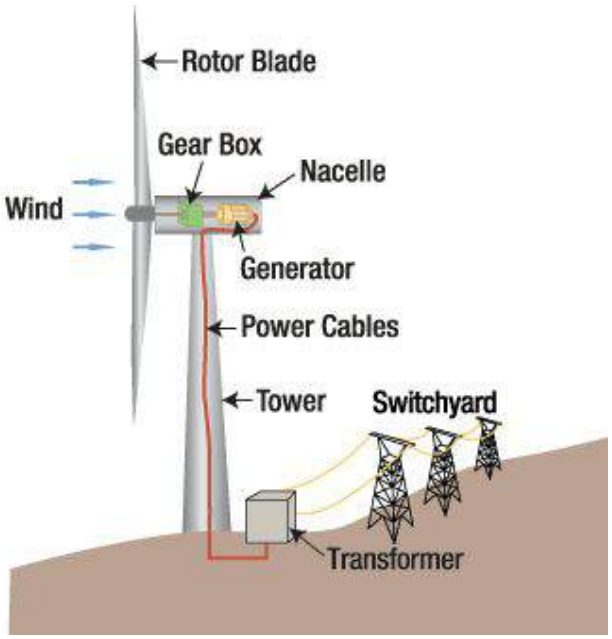

Figure 2.3: Generic design for a wind turbine (*Source*: Tennessee Valley Authority, Wikimedia).

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 20 x 20 m (0.04 ha) and a crane platform of 50 x 50 m (0.25 ha) will be established next to each turbine. It will therefore comprise a total area of approximately 13.63 ha for the 47 turbines. 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, Mulilo 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 will be 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 EIA.

2.1.2 Associated Infrastructure

2.1.2.1 Construction Laydown and Hardstand Areas

During construction, three construction laydown areas with a footprint of 2 ha each (200 m x 100 m), including a construction camp and crane platform (including boom erection, storage and assembly area), will be established. These crane platform areas (50 x 50 m) will be utilised by cranes to erect the turbines during the construction phase (and also possibly when maintenance is done in the operational phase). The crane platform covering a footprint of approximately 0.25 ha will be established adjacent to 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 2.4 below.

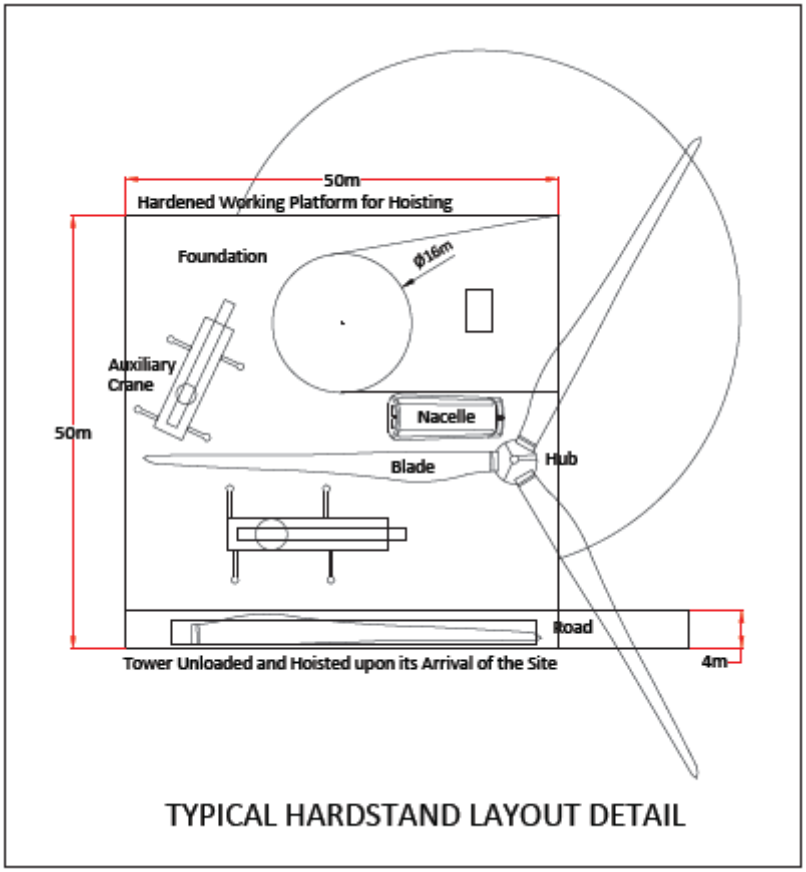

Figure 2.4: Example of a typical hard standing area

2.1.2.2 Fencing

For various reasons (such as security, public protection and lawful requirements), the proposed facility will be secured via the installation of boundary fencing. Permanent fencing will be required around the O&M Building and on-site substation. The fencing is planned to be approximately 5 m high. Access points will be managed and monitored by an appointed security service provider. The type of fencing is yet to be determined and detailed design will follow as the development progresses.

2.1.2.3 Stormwater Channels and Water Pipelines

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.

2.1.2.4 Batching plant

A concrete batching plant is proposed on site with a footprint of approximately 0.25 ha during construction.

2.1.2.5 Operations and Maintenance Area

The on-site operation and maintenance area is required to support the functioning of the proposed Kuruman WEF and provide services to personnel who will be responsible for the operation and routine maintenance of the facility. The proposed infrastructure entails establishment of the following: operational control centre, workshop or warehouse, ablution facilities, site offices, on-site substation building, security enclosures, and an area for the storage of maintenance equipment.

2.1.3 Electrical Components and Connection to the Grid

Note: The electrical components are discussed below to provide a holistic overview of the proposed Kuruman WEF and for the sake of completeness. However, as noted in Chapter 1, the transmission component to the project forms part of a separate Basic Assessment process which will be undertaken for the project.

2.1.3.1 Electrical Infrastructure

The transmission line for the proposed Kuruman WEF will be constructed and will extend between the proposed on-site substation and the Ferrum substation (located in Kathu) or to the Segame substation (located in Kuruman).

A servitude of approximately 31 m wide will be established for the construction of a 132 kV high voltage powerlines to connect to Eskom's Electricity Distribution. Two different route alternatives (Alternatives 1 and 2) are considered as part of the separate BA process and a corridor of 500 m wide is being assessed along each route alternative. It should be noted that the footprint will only be where the pylons are located and the 4x4 track (less than 2.5m wide). The preliminary routing of the powerlines has been proposed in such a way to minimise the length of powerlines required, as well as the total number of properties which would need to be traversed. Where practical and possible, the internal cabling (22/33 kV) will be routed underground between each turbine and will be located alongside on-site access roads as far as possible. This will reduce the visual impact of the proposed project, and the risk of collision with overhead powerlines for birds and bats, and provides increased security against cable theft. However, it is important to note that the extent to which cabling may be routed underground would be dependent on site conditions present along the cabling route. Should internal overhead lines be required, the bird specialist should assess and approve the design and recommend additional mitigation measures where appropriate. All structures must be bird friendly.

The on-site substation buildings and structures are expected to be approximately 5 m high, with a maximum footprint of 2 ha. The construction of the on-site substation would require the following activities:

- A survey of the site on which the proposed on-site substation will be constructed;
- Site clearing and levelling;
- Construction of access road/s to the proposed substation site (where required);
- Construction of substation terrace and foundations;
- Assembly, erection and installation of equipment (including transformers);
- Connection of conductors to equipment;
- Testing of equipment; and
- Rehabilitation of any disturbed areas and protection of erosion sensitive areas.

The development of the 132 kV powerline will consist of the following steps:

- Establishment of a servitude;

- Construction of tower/support structures;
- Stringing of the high voltage cables; and
- Ongoing maintenance.

Tower types available for the 132 kV powerlines include lattice structures, concrete monopole structures, steel monopole structures, wood pole structures, guyed steel monopole structures and steel H structures. Double circuit towers are towers which accommodate the routing of two powerlines on the same/single structure. Double circuit towers may either route powerlines as horizontal circuits (where the two powerlines run level horizontally alongside one another) or as vertical circuits (where powerlines run above and below one another). Due to their configuration, vertical circuit towers are generally taller than horizontal circuit towers, and are perceived to have a greater visual impact on the surrounding area. The preferred tower type for a particular line depends on the conductor size, terrain, required electrical characteristics, cost, maintenance requirements, live line compatibility, reliability and regional preferences. The type of tower structure selected for implementation would therefore need to be determined during the detailed project design phase, and would be based on the outcomes of the EIA Process and additional on-site investigations. Further powerline details will be confirmed in the separate BA process that was undertaken for the construction of the proposed electrical infrastructure associated with the proposed WEF. The size and type of foundation are also dependent on the type of tower structure selected for implementation, and the geotechnical conditions present on site. The foundations will therefore be designed based on the soil conditions. Once the foundations have been constructed, tower structures may be assembled on the ground and then erected, followed by the stringing of powerlines and conductors.

2.1.4 Site Access and Transportation of Wind Turbine Components to Site

2.1.4.1 Site access

The proposed main route will be along the R31 (Voortrekker Road) and the N14 (Hoof Street). The proposed turbine and internal road layout indicates that the main access road to the WEF will be constructed on D3441, located to the east of the site, approximately 3 km from the N14. No existing access road currently exists along D3441 to the proposed WEF site.

It should be noted that there are additional existing gravel roads located further south on D3441. These existing gravel roads could be further investigated as alternative accesses to the proposed Phase 1 site should the proposed main access (indicated above) not be a feasible option. An additional option for access to the Phase 1 area would be via gravel road D3420, located south of the site and accessed via the R31. The access roads are shown in Figure 2.5. Existing roads will be used where possible, and will be widened to 8 m. Internal roads will also be constructed for the construction and operational phases. The roads will be approximately 8 m wide and will connect all the turbines.

Mulilo appointed JG Afrika (Pty) Ltd to undertake a Transportation Impact Assessment (TIA) for the proposed Kuruman WEF. The TIA will assess the expected traffic related impacts of the proposed facility during the construction, operation and subsequent decommissioning phases. The purpose of the study is also to consider the traffic impact that the facility will have on the surrounding road network and environment during the construction of the access roads, construction and installation of the turbines and during maintenance.

Figure 2.5: Access roads to the proposed Kuruman WEF.

The nearest towns in relation to the proposed Kuruman WEF site are Kuruman and Kathu. Kuruman is situated within 5 km from the WEF and Kathu at 40 km. The main route linking Kuruman and Kathu to the proposed WEF is the N14. The Transportation study (JK Afrika, 2018) states that it is envisaged that the majority of materials, plant and labour will be sourced from Kuruman and Kathu and will be transported to the WEF via the N14. Existing concrete batch plants and quarries are situated in Kuruman and Kathu. If these businesses were contracted to supply materials and concrete, the impact on the traffic would be reduced due to their proximity to the proposed WEF site. Alternatively, mobile concrete batch plants and temporary construction material stockpile yards could be commissioned on vacant land near the proposed 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 labour will be procured within a 60 km radius from the proposed WEF.

2.1.4.2 Port of entry

It is assumed that the wind turbine components will be imported to South Africa via the Port of Ngqura in Port Elizabeth in the Eastern Cape (Figure 2.6). The Port of Ngqura is a world class deep water

transhipment hub offering an integrated, efficient and competitive port service for containers on transit. The Port forms part of the Coega Industrial Development Zone and is operated by Transnet National Ports Authority. The Port also services the industrial bulk commodity requirements of the regional and national hinterland. Containers handled include imports and exports from across the globe as well as transhipment cargoes serving primarily East and West coast traffic as well as inter-line traffic from South America to Asia.

Figure 2.6: Preferred route from Port of Ngqura to the proposed Kuruman WEF (Map from Transport study: Scoping Report prepared by JG AFRIKA (PTY) LTD, 2018)

Most shipping vessels importing the turbine components will be equipped with on-board cranes to do all the safe off-loading of WTG components to the abnormal transport vehicles, parked adjacent to the shipping vessels (Figure 2.7).

Figure 2.7: Example of cranes at Port of Entry
(Image from Transport study: Scoping Report prepared by JG AFRIKA (PTY) LTD, 2018)

2.1.4.3 Transportation of wind turbines

For the transportation of the turbines to the WEF site, it was assumed that the turbine blades will be transported separately to site. Consequently, for each wind turbine three abnormal loads will be required for the blades, seven abnormal loads for the tower sections and another abnormal load for the nacelle. All further components will be transported with normal limitations haulage vehicles. With approximately 11 abnormal loads trips, the total trips to deliver the components of 47 turbines to the WEF site will be around 517 trips. The constructions of roads and concrete footings will also have a significant impact on the surrounding road network as vehicles deliver materials to the site. A concrete footing (approximately 500 m^3) adds over 80 trips by concrete trucks to the surrounding road network (JG AFRIKA (PTY) LTD, 2018).

In terms of the Road Traffic Act (Act 29 of 1989) the trucks delivering turbine components will be considered as abnormal loads. Approval may have to be obtained from National, Provincial and Local competent authority for the transportation of abnormal heavy components. This is normally the responsibility of the logistics company in charge of these components. Figures 2.8 to 2.11 below provide examples of transportation of some of the turbine components.

Figure 2.8: Tower section being transported.

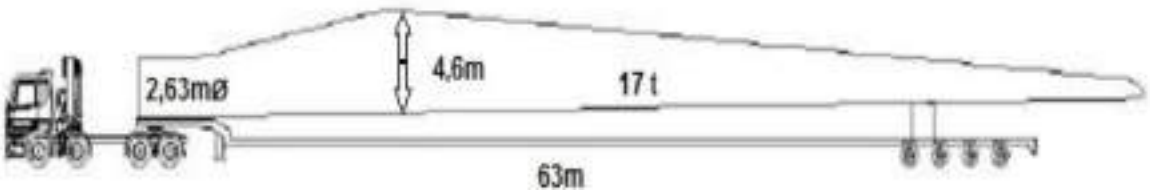

Figure 2.9: Rotor blade being transported.

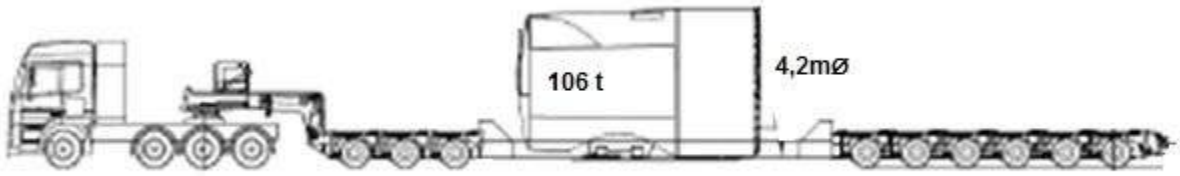

Figure 2.10: Nacelle being transported.

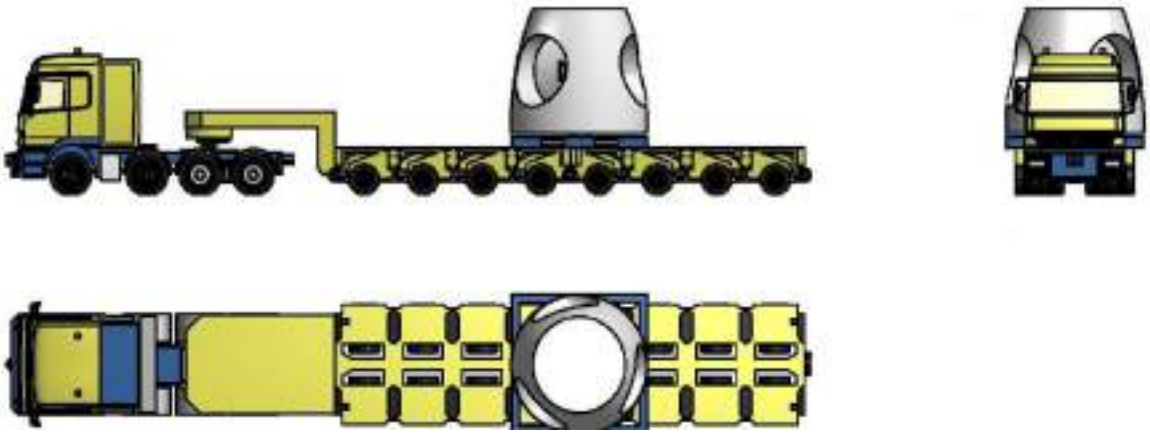

Figure 2.11: Hub and Rotary units being transported.

Note: Photos from Transport study: Scoping Report prepared by JG AFRIKA (PTY) LTD, 2018

2.1.5 Water requirements

The construction phase will extend over approximately 18 months. The weekly water requirement during this phase is an average of 409, 640 litres (l). High water use is only anticipated for the first six months for the construction of the turbine foundations, roads and dust suppression. Thereafter the water usage will decrease drastically.

The weekly water requirement during the operational phase is an average of 100 l. Water will be sourced from a borehole on site which will be subject to a Water Use Licence Application (WULA) that will be applied for by the project applicant. A groundwater census will be included in the WULA.

2.2 Overview of Project Development Cycle

This section provides an outline of the main activities that are proposed during each phase of the proposed project, i.e. extending from the Planning and Design phase through to the Decommissioning phase. The operational life of the wind turbine facility is expected to be approximately 20 years which could be extended through regular maintenance and/or upgrades in technology.

2.2.1 Detailed Planning and Design

The project layout, including the placement of each individual turbine and subsequent proposed access roads will be finalised in the EIA phase. The project layout will be informed by the findings of the specialist studies, which included the identification of sensitive biophysical areas that need to be avoided. The specialists will be requested to comment on the final layout. 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.

2.2.2 Construction Phase

The construction phase will take place subsequent to the issuing of an EA from the DEA and once a power purchase agreement (PPA) with a suitable energy off-taker is signed, this could be Government or private. The construction phase for the proposed Kuruman WEF project is expected to extend over 18 months (however the construction period is subject to the actual number of turbines, the final requirements of Eskom and the REIPPPP RfP provisions at that point in time).

The main activities that are proposed to take place during the construction phase will entail the 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). The temporary laydown area will then be constructed 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). The wind turbine foundations will then be constructed at each turbine location. As noted above, each turbine will be supported by a concrete foundation of approximately 400 m^2, with the aid of a mechanical excavator.

Thereafter, the on-site substation, including the substation building will be constructed. The construction of the substation building will entail construction of the foundations and building structure as well as the installation of electrical infrastructure (such as transformers, conductors, etc.). The construction phase will also involve the transportation of personnel, construction material and equipment to and from the site. Subsequently, the trenches will be excavated at a depth of approximately 5 m, between each wind turbine, for the laying of the cables to facilitate the connection of the wind turbines to the on-site substation.

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 EMPr which will be compiled and included in the EIA 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 EMPr and EA respectively. 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 420 employment opportunities (180 permanent and 240 temporary) are expected to be created during the construction phase. Of these 20 % will comprise highly skilled; 50 % skilled; and 30% will comprise unskilled employment opportunities. The proposed construction and operational phases will make use of local labour (including female labour) as far as possible and a minimum of 50 % of the workers will be sourced from the local communities. All non-local workers will be housed in rental accommodation in the nearby towns, i.e. Kuruman and Danielskuil. Mulilo will transport these workers to and from the site by busses. No workers will be accommodated in workers camps on site.

2.2.3 Operational Phase

The following activities will occur during the operational phase:

- Operation of the WEF and generation of electricity to add to the national grid;
- Routine maintenance of the WEF; and
- Unscheduled maintenance of the WEF.

The operational lifespan of the proposed Kuruman WEF is expected to be approximately 20 years. 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 expected that the WEF will operate throughout the day and night. During the operational phase, most of the WEF project area will continue its current agricultural use. The only development related activities on-site will be routine servicing and maintenance.

The projected operations are expected to provide several services and added economic spin offs (as highlighted in Chapter 1 of this Scoping Report). Approximately 35 employment opportunities (25 permanent and 10 temporary) will be created during the operational phase of the project. Of these, 30 % will comprise highly skilled-; 20% semi-skilled- and 50% unskilled employment opportunities. Approximately 70% of the operations and maintenance team will be sourced from the local community.

2.2.4 Decommissioning Phase

At the end of the operational phase, the WEF may be decommissioned, or may be repowered i.e. redesigned and refitted so as to operate for a longer period. 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 facility 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 its pre-construction state.

Various components of the proposed Kuruman 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.

MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 1 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report

CHAPTER 3:

Description of the Environment

CONTENTS

TABLES

FIGURES

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter provides an overview of the affected environment for the proposed Kuruman WEF 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 here has been sourced from:

- Scoping inputs from the specialists that form part of the project team;
- 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
- Gamagara Local Municipality and Ga-Segonyana Local Municipality IDPs, the John Taolo Gaetsewe District Municipality SDF and the Northern Cape PSDF.

It is important to note that this chapter intends to provide an overview and does not represent a detailed environmental study. Detailed studies focused on significant environmental aspects of this project within the development footprint of the project will be provided during the EIA Phase.

3.1 Background

As noted in Chapters 1 and 2, the development of the proposed Kuruman WEF Phase 1 and associated electrical infrastructure (subject to a separate Basic Assessment Process) will be on the following farm portions near Kuruman in the Northern Cape Province:

- Remainder of the Farm Woodstock No. 441
- Remainder Portion 1 of the Farm Hartland No. 381
- Portion 2 of the Farm Hartland No. 381
- Remainder of the Farm Rossdale No. 382
- Remainder Portion 2 of the Farm Carrington No. 440
- Portion 4 of the Farm Carrington No. 440

Figure 3.1 below represents the regional setting of the proposed Kuruman WEF Phase 1 project.

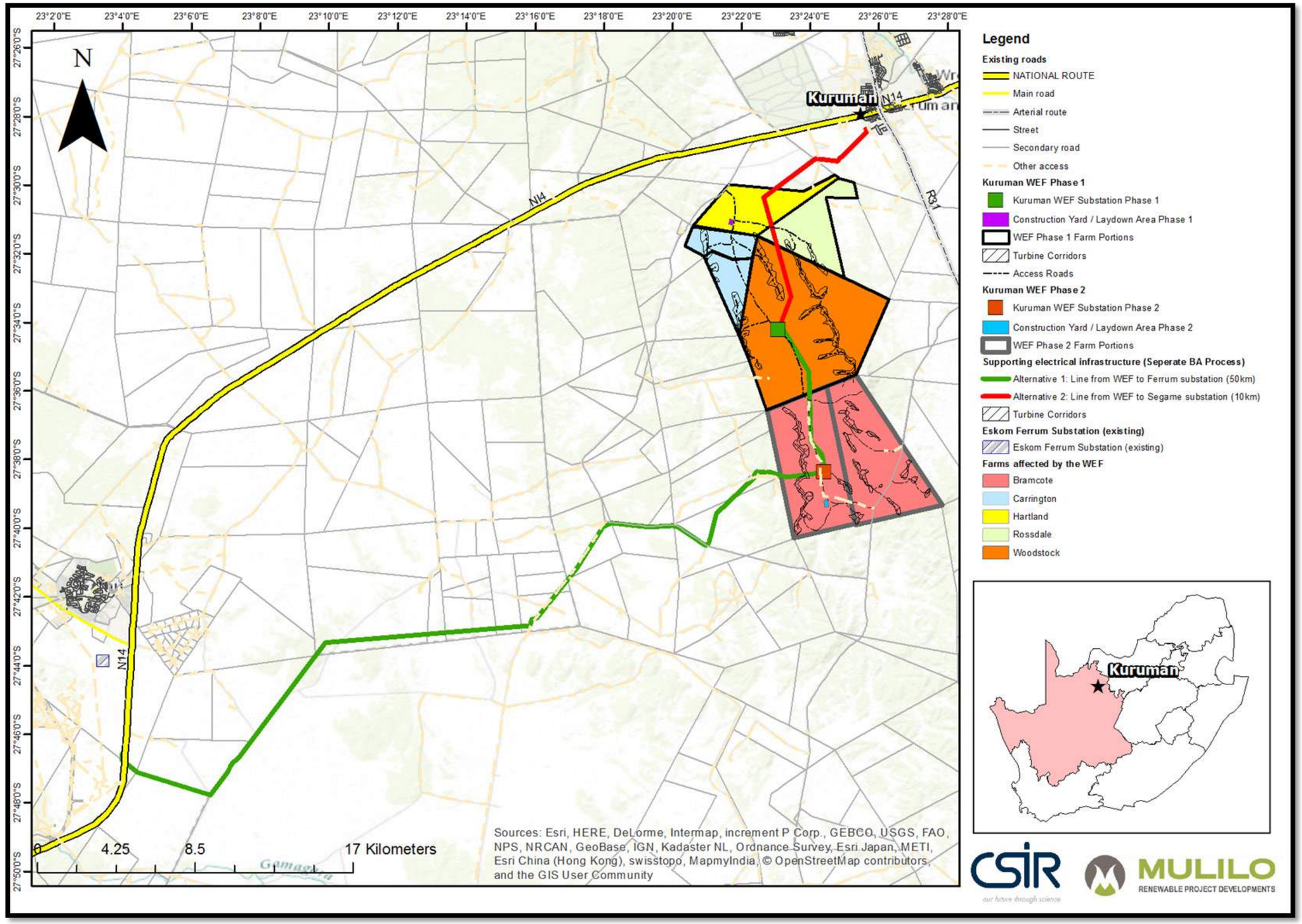

Figure 3.1: Locality Map for the proposed Kuruman WEF project within a Regional Setting. Please note that the 132kV transmission line route (Alternative 1) is yet to be confirmed.

3.2 Biophysical Environment

3.2.1 Climatic Conditions

The climate of the Northern Cape is semi-arid with a late summer-autumn rainfall regime. The average rainfall of the area varies from 0 mm to 200 mm per year. Evaporation levels within this province exceed the annual rainfall. Climate conditions are extreme (i.e. very cold in winter and extremely hot in summer). The mean annual rainfall of South Africa is shown in Figure 3.2 below.

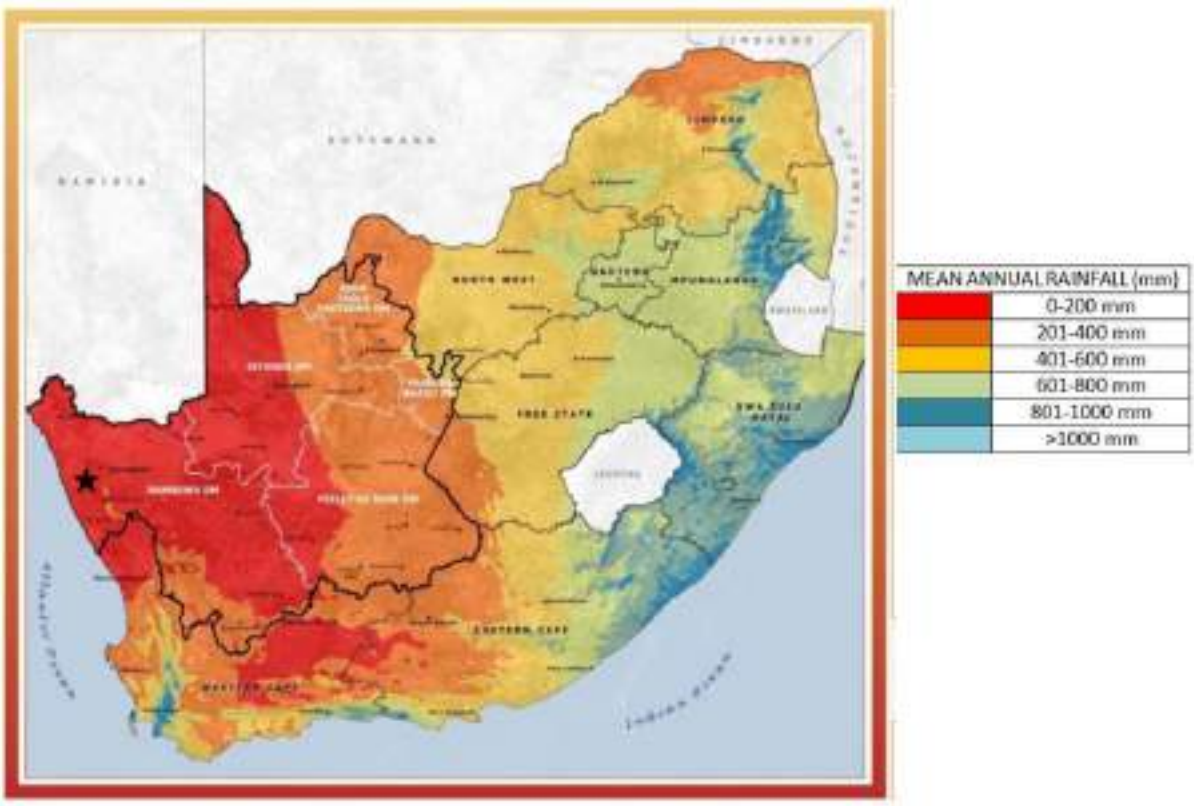

Figure 3.2: Mean Annual Rainfall Levels of South Africa (*Source: Northern Cape PSDF, 2012*)

One of the most important climate parameters for agriculture in a South African context is moisture availability, which is the ratio of rainfall to evapotranspiration. According to the World Bank Climate Change Knowledge Portal (2005), the average annual rainfall for the proposed site is low, at 400 mm per annum. The average monthly distribution of rainfall is shown in Figure 3.3 below.

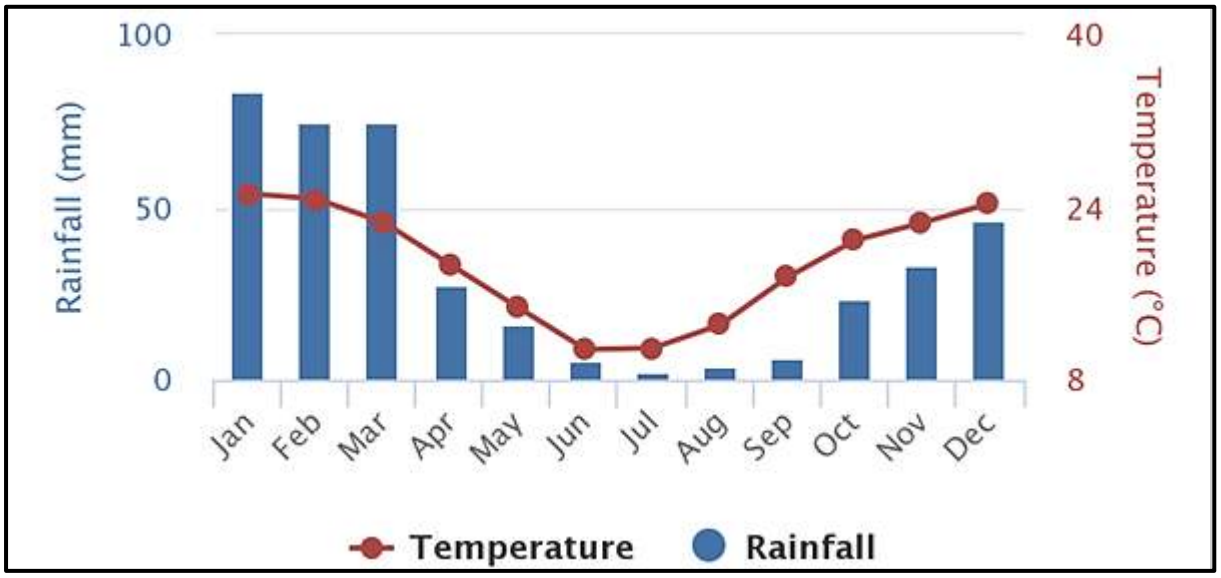

Figure 3.3: The average monthly distribution of rainfall within the area, including the Kuruman WEF *(Source: Lanz, 2018)*

3.2.2 Topography and Landscape

The proposed development is located on a series of hilly, north-south running ridges which rise from the plateau at varying altitudes of between 1 400 m and 1 700 m. Slopes vary across the area, with maximum slopes of 35% down the sides of the ridges where they are steepest. The proposed turbine locations are along the ridge lines with maximum slopes that would be impacted by any footprint of the development much less and are not likely to exceed 15%.

3.2.3 Regional Geology

The underlying geology of the area is underlain by the Quaternary age alluvial material in the lower lying areas, which overlays the yellow-brown banded or massive jaspilite with crocidolite, and banded ironstone from the Danielskuil Formation with subordinate amphibolite, crocidolite and ferruginous brecciated banded ironstone from the Kuruman Formation (Figure 3.4). These geological units are part of the Griquatown group and form the distinctive north-south trending ironstone mountain ranges of the larger Kuruman area. This is underlain by fine and coarse - grained dolomite with interbedded chert of Ghaaplato Formation part of the Campbell Group (Council for Geoscience, 1:250 000 Map (2722 – Kuruman)).

3.2.4 Regional Hydrogeology

According to the 1:500 000 scale groundwater map of Kuruman (2723) the northern portion of the study area hosts a karst aquifer, whereas the central portion of the study area hosts a fractured aquifer (Figure 3.5). Although groundwater quality in the area is considered to be generally good with greatest recharge occurring in the mountainous areas, the potential for groundwater vulnerability is overall low except for a small portion that is considered high towards the north-east corner of the proposed project area (Figure 3.6).

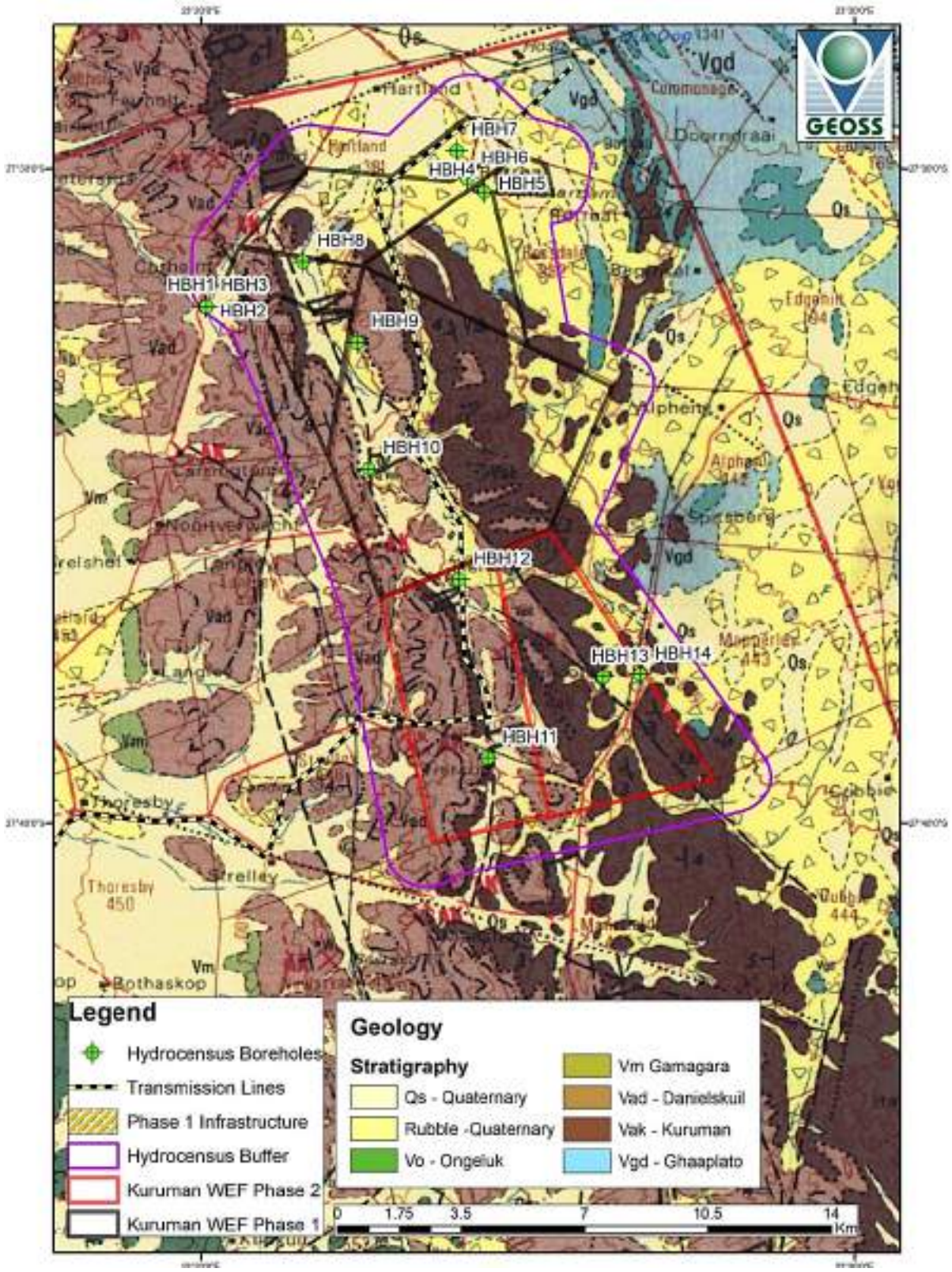

Figure 3.4: Geological setting of the proposed Kuruman WEF and the surrounding environment (*Source: Mulder et.al. 2018*)

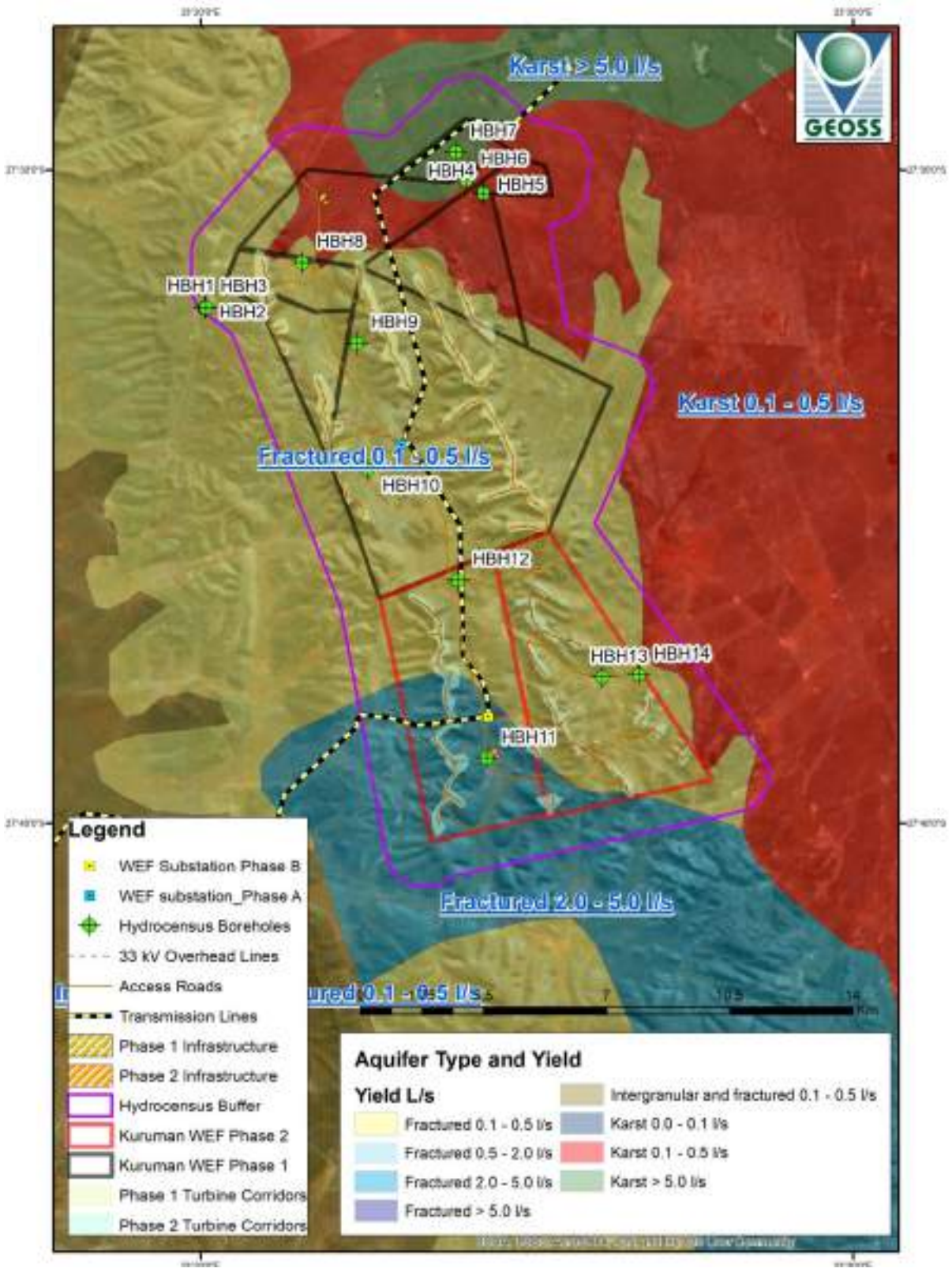

Figure 3.5: Hydrogeological setting of the proposed Kuruman WEF and the surrounding environment: Aquifer type and yield of the (*Source: Mulder et.al. 2018*)

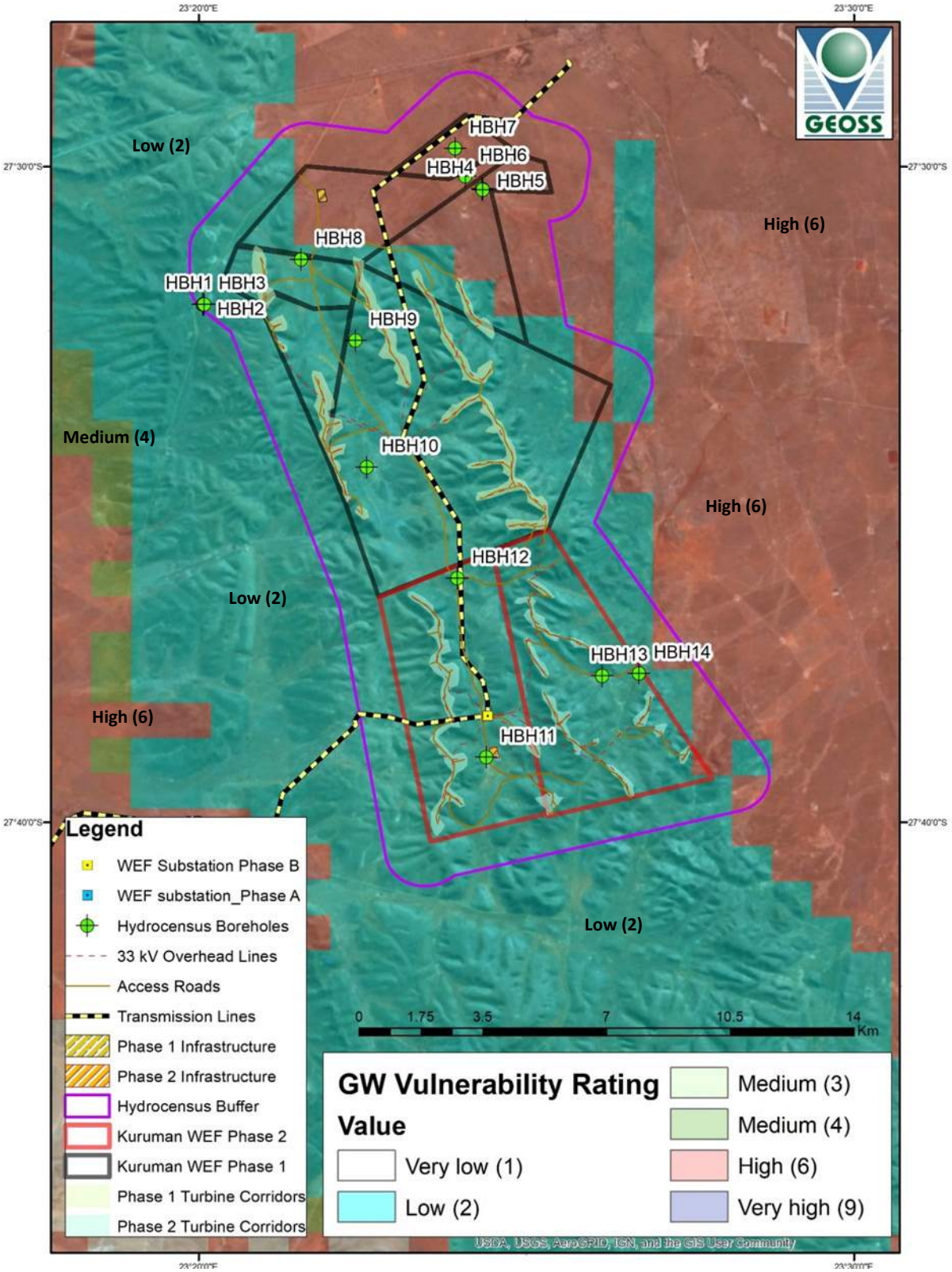

Figure 3.6: Groundwater vulnerability of the proposed Kuruman WEF and the surrounding environment (*Source: Mulder et.al. 2018*)

3.2.5 Soil Types and Soil Potential

The land type classification is a nationwide survey that groups areas of similar soil, terrain and climatic conditions into different land types. The proposed development site is located on land zoned and used for agriculture. The proposed project site characteristic of predominantly only one land type, Ib236, across the hilly terrain of the area with a second, Ae2, extending a small distance into the site up into some of the largest valleys. Land type Ib236 is dominated (71% of the surface) by rock outcrop. The soils between the rock outcrops are red, sandy soils on underlying hard rock, of the Hutton soil form. They are predominantly shallow, but patches of deeper sands occur. The soils of Ae2 are shallow to deep, red, sandy soils on underlying rock or hardpan carbonate and are of the Hutton or Plooysburg soil forms. The soils would fall into the Oxidic and Calcic (underlying hardpan carbonate) soil groups according to the classification of Fey (2010). The environment does not pose a particularly high erosion risk, but due to the sandy texture of the resident soils, they are susceptible to wind erosion (Lanz, 2018). A summary of detailed soil data for land types is provided in Table 3.1.

Table 3.1: Land Types Soil data for the site (*Source: Lanz, 2018*)

Land type	Land capability class	Soil series (forms)	Depth (mm)	Clay % A horizon	Clay % B horizon	Depth limiting layer	% of land type
Ib236	8	Rock outcrop					71
		Hutton	50 - 300	2 - 6	4 - 10	R	22
		Hutton	300 - 1200	2 - 6	4 - 10	R	6
Ae2	5	Hutton	600 > 1200	2 - 6	4 - 10	R	26
		Hutton	750 > 1200	2 - 6	4 - 9	R,ka	23
		Hutton	300 - 600	2 - 6	4 - 10	R	16
		Hutton	100 - 300	4 - 8	4 - 10	R	15
		Hutton	300 - 600	2 - 6	4 - 9	R,ka	10
		Rock outcrop					4
		Hutton	450 - 750	10 - 15	15 - 20	R,ka	2
		Clovelly	750 - 1200	2 - 6	4 - 10	ka	1
		Mispah	50 - 250	4 - 10		ka	1

Land capability classes: 5 = non-arable, moderate potential grazing land; 8 = non-utilisable wilderness land.
Depth limiting layers: R = hard rock; ka = hardpan carbonate.

3.2.6 Agricultural Capability and Sensitivity

Land capability is the combination of soil suitability and climate factors. As noted above, Land type Ib236, which characterises the majority of the site, is classified as Class 8 – non-utilisable wilderness land. The small portion of land type Ae2 included in the site is classified as Class 5, which is defined as non-arable, moderate potential grazing land. Limitations to agriculture are predominantly the shallow, rocky soils on the ridges where the turbines are located, but in the patches of deeper soils, agriculture is still very limited by the low climatic moisture availability. The grazing capacity of the area is classified at approximately 20 hectares per large stock unit. Agricultural potential and conditions are very uniform across the site and the choice of placement of facility infrastructure, including access roads and transmission lines therefore has minimal influence on the significance of agricultural impacts. No sensitive agricultural areas occur within the study area. From an agricultural point of view, no parts of the site need to be avoided by the proposed development and no buffers are required (Lanz, 2018).

3.2.7 Ecology: Freshwater and Terrestrial Environment

The ecological evaluation is based on a preliminary desktop and scoping exercise of the site and general area, and site visits were undertaken during the Scoping phase. The SANBI BGIS was used to define the regional vegetation and water resources present in the area and the anticipated ecological sensitivity of the receiving environment. In addition, a literature review of existing reports, scientific studies, databases, reference works, guidelines and legislation relevant to the study area was conducted to establish the baseline ecological and vegetative condition of the site and associated environment.

3.2.8 Freshwater Environment (Surface Water, Drainage, and Wetland Ecosystems)

The water resources of South Africa have been divided into quaternary catchments, which serve as water management units for the country (DWA, 2015). A Quaternary Catchment is a fourth order catchment in a hierarchical classification system in which the primary catchment is the major unit. The quaternary catchments indicated for the study area are D41L and D41K and the study area falls within the Southern Kalahari Ecoregion and within the Lower Vaal Water Management Area (WMA), as well as the Molopo sub-Water Management Area (sub-WMA) as defined by NFEPA (2011).

Only the Kuruman River and one of its larger tributaries, the Ga-Mogara River, traverse the Ga-Segonyana Local Municipality. The Kuruman River originates east of Kuruman where it receives water from several springs of which the Great Koning Eye, Little Koning Eye and the Kuruman Eye are the largest. Both the Kuruman River and the Ga-Mogara River are usually dry, flowing only for short periods following sufficient rainfall. The nearest river system is a tributary of the Kuruman River located approximately 4 km north east of the study area, with the Kuruman River itself located approximately 6.6 km from the study area boundary, both of which are ephemeral watercourses (Figure 3.7).

The applicable wetland vegetation unit for seeps and depressions, the only wetland habitat identified within the study area, is the Eastern Kalahari Bushveld Group 3 and 4 (Figure 3.8) both listed as ‘Least Threatened’ (NFEPA, 2011). A single natural seep wetland extending over approximately 13 ha is located within the study area, indicated to fall within an AB wetland condition (natural or good) with only one smaller artificial feature, approximately 0.38 ha, is located within 500 m of the study area boundary (Northern Cape Critical Biodiversity Areas, 2016 and NFEPA, 2011). The topography has however resulted in the formation of numerous small ephemeral drainage lines occurring throughout the study area.

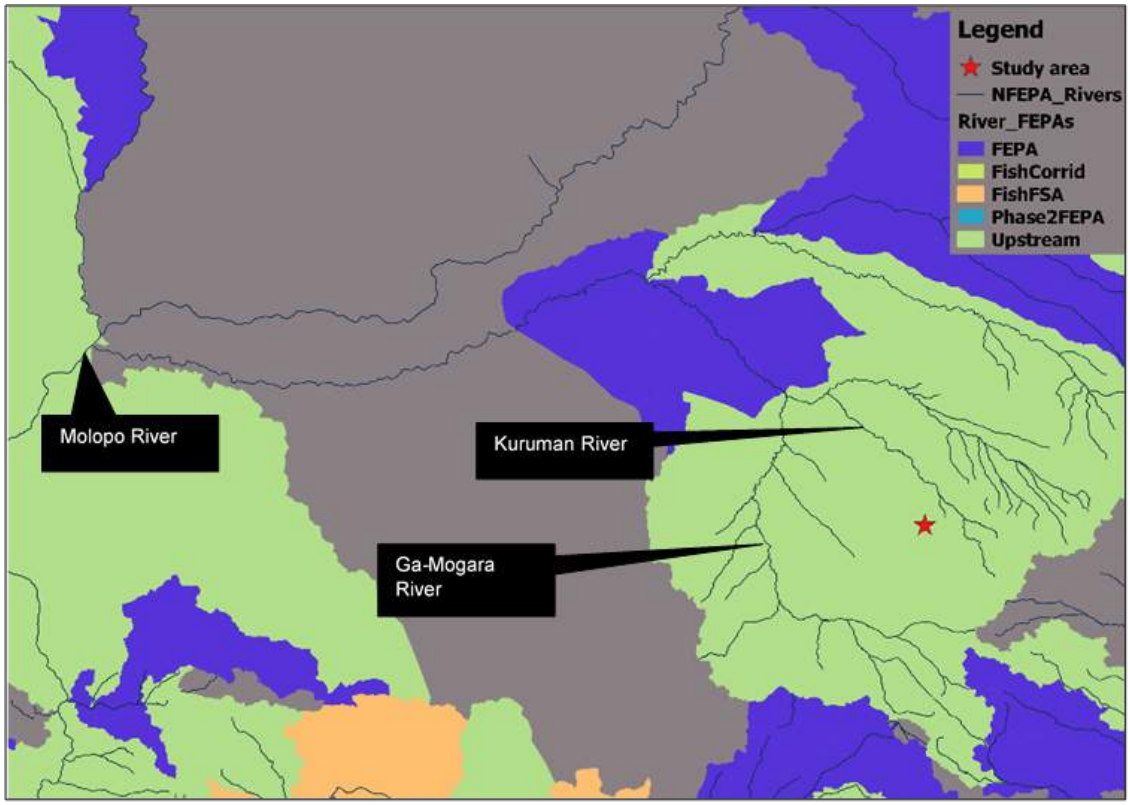

Figure 3.7: Freshwater Ecosystem Priority Areas and major rivers (*Source*: *Van de Haar, 2018*).

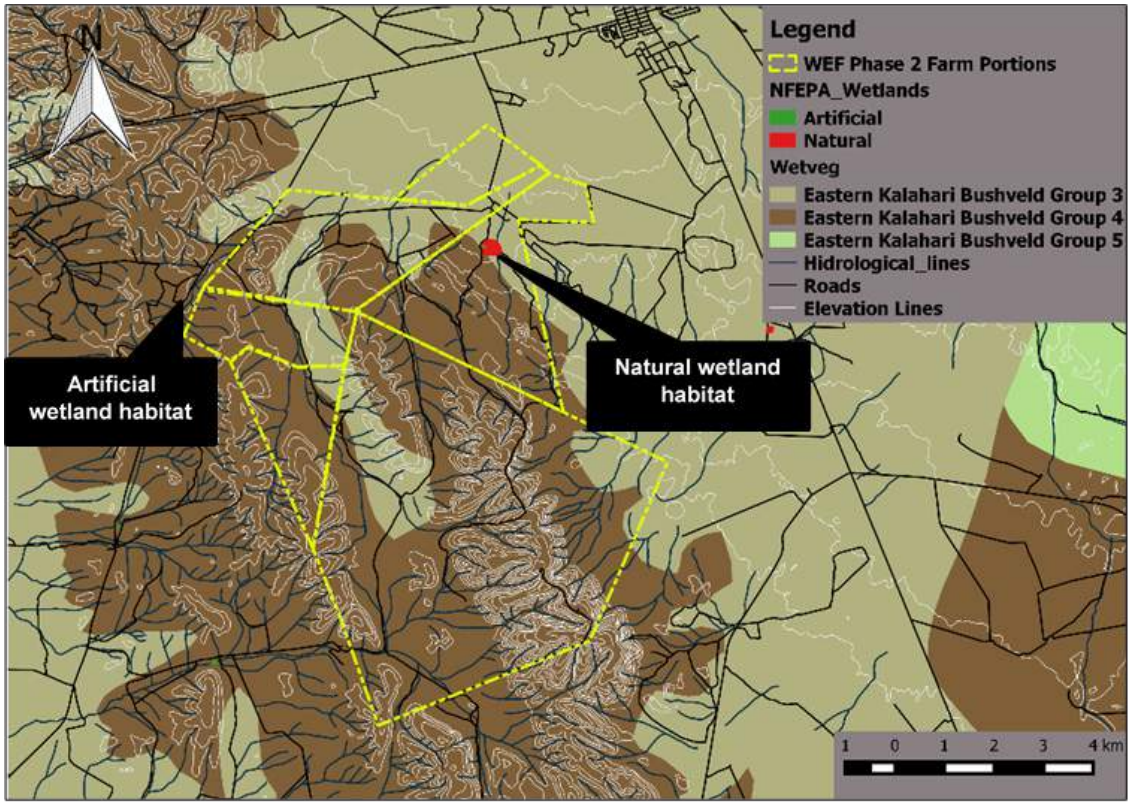

Figure 3.8: Wetland vegetation units, wetland habitats and drainage lines (*Source: Van de Haar, 2018*).

3.3 Terrestrial Environment

3.3.1 General Vegetation Description

The proposed Kuruman WEF Phase 1 site consists of Kuruman Mountain Bushveld on the rocky hills and Kuruman Thornveld on the lowlands/plains (Figure 3.9). The majority of the site is mapped as Kuruman Mountain Bushveld. Kuruman Mountain Bushveld has a limited distribution in the Northern Cape and North-West provinces with a total mapped extent of 4,360 km^2 which is a narrow range for an arid vegetation type. This vegetation type is associated with rolling hills with gentle to moderate slopes and hill pediment areas, and typically consists of an open shrubveld. Kuruman Mountain Bushveld has been little impacted by transformation and is classified as 'Least Threatened', but is not currently conserved within any formal conservation areas. The plains areas of the site are mapped as Kuruman Thornveld. This is also a restricted vegetation type which occupies 5,794 km^2 of the Northern Cape and North West provinces from the vicinity of Postmasburg and Danielskuil in the south, extending via Kuruman to Tsineng and Dewar in the north. It has been little impacted by transformation with more than 98% of the original extent still intact and it is classified as 'Least Threatened'. This vegetation type occupies flat rocky plains and sloping hills with a very well-developed, closed shrub layer and well-developed tree stratum usually consisting of *Acacia erioloba* (Todd, 2018).

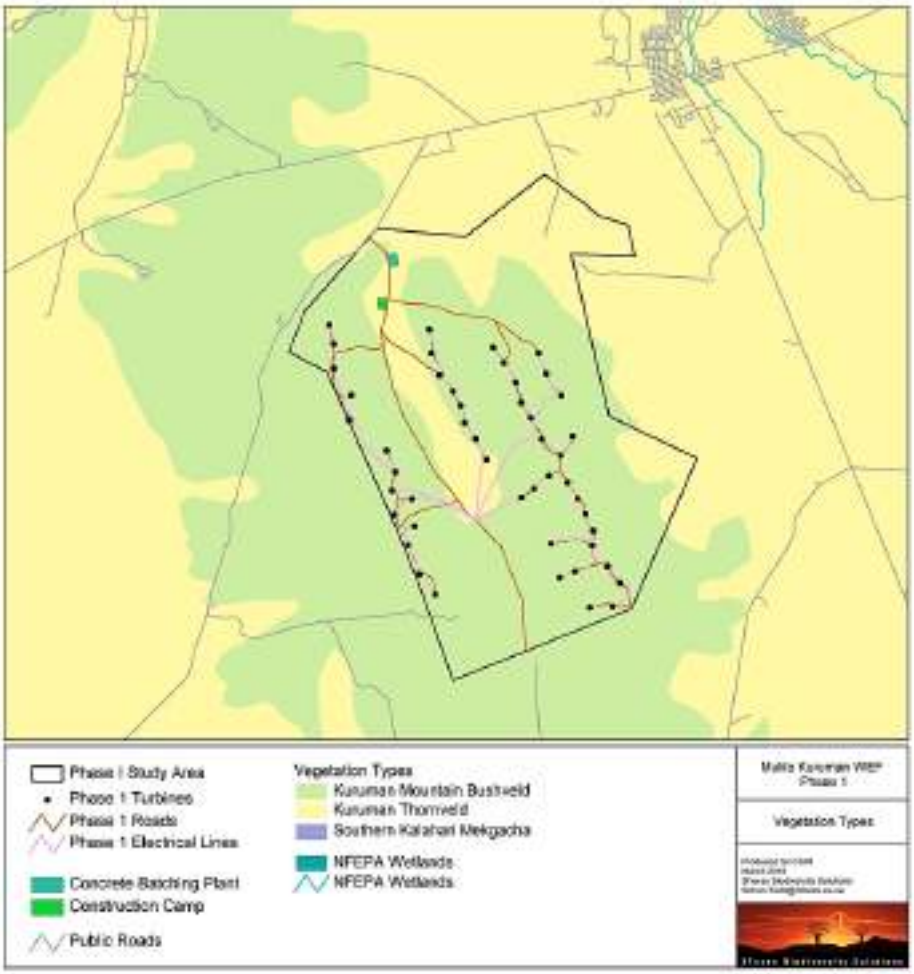

Figure 3.9: Vegetation mapping for the proposed Kuruman WEF Phase 1 study area (*Source: Todd, 2018*)

The northern parts of the proposed Kuruman WEF Phase 1 development site fall within the Tier 2 Critical Biodiversity Area (CBA) which forms a buffer area around the Billy Duvenhage Nature Reserve (Figure 3.10). The majority of the footprint of the development is situated within an Ecological Support Area (ESA) with some footprint areas such as the collector substation which are within areas that are classified as 'other natural areas'. The footprint within the CBA 2 area is small and a significant impact would not occur in this area. It is highly unlikely that the development would compromise the functioning of the ESA and with the appropriate mitigation, the development of a wind energy facility is considered compatible with the aims and objectives of ESAs, at least from a terrestrial biodiversity point of view. As a result, the overall impact of the development on CBAs and ESAs is considered to be low and a long-term significant impact is unlikely. In addition, the site does not fall within an area identified as being a priority conservation expansion area under the Northern Cape Protected Area Expansion Strategy (NCPAES) Focus Area (2017) (Todd, 2018).

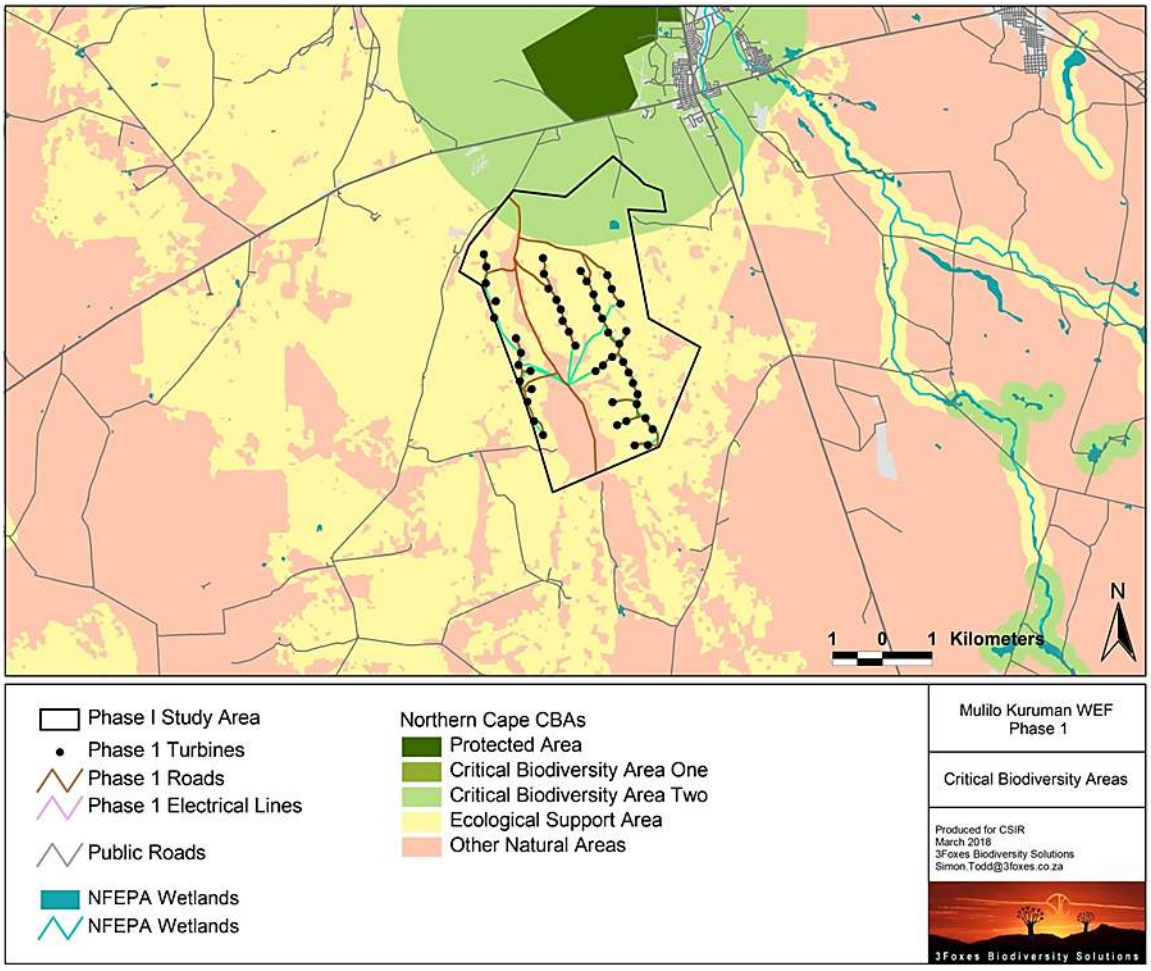

Figure 3.10: Critical Biodiversity Areas map for the study area, showing that the site lies partially within a Tier 2 CBA (*Source: Todd, 2018*).

3.3.1.1 Flora

Based on the SANBI POSA database and field surveys conducted at the proposed Kuruman WEF Phase 1 development site, the abundance of listed and protected species at the site is low. No threatened plant species were observed at the site and while the SANBI POSA database does indicate that few such species

are present in the wider area surrounding the proposed development site, the site is large and it is possible that some red-listed species are present at the site, but if present they would not be common. Only two endemic species are known to occur in the area, namely the succulent *Euphorbia planiceps* which is characteristic of the Kuruman Mountain Bushveld vegetation type, and *Gnaphalium englerianum* which is associated with Kuruman Thornveld. None of these two species was recorded on site. There are however at least three protected tree species present at the site; *Boscia albitrunca*, which is rare and was not observed within the development footprint; *Acacia haematoxylon,* which occurs at a low density across the plains and would be affected to some extent by the proposed development; and *Acacia erioloba*, which is a common to dominant species across the plains present on site and would be impacted to some degree. However, no local populations of any protected species would be compromised by the development (Todd, 2018).

3.3.1.2 Fauna

There are 39 different mammal species that are known to occur in the broader area around the proposed development site. The affected property is however also used as a game farm and numerous additional large ungulate species such as Oryx are present, but are considered to be part of the farming system as they are not free ranging beyond the property. Naturally-occurring species present at the site includes Kudu, Common Duiker, Cape Hare, Steenbok, Chacma Baboon, Rock Hyrax, Yellow Mongoose, Porcupine and Smith's Red Rock Rabbit, as well as numerous other species which will be identified through the camera trapping that is currently being conducted at the site. Small mammals trapped or observed at the site includes South African Pouched Mouse, Namaqua Rock Mouse, Four-striped Mouse and Multimammate Mouse. The only Species of Conservation Concern (SCC) that may occur in the area includes the Southern African Hedgehog, *Atelerix frontalis* (Near-Threatened), as well as the Ground Pangolin, *Smutsia temminckii* (Vulnerable). Although neither of these two species were recorded on site, it is likely that both the Hedgehog and the Pangolin could be present in the area as the habitat is broadly suitable, but as these species usually occur at a low density the extent of habitat loss for these species would be low (Todd, 2018).

As many as 38 reptile species are known to occur in the wider area surrounding the proposed development site. Species observed at the site include the Ground Agama, Boomslang, Rock Monitor, Spotted Sand Lizard, Variegated Skink and Leopard Tortoise. No reptile SCC have been recorded from the area. Overall, 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 on site.

The only amphibian species recorded from the area was the Tremelo Sand Frog although some of the other toad species such as Olive Toad are also likely to occur in the area. Given the scarcity of important amphibian habitats at the site i.e. lack of any natural permanent water sources and the low diversity of amphibians, a significant impact on frogs is unlikely.

3.3.1.3 Bats

The topography of the site consists of a series of rolling ridges with generally gentle to moderate slopes and hill pediment areas characteristic of an open shrubveld with a well-developed grass layer. The dominant vegetation type around the proposed turbine ridges is Kuruman Mountain Bushveld with Kuruman Thornveld occurring on the ridge edges, along the sloping hills and in the valleys. The latter is typical of a closed shrub layer and well-developed open tree stratum dominated by *Acacia erioloba*. The abundance of trees provides roosting and foraging for several insectivorous bat species. Geologically the area consists of Campbell Group dolomite and chert, as well as mostly younger, superficial Kalahari Group sediments with red wind-blown sand which forms rocky pavements in some places. The landscape

features provide roosting space for bat species inhabiting rock crevices, outcrops and hollows, while the grassland provides opportunities for open-air foraging bat species.

The project falls within the actual or predicted distribution range of approximately nine bat species (African Chiroptera Report 2016; Monadjem *et al*. 2010). Analysis of the acoustic monitoring data confirmed the presence of at least five species of bat on site (Table 3.2). The sensitivity of each of these species to the project is a function of their conservation status and the likelihood of risk of fatality to these species from WEF development. The likelihood of risk to impacts of wind energy facility was determined from the South African Good Practice Guidelines for Surveying Bats in Wind Energy Facility Developments, as well as South African Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy Facilities and is based on the foraging and flight ecology of bats and migratory behaviour.

Pre-construction bird monitoring is currently undertaken for the site and a marked decrease in bat activity was found with an increase in altitude on site (e.g. low-lying areas compared to hilltops), therefore larger turbines with a higher minimum rotor swept height will decrease the probability of bat mortalities due to moving blades (Marais, 2018).

Table 3.2: Bat Species recorded at the proposed WEF site and their sensitivity to WEFs

Species	Species Code	# of Bat Passes	Conservation Status		Likelihood of Risk
			National	Regional	
Egyptian free-tailed bat *Tadarida aegyptiaca*	EFB	14,813	Least Concern	Least Concern	High
Roberts's flat-headed bat *Sauromys petrophilus*	RFB	894	Least Concern	Least Concern	High
Natal long-fingered bat *Miniopterus natalensis*	NLB	1,749	Near Threatened	Least Concern	Medium-High
Cape serotine *Neoromicia capensis*	CS	5,983	Least Concern	Least Concern	Medium-High
Long-tailed serotine *Eptesicus hottentotus*	LTS	135	Least Concern	Least Concern	Medium
Dent's horseshoe bat *Rhinolophus denti*	DeHB	395	Near Threatened	Near Threatened	Low
Geoffroy's horseshoe bat *Rhinolophus clivosus*	GHB		Near Threatened	Least Concern	Low
Darling's horseshoe bat *Rhinolophus darlingi*	DaHB		Near Threatened	Least Concern	Low
Egyptian slit-faced bat *Nycteris thebaica*	ESB	tbc	Least Concern	Least Concern	Low

3.3.1.4 Birds

It is important to note that the proposed development site does not fall within an Important Bird Area (IBA). The proposed WEF development area is situated in the savanna biome and consists of a series of parallel ridges with a general south-east to north-west orientation, known as the Kuruman Mountains, interspersed with broad valleys. The ridges consist of gentle slopes covered in short grassland with an open shrub layer, and a few exposed rocky ridges, whereas the valleys are covered in tall grassland on red Kalahari sands with scattered trees. The variety in vegetation types can explain the distribution and

abundance of an estimated 201 bird species that could potentially occur in the study area, of which 133 were recorded at the proposed WEF development area during pre-construction bird monitoring. Of the 201 species that could occur on site, 18 are classified as priority species for wind farm developments (Retief *et al.* 2012). Priority species associated with savanna which occur or could potentially occur in the study area include for example the African Rock Pipit (slopes), Black Harrier, Black-chested Snake-Eagle, Double-Banded Courser, Greater Kestrel, Grey-winged Francolin (slopes), Jackal Buzzard, Kori Bustard, Lesser Kestrel, Martial Eagle, Southern Pale Chanting Goshawk, Spotted Eagle-Owl, Verreaux's Eagle (slopes), Steppe Buzzard, Lanner Falcon and Northern Black Korhaan (valleys).

Surface water is of specific importance to avifauna in this semi-arid study area. The proposed WEF development area contains several boreholes with water troughs and a number of small, man-made farm dams. Priority species that could attracted to surface water are mostly raptors such as Jackal Buzzard, Steppe Buzzard, Black Harrier, Black-chested Snake-Eagle, Greater Kestrel, Lanner Falcon, Martial Eagle and Verreaux's Eagle. High voltage lines are an important potential roosting and breeding substrate for large raptors in the study area and although there are no existing high voltage lines crossing the actual WEF development area, the Mercury – Ferrum 400kV line crosses the study area to the north of the proposed WEF development area, running more or less parallel to the N14 national road. The Moffat – Valley 66kV distribution line runs east and south of the WEF development area and terminates at the Valley Substation in the study area. The Gryppoort - Valley 66kV distribution line enters the study area from the south and terminates at the Valley Substation. These powerlines, as well as a number of smaller reticulation lines and telephone lines are used as perches by priority species such as Lesser Kestrel, Jackal Buzzard, Steppe Buzzard, Black Harrier, Black-chested Snake-Eagle, Greater Kestrel, Lanner Falcon, Martial Eagle and Verreaux's Eagle. No raptor nests were recorded on any of the powerlines in the study area.

The overall abundance of priority species at the WEF development area is very low. The sensitive areas that have been identified from a bird impact perspective are areas of surface water and ridge edges. A 300 m no-turbine-zone (other infrastructure allowed) is recommended around all areas of surface water to reduce the risk of collisions for priority species, particularly raptors which are attracted to the surface water to drink and bath. A 100 m 'no turbine' setback buffer zone (other infrastructure allowed) is recommended around selected ridge edges to reduce the risk of collisions for soaring raptors.

3.3.2 Heritage, Archaeology and Palaeontology Profile

The Kuruman Hills have historically been used for small scale pastoralist farming activities with goats and sheep, a practice which extends back possibly as much as 2,000 years ago when Khoekhoe herders first entered the area. Three sites with possible herder art were found in association with Later Stone Age artefact assemblages on the Tierkop farm during a survey undertaken by Dave Halkett and Jayson Orton in 2009, when investigating the potential impacts of iron and manganese ore mining on Bramcote farm (No. 446) which is located to the south of the Kuruman WEF Phase 1 development site. However, the proposed WEF Phase 1 development area itself has not been previously surveyed to determine the presence of any sites or structures of heritage, archaeological or palaeonlotigcal value. It is therefore anticipated that similar findings such as ruined farm infrastructure, possible old mines, open site scatters of artefacts representative of Early, Middle and Later Stone Ages, and possibly more rock art sites in overhangs could be made on site. Also, a number of visual impacts in terms of the cultural landscape encompassed by the inner valley and boundary hills containing the proposed WEF should also be further assessed. The Wonderwerk Cave, a National Heritage Site containing archaeological traces stretching back over 2 million years, is located approximately 25 km to the southeast of the proposed WEF (Wiltshire, 2018).

The proposed WEF development footprint is geologically underlain by Precambrian sediments and lavas of the Transvaal Supergroup, including the Ghaap Group (marine carbonates of the Campbell Rand Subgroup followed by banded iron formations of the Asbestos Hills Subgroup) and Postmasburg Group (Ongeluk Formation lavas). Most of these rock units are of low palaeontological sensitivity. However, the Campbell Rand carbonates near Kuruman may be stromalite-rich and therefore of high sensitivity. Late Caenozoic superficial sediments include windblown sands (Kalahari Group), colluvial and other surface gravels, alluvium and pedocretes (e.g. calcretes). Most of these younger sediments are of low sensitivity but older alluvial deposits along major drainage lines, as well as calcretes need to be inspected for fossils (e.g. mammalian remains).

A complete Heritage Impact Assessment (which includes archaeology and palaeontology) assessing the potential impacts to cultural landscape character, secondary (and possibly primary) impacts on built environment resources, archaeological resources, graves and burial grounds, as well as fossil and mining heritage will be included in the EIA Phase.

3.4 Environmental Sensitivity Map

Based on the sensitivities identified on site by the specialists to date in their scoping inputs, an environmental sensitivity map has been compiled for the development footprint of the proposed Kuruman WEF (Figure 3.11). The sensitivities will be considered and refined during the EIA phase through final specialist studies which will be included in the EIA Report.

Figure 3.11: Environmental Sensitivity Map for the proposed Kuruman WEF Phase 1 (site's boundary indicated in blue).

3.5 Socio-Economic Environment

The available data used to compile the socio-economic baseline for the Kuruman area and surrounds, although not exhaustive, is interpreted in terms of professional opinion and is indicative of generally accepted trends within the study area and South Africa.

3.5.1 Demographic and Economic Profile

The Ga-Segonyana Local Municipality (LM) has a population of approximately 96 297, with a total of 93 651 households (Stats SA, 2017). This is indicative of an average household size of 3.5 in the municipality. The Ga-Segonyana LM constitutes 8% of the provincial population and two-fifths of the John Taolo Gaetsewe District Municipality (DM) population, making it the largest in the district. Furthermore, 44% of the total households in the John Taolo Gaetsewe DM are located in the Ga-Segonyana LM. The average population growth rate over the past five years has been just over 1%, indicative of stagnant to slow population growth. This could be attributed to the closure of mines and limited job opportunities thus resulting in limited in-migration of job seekers and migrant labour.

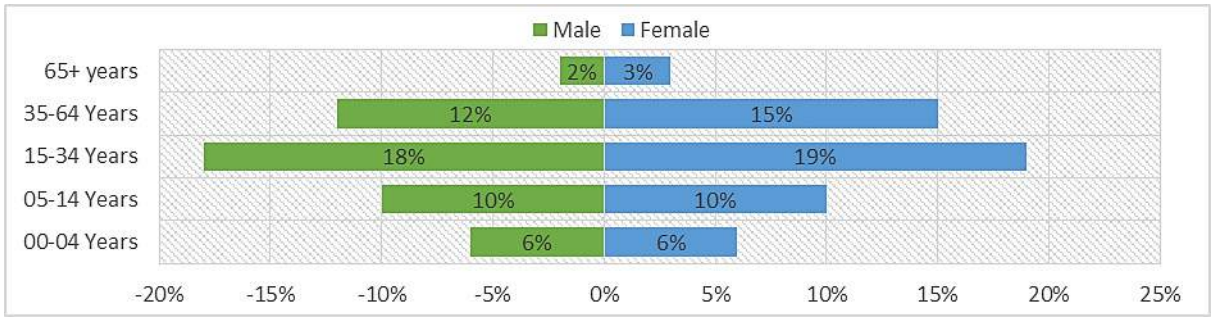

Figure 3.12: Population gender pyramid by age groups for the Ga-Segonyana Local Municipality (Ga-Segonyana LM IDP, 2017-2018)

A large portion of the population (85%) reside in tribal areas, followed by 14% located in urban areas, and the remaining 1% reside on farm land (Stats SA, 2017). In the zone of influence, the population density is concentrated in the closest town, Kuruman and the villages of Mothibistadt, Ga-Motlhware, Bankhara Bodulong and Wrenchville. The majority of residents in the Ga Segonyana LM (87%) are Black, 8% are Coloured and 4% are White. Setswana is the most commonly used language in the municipality followed by Afrikaans (Stats SA, 2017).

Within the Ga Segonyana Local Municipality, several sectors contribute to the municipality's economy and the Gross Domestic Product (GDP). These sectors include, amongst others agriculture, mining, manufacturing, electricity, gas and water, construction, trade, transport and communications. From 2006 to 2016, the municipality's economy grew at a positive compounded annual growth rate (CAGR) of 3% per annum and contributes a quarter to the economy of the John Taolo Gaetsewe DM, as well as 6% to the economy of the Northern Cape Province (Table 3.3).

Economic activities currently characteristic of the proposed development area are mainly agriculture, specifically game farming and hunting, and tourism related. Adjacent land uses include livestock farming and irrigated crop production.

Table 3.3: GDP Contributions of the Northern Cape and Ga-Segonyana LM (*Source: Broughton, 2018*)

Economic Sector	Northern Cape (GDP in 2010 prices)			Ga-Segonyana LM (GDP in 2010 prices)		
	GDP (R'mil)	% of GDP	CAGR (2010-2016)	GDP (R'mil)	% of GDP	CAGR (2010-2016)
Agriculture, forestry and fishing	R10 908	9%	0%	R371	5%	3%
Mining and quarrying	R30 141	25%	2%	R1 880	26%	3%
Manufacturing	R7 479	6%	0%	R500	7%	1%
Electricity, gas and water	R3 973	3%	2%	R215	3%	1%
Construction	R5 260	4%	2%	R390	5%	3%
Trade	R12 892	11%	2%	R905	13%	3%
Transport and communication	R12 688	11%	3%	R730	10%	5%
Finance and business services	R16 760	14%	3%	R988	14%	5%
General government	R14 369	12%	2%	R726	10%	1%
Personal services	R6 003	5%	3%	R397	6%	3%
TOTAL	**R120 473**	**100%**	**2%**	**R7 101**	**100%**	**3%**

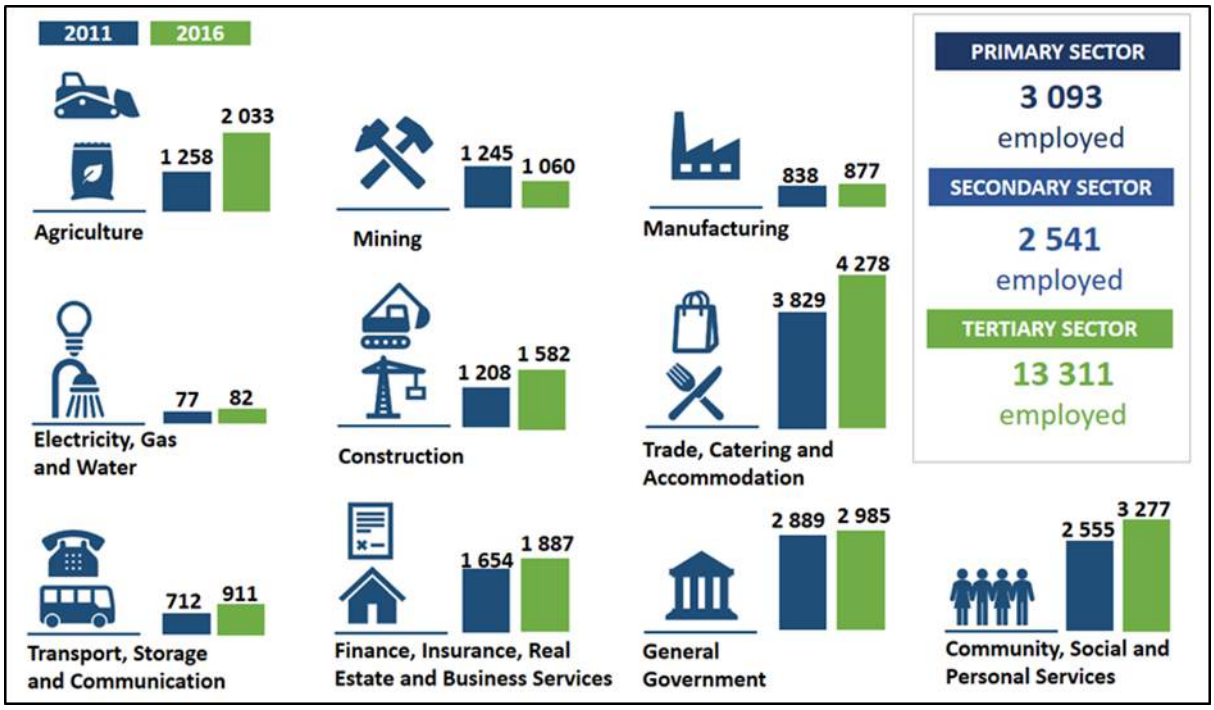

Figure 3.13: Employment profile per economic sector compared between 2011 and 2016 in the Ga-Segonyana LM (*Source: Broughton, 2018*)

Figure 3.14: Status of service delivery in the Ga-Segonyana LM (*Source: Broughton, 2018*)

Kuruman

The town of Kuruman, named after the Chief who lived in the area called Kudumane and currently the main business / services centre of the Ga-Segonyana municipal area, was at first a mission station of the London Missionary Society founded by Robert Moffat in 1821. It is known for its scenic beauty and the 'Eye of Kuruman', a geological feature i.e. mineral spring that brings water from deep underground and gives about 20 million litres of water daily to approximately 10 000 inhabitants. Kuruman is regarded as the "Oasis of the Kalahari" with this spring also known as 'Die Oog' (in Afrikaans) or 'Gasegonyane' (in Setswana) of the Kalahari region (Ga-Segonyana Local Municipality: 2017/18 IDP). In 2011, Kuruman had 3 188 households with 13 057 residents (Broughton, 2018). Kuruman is situated on a main route between Gauteng and Namibia/Cape Town via Upington. This route is growing in popularity because of the unspoilt nature and wide variety of tourist attractions found on the route. As a result, the Ga-Segonyana LM is experiencing a growth in game-related tourism with a particular emphasis on hunting.

Asbestos

Historically the larger Kuruman area has been mined for iron ore and asbestos (John Taolo Gaetsewe DM SDF, 2017). The mining of iron ore, an ongoing activity occurs towards the south west of the study area (mainly around Kathu) where large quantities of iron ore are still being mined from rocks characteristic of the geological Griquatown Group. Earlier mining of asbestos from rocks of the same geological formation in the vicinity of Kuruman and surrounds was ceased in 2002 and although all of these asbestos mines have been decommissioned, there might still be an ongoing risk of contamination through exposure to remaining mine dumps. The proposed WEF development site is located in close proximity to several rehabilitated, partially rehabilitated and un-rehabilitated asbestos mines, all of which continue to pose potential health risks to surrounding communities and land uses (Liebenberg-Weyers, 2010). Due to the carcinogenic nature of asbestos, numerous diseases can result from exposure to the asbestos fibres in the soil for prolonged periods. Asbestosis is an occupational disease confined to the workplace wherein continuous inhalation of asbestos fibres weaken the lungs. However, an additional disease linked to asbestos is Mesothelioma, which occurs as a result of trivial exposure to asbestos fibres (Journeyman.tv, 2002). In light of the latter, it is important to note the potential health risk that residual asbestos exposure within the proposed development area could have on workers during the construction and operational phases of the proposed WEF project.

MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 1 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report

CHAPTER 4:

Approach to EIA Process and Public Participation

CONTENTS

TABLES

4 APPROACH TO EIA PROCESS AND PUBLIC PARTICIPATION

This chapter presents the EIA Process to be conducted for the proposed development and gives particular attention to the legal context and guidelines that apply to this EIA, the steps in the Scoping and Public Participation component of the EIA (in accordance with Regulations 41, 42, 43 and 44 of GN R326 of the NEMA 2014 EIA Regulations, as amended), and the schedule for the EIA Process.

4.1 Legal Context for this EIA

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 R327, R326, R325 and R324 in Government Gazette 40772, dated 7 April 2017. The relevant Government Notices published in terms of the NEMA collectively comprise the NEMA EIA Regulations listed activities that require either a Basic Assessment, or Scoping and EIA (that is a "full EIA") be conducted. As noted in Chapter 1 of this Scoping Report, the proposed project requires a full EIA, as it particularly includes, *inter alia*, the inclusion of Listed Activity Number 1 in GN R325:

- *"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 facilities or infrastructure is for photovoltaic installations and occurs within an urban area, or, on existing infrastructure".*

All the listed activities forming part of this proposed development and therefore requiring EA are included in the Application Form for EA that has been prepared and has been submitted to the DEA with this Draft Scoping Report. The listed activities triggered by the proposed Kuruman WEF are indicated in Table 4.1.

Table 4.1: Listed Activities in GN R327 and GN R325 that will be potentially triggered by the proposed Kuruman Wind Energy Facility

Listed Activity Number	Listed Activity Description	Description of the project activity that potentially triggers the relevant listed activity
GN R327		
Activity 11	The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	The proposed project will entail the construction of a 132 kV on-site substation and underground cabling (22/33kV) to connect the proposed WEF to it. The proposed facility is situated outside of the urban edge. This activity would therefore be triggered.
Activity 12 (x) and (xii)	The development of- (x) buildings exceeding 100 square metres in size; (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- a) within a watercourse; b) in front of a development setback; or c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	The proposed WEF will entail the construction of the WEF and associated infrastructure (such as wind turbines/hardstands, offices, workshop, ablution facilities, on-site substation, laydown area and security enclosures etc.) Based on the Freshwater Assessment undertaken for the Scoping Phase, drainage lines were identified on site. The buildings and infrastructure are expected to exceed a footprint of 100 m^2 with some infrastructure or structures occurring within a watercourse (drainage line) or 32 m of watercourses. The proposed project will take place outside of an urban area. This activity would therefore be triggered. Additional information regarding the presence of watercourses on site is provided in the Freshwater Scoping Report, which is attached to this report as Appendix E4.
Activity 14	The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	The storage of diesel and fuel in containers during construction phase for construction machinery and trucks may potentially trigger this listed activity. The applicability of this activity will be confirmed during the EIA Phase.
Activity 19 (i)	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from (i) a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving- a) will occur behind a development setback; b) is for maintenance purposes undertaken in accordance with a maintenance management plan; c) falls within the ambit of activity 21 in this	The proposed project will entail the excavation, removal and moving of more than 10 m^3 of soil, sand, pebbles or rock from the nearby watercourses. The proposed project would also entail the infilling of more than 10 m^3 of material into the nearby watercourses. Based on the scoping inputs provided by the Freshwater specialist, watercourses occur on the farms. Construction of the internal gravel access road and/or the construction of infrastructure within drainage lines will of material. The activity would therefore be triggered.

Listed Activity Number	Listed Activity Description	Description of the project activity that potentially triggers the relevant listed activity
	Notice, in which case that activity applies. d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or e) where such development is related to the development of a port or harbor in which case activity 26 in Listing Notice 2 of 2014 applies.	*Additional information regarding the presence of watercourses on site is provided in the Freshwater Scoping Report, which is attached to this report as Appendix E4.*
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; but excluding a road– a) which is identified and included in activity 27 in Listing Notice 2 of 2014; or b) where the entire road falls within an urban area; or which is 1 km or shorter.	The proposed main route will be along the R31 (Voortrekker Road) and the N14 (Hoof Street). The proposed Kuruman WEF can be accessed via the D3441. No existing access road currently exists along D3441 to the proposed WEF site. An access road wider than 8 m in some sections may be constructed via the D3441.
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 Kuruman WEF which is considered to be a commercial/industrial development will have an estimated footprint of approximately 580 ha. This activity would therefore be triggered.
Activity 56	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; excluding where widening or lengthening occur inside urban areas.	Existing roads may be widened by more than 6 m in some places to provide access the WEF site. This activity would therefore be triggered.
GN R325		
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 facilities or infrastructure is for PV installations and occurs (a) within an urban area or; (b) on existing infrastructure.	The proposed project will entail the construction of a WEF with a maximum of 47 wind turbines (i.e. facilities for the generation of more than 20 MW of electricity from a renewable resource) and be located outside an urban area. This activity would therefore be triggered.

Listed Activity Number	Listed Activity Description	Description of the project activity that potentially triggers the relevant listed activity
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 Kuruman WEF will have an estimated footprint of 580 ha. As a result, more than 20 ha of indigenous vegetation will be removed for the construction of the proposed WEF. This activity would therefore be triggered.
GN R324		
Activity 4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. (g) In the 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;	An internal gravel road wider than 8 m at some sections will be constructed to provide access to the proposed project site via the D3441. The northern part of the site is located within a CBA 2 which forms a buffer area around the Billy Duvenhage Nature Reserve. The majority of the footprint of the development is however within an Ecological Support Area. The footprint within the CBA 2 area is low and a significant impact on the CBA is not likely. In addition, it is unlikely that the development would compromise the functioning of the ESA.
Activity 10	The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 30 cubic metres or more but not exceeding 80 cubic metres.	The storage of diesel and fuel in containers during construction phase for construction machinery and trucks may potentially trigger this listed activity. The applicability of this activity to be confirmed during the EIA Phase.
Activity 12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (g) In the Northern Cape (ii) Within critical biodiversity areas identified in bioregional plans;	The proposed facility's development footprint will result in more than 300 square meters of indigenous vegetation removed. The northern part of the site is located within a CBA 2 which forms a buffer area around the Billy Duvenhage Nature Reserve. The majority of the footprint of the development is however within an Ecological Support Area. The footprint within the CBA 2 area is low and a significant impact on the CBA is not likely.
Activity 14	The development of: (xi) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs- d) within a watercourse; e) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; (g) In the Northern Cape	The proposed WEF will entail the construction of building infrastructure and structures (such as wind turbines, offices, workshop, ablution facilities, on-site substation, laydown area and security enclosures etc.). Based on the preliminary sensitivity screening undertaken for the site, drainage features occur on site and the buildings and infrastructure exceeding a footprint of 100 m^2 and will occur within 32 m of the watercourses. The northern part of the site is located within a CBA 2 which forms a buffer area around the Billy Duvenhage Nature Reserve. The majority of the

Listed Activity Number	Listed Activity Description	Description of the project activity that potentially triggers the relevant listed activity
	(ii) Outside Urban Areas: (bb) National Protected Area Expansion Strategy Focus areas (ff) Critical biodiversity areas or ecosystem service areas as identified in in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	footprint of the development is however within an Ecological Support Area. The footprint within the CBA 2 area is low and a significant impact on the CBA is not likely. In addition, it is unlikely that the development would compromise the functioning of the ESA. The proposed project will take place outside of an urban area. This activity would therefore be triggered.
Activity 18	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 in systematic biodiversity plans adopted by the competent authority or in bioregional plans. (gg) Areas within 10 km from national parks or world heritage sites or 5 km from any protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve. (ii)Areas within a watercourse or wetland; or within 100 meters from the edge of a watercourse or wetland.	An internal gravel road may be widened by more than 4 m in some sections to provide access to the proposed project site. The northern part of the site is located within a CBA 2 which forms a buffer area around the Billy Duvenhage Nature Reserve. The majority of the footprint of the development is however within an Ecological Support Area. The footprint within the CBA 2 area is low and a significant impact on the CBA is not likely. In addition, it is unlikely that the development would compromise the functioning of the ESA and with the appropriate mitigation, the development of a wind energy facility is considered compatible with the aims and objectives of ESAs, at least from a terrestrial biodiversity point of view.

Notes regarding the identification of potential listed activities:

- *It should be noted that a precautionary approach was followed when identifying listed activities (for inclusion in the Application for EA and to be assessed as part of the Scoping and EIA Process), i.e. if the activity potentially forms part of the project, it is listed. However, the final project description will be shaped by the findings of the EIA Process and certain activities may be added or removed from the project proposal.*
- *The relevant listed activities applicable to the construction of the proposed transmission lines and associated electrical infrastructure at the Ferrum or Segame substation will be included in the **separate BA Report** and the Application for EA for the BA Process. As mentioned previously, the Applications for EA for the BA Processes will be lodged with the DEA during the EIA Phase, in order to comply with the timeframes stipulated in Regulation 19 (1) of GN R326.*

4.2 Legislation and Guidelines Pertinent to this EIA

The scope and content of this Scoping Report has been informed by the following legislation, guidelines and information series documents:

4.2.1 National Legislation

4.2.1.1 The Constitution of the Republic of South Africa (Act 108 of 1996)

The Constitution, which is the supreme law of the Republic of South Africa, provides the legal framework for legislation regulating environmental management in general, against the backdrop of the fundamental human rights. Section 24 of the Constitution 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 –
    - prevent pollution and ecological degradation;
    - promote conservation; and
    - secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

Section 24 of the Bill of Rights therefore guarantees the people of South Africa the right to an environment that is not detrimental to human health or well-being, and specifically imposes a duty on the State to promulgate legislation and take other steps that ensure that the right is upheld and that, among other things, ecological degradation and pollution are prevented.

In support of the above rights, the environmental management objectives of proposed project is to protect ecologically sensitive areas and support sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development in the towns nearest to the project site.

4.2.1.2 NEMA and EIA Regulations published on 8 December 2014 (as amended on 7 April 2017; GN R327, GN R326, GN R325 and GN R324)

The NEMA sets out a number of principles (Chapter 1, Section 2) to give guidance to developers, private land owners, members of public and authorities. The proclamation of the NEMA gives expression to an overarching environmental law. Various mechanisms, such as cooperative environmental governance, compliance and non-compliance, enforcement, and regulating government and business impacts on the environment, underpin NEMA. NEMA, as the primary environmental legislation, is complemented by a number of sectoral laws governing marine living resources, mining, forestry, biodiversity, protected areas, pollution, air quality, waste and integrated coastal management. Principle number 3 determines that a development must be socially, environmentally and economically sustainable. Principle Number 4(a) states that all relevant factors must be considered, *inter alia* i) that the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied; vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised; and viii) that negative impacts on the environment and on peoples' environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.

4.2.1.3 National Environmental Management: Biodiversity Act (Act 10 of 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for "the management and conservation of South Africa's biodiversity within the framework of the NEMA, the protection of species and ecosystems that warrant national protection, and the use of indigenous biological resources in a sustainable manner, amongst other provisions". The Act states that the state is the custodian of South Africa's biological diversity and is committed to respect, protect, promote and fulfil the constitutional rights of its citizens.

Furthermore, NEMBA states that the loss of biodiversity through habitat loss, degradation or fragmentation must be avoided, minimised or remedied. The loss of biodiversity includes *inter alia* the loss of threatened or protected species.

Chapter 5 of NEMBA (Sections 73 to 75) regulates activities involving invasive species, and lists duty of care as follows:

- the land owner/land user must take steps to control and eradicate the invasive species and prevent their spread, which includes targeting offspring, propagating material and regrowth, in order to prevent the production of offspring, formation of seed, regeneration or re-establishment;
- take all required steps to prevent or minimise harm to biodiversity; and
- ensure that actions taken to control/eradicate invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.

An amendment to the NEMBA has been promulgated, which lists 225 threatened ecosystems based on vegetation types present within these ecosystems. Should a project fall within a vegetation type or ecosystem that is listed, actions in terms of NEMBA are triggered. Based on the preliminary sensitivity screening undertaken for the proposed site, none of the threatened ecosystems occur within the study area. However the site provides habitat to numerous Species of Conservation Concern (SCC). This will be confirmed as part of the Ecological Impact Assessment undertaken during the EIA Phase.

4.2.1.4 The National Heritage Resources Act (Act 25 of 1999)

The National Heritage Resources Act (Act 25 of 1999) (NHRA) introduces an integrated and interactive system for the managements of national heritage resources (which include landscapes and natural features of cultural significance).

Parts of sections 35(4), 36(3) (a) and 38(1) (8) of the NHRA apply to the proposed project:

Archaeology, palaeontology and meteorites:
Section 35 (4) No person may, without a permit issued by the responsible heritage resources authority:

a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
c) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

Burial grounds and graves:
Section 36 (3) (a) No person may, without a permit issued by South African Heritage Resources Agency (SAHRA) or a provincial heritage resources authority:

a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

Heritage resources management:
38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as:

a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
b) the construction of a bridge or similar structure exceeding 50 m in length;
c) any development or other activity which will change the character of the site –
    (i) exceeding 5000 m^2 in extent, or
    (ii) involving three or more erven or subdivisions thereof; or
    (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
    (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA, or a provincial resources authority;
d) the re-zoning of a site exceeding 10 000 m^2 in extent; or
e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list "historical settlements and townscapes" and "landscapes and natural features of cultural significance" as part of the National Estate. Furthermore, Section 3(3) describes the reasons a place or object may have cultural heritage value. Section 38 (2a) of the NHRA states that if there is reason to believe that heritage resources will be affected then an impact assessment report must be submitted.

A Heritage Impact Assessment (including Archaeology and Cultural Landscape) and a desktop Palaeontological Impact Assessment will be undertaken as part of the EIA process. These relevant specialist studies will be released to I&APs for review during the EIA Phase.

Ngwao-Boswa Ya Kapa Bokoni (Heritage Northern Cape) and the SAHRA are required to provide comment on the proposed project in order to facilitate final decision-making by the DEA. To this end and to facilitate comment from the relevant heritage authorities, the proposed project has been loaded onto the South African Heritage Resources Information System (SAHRIS) for comment.
Once a final comment has been issued by the heritage authority, the recommendations should be included in the conditions of the EA (should it be granted). This will essentially give 'permission' from the heritage authorities to proceed. If any archaeological mitigation is required then this would need to be conducted by an appropriate specialist under a permit issued to that specialist by SAHRA. This permit has no bearing on the developer or development but is purely a way in which the heritage authority can be sure that the mitigation work will be carried out satisfactorily.

4.2.1.5 National Forests Act (Act 84 of 1998)

The National Forest Act (Act 84 of 1998) allows for the protection of certain tree species. The Minister has the power to declare a particular tree to be a protected tree. According to Section 12 (1) d (read with Sections (5) 1 and 62 (2) (c)) of the National Forest Act (Act 84 of 1998), a licence is required to remove, cut, disturb, damage or destroy any of the listed protected trees. The most recent list of protected tree species was published in November 2014. The Department of Agriculture, Forestry and Fisheries (DAFF) is authorised to issue licences for any removal, cutting, disturbance, damage to or destruction of any protected trees. The removal of *Acacia erioloba* or any other tree listed within the National Forest Act (NFA) 84 of 1998 at watercourse crossing points will require a tree removal permit which can be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF).

4.2.1.6 Conservation of Agricultural Resources Act (Act 43 of 1983)

The objectives of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) are to provide for the conservation of the natural agricultural resources of South Africa by the:

- maintenance of the production potential of land;
- combating and prevention of erosion and weakening or destruction of the water sources; and
- protection of the vegetation and the combating of weeds and invader plants.

The CARA states that no land user shall utilise the vegetation of wetlands (a watercourse or pans) in a manner that will cause its deterioration or damage. This includes cultivation, overgrazing, diverting water run-off and other developments that damage the water resource. The CARA includes regulations on alien invasive plants. According to the amended regulations (GN R280 of March 2001), declared weeds and invader plants are divided into three categories:

- Category 1 may not be grown and must be eradicated and controlled,
- Category 2 may only be grown in an area demarcated for commercial cultivation purposes and for which a permit has been issued, and must be controlled, and
- Category 3 plants may no longer be planted and existing plants may remain as long as their spread is prevented, except within the flood line of watercourses and wetlands. It is the legal duty of the land user or land owner to control invasive alien plants occurring on the land under their control.

Should alien plant species occur within the study area; this will be managed in line with the EMPr. Rehabilitation after disturbance to agricultural land is also managed by CARA. The DAFF reviews and approves applications in terms of these Acts according to their Guidelines for the evaluation and review of applications pertaining to renewable energy on agricultural land, dated September 2011.

4.2.1.7 National Water Act (Act 36 of 1998)

One of the important objectives of the National Water Act (Act 36 of 1998) (NWA) is to ensure the protection of the aquatic ecosystems of South Africa's water resources. Section 21 of this Act identifies certain land uses, infrastructural developments, water supply/demand and waste disposal as 'water uses' that require authorisation (licensing) by the Department of Water and Sanitation (DWS). Chapter 4 (Part 1) of the NWA sets out general principles for the regulation of water use. Water use is defined broadly in the NWA, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering the bed, banks, course or characteristics of a watercourse, removing water found underground for

certain purposes, and recreation. In general a water use must be licensed unless it is listed in Schedule I, is an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a licence. The Minister may limit the amount of water which a responsible authority may allocate. In making regulations the Minister may differentiate between different water resources, classes of water resources and geographical areas.

All water users who are using water for agriculture: aquaculture, agriculture: irrigation, agriculture: watering livestock, industrial, mining, power generation, recreation, urban and water supply service must register their water use. This covers the use of surface and ground water.

Section 21 of the Act lists the following water uses that need to be licensed:

a) taking water from a water resource;
b) storing water;
c) impeding or diverting the flow of water in a watercourse;
d) engaging in a stream flow reduction activity contemplated in section 36;
e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
g) disposing of waste in a manner which may detrimentally impact on a water resource;
h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
i) altering the bed, banks, course or characteristics of a watercourse;
j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
k) using water for recreational purposes.

Any activities that take place within a water course or within 500 m of a wetland boundary require a Water Use Licence (WUL) under the Section 21 (c) and Section 21 (i) of the NWA. The proposed Kuruman WEF requires a WUL and the relevant application will be submitted to DWS. Depending on the nature of the activity a General Authorisation (GA) may be required. An Authorisation will be required if groundwater is abstracted.

4.2.1.8 Subdivision of Agricultural Land Act (Act 70 of 1970)

A change of land use (re-zoning) for the development on agricultural land needs to be approved in terms of the Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA). This is required for long term lease, even if no subdivision is required.

4.2.1.9 Development Facilitation Act (Act 67 of 1995)

The Development Facilitation Act (Act 67 of 1995) (DFA) sets out a number of key planning principles which have a bearing on assessing proposed developments in light of the national planning requirements. The planning principles most applicable to the study area include:

- Promoting the integration of the social, economic, institutional and physical aspects of land development;
- Promoting integrated land development in rural and urban areas in support of each other;
- Promoting the availability of residential and employment opportunities in close proximity to or integrated with each other;

- Optimising the use of existing resources including such resources relating to agriculture, land, minerals, bulk infrastructure, roads, transportation and social facilities;
- Contributing to the correction of the historically distorted spatial patterns of settlement in the Republic and to the optimum use of existing infrastructure in excess of current needs;
- Promoting the establishment of viable communities; and
- Promoting sustained protection of the environment.

4.2.1.10 Other Applicable Legislation

Other applicable national legislation that may apply to the proposed project include:

- Electricity Act (Act 41 of 1987);
- Electricity Regulations Amendments (August 2009);
- Energy Efficiency Strategy of the Republic of South Africa (Department of Minerals and Energy (DME) now operating as Department of Mineral Resources (DMR), March, 2005);
- Promotion of Administrative Justice Act (Act 2 of 2000);
- Civil Aviation Act (Act 13 of 2009) and Civil Aviation Regulations (CAR) of 1997;
- Civil Aviation Authority Act (Act 40 of 1998);
- White Paper on Renewable Energy (2003);
- Integrated Resource Plan for South Africa (2010);
- Occupational Health and Safety Act (Act 85 of 1993), as amended by Occupational Health and Safety Amendment (Act 181 of 1993);
- Road Safety Act (Act 93 of 1996);
- Fencing Act (Act 31 of 1963);
- National Environmental Management: Air Quality Act (Act 39 of 2004);
- National Environmental Management: Protected Areas Act (NEM:PA) (Act 31 of 2004);
- National Environmental Management: Waste Management Act (Act 59 of 2008); and
- National Road Traffic Act (Act 93 of 1996).

4.2.2 Provincial Legislation

4.2.2.1 Northern Cape Nature Conservation (Act 09 of 2009)

The Northern Cape Nature Conservation Act (Act 09 of, 2009) and in particular the Northern Cape Conservation: Schedule 2 – Specially Protected Species has reference to the proposed project. This Act aims at improving the sustainability in terms of balancing natural resource usage and protection or conservation thereof. It includes six schedules, as follow:

- Schedule 1 - Specially Protected species;
- Schedule 2 - Protected species;
- Schedule 3 - Common indigenous species;
- Schedule 4 - Damage causing animal species;
- Schedule 5 - Pet species; and
- Schedule 6 - Invasive Species.

With regard to protected flora, the Northern Cape Nature Conservation Act includes a list of protected flora. The plant species potentially present within the proposed project area will be identified as part of the Ecological Impact Assessment specialist study. However, it will be recommended as part of the EMPr, that a detailed plant search and rescue operation be conducted before the final design process and prior

to the commencement of the construction phase. If any of the listed species are found, the relevant permits should be obtained by the Project Applicant prior to their relocation or destruction. In addition, the Provincial Department of Environment and Nature Conservation (DENC) should be consulted on whether a permit is required for the clearance of indigenous vegetation on site. DENC have been pre-identified as a key stakeholder and therefore included on the project database (as shown in Appendix C of this Scoping Report).

4.2.2.2 The Provincial Spatial Development Framework for the Northern Cape (Office of the Premier of the Northern Cape, 2012)

The Provincial Spatial Development Framework (PSDF) prioritises the assessment of the feasibility and desirability of large scale wind energy projects on the coast. Furthermore there is considerable potential for wind energy in the Northern Cape (PGDS, July 2011), in particular, along the Namaqualand coast and in certain parts of the interior of the province.

The energy objectives included in the PSDF include the following:

- "Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts.
- In order to reinforce the existing transmission network and to ensure a reliable electricity supply in the Northern Cape, construct a 400 kV transmission power line from Ferrum Substation (near Kathu/Sishen) to Garona Substation (near Groblershoop). There is a national electricity supply shortage and the country is now in a position where it needs to commission additional plants urgently. Consequently, renewable energy projects are a high priority.
- Develop and institute innovative new energy technologies to improve access to reliable, sustainable and affordable energy services with the objective to realize sustainable economic growth and development. The goals of securing supply, providing energy services, tackling climate change, avoiding air pollution and reaching sustainable development in the province offer both opportunities and synergies which require joint planning between local and provincial government as well as the private sector.
- Develop and institute energy supply schemes with the aim to contribute to the achievement of the targets set by the White Paper on Renewable Energy (2003). This target relates to the delivery of 10 000 GWh of energy from renewable energy sources (mainly biomass, wind, solar, and small-scale hydro) by 2013".

The PSDF further states that renewable energy sources (e.g. wind, solar thermal, biomass, and domestic hydroelectricity generation) are to comprise 25% of the province's energy generation capacity by 2020. The spatial vision for the Northern Cape constitutes a coherently structured matrix of sustainable land-use zones that collectively support a dynamic provincial economy vested in the primary economic sectors, in particular, mining, agriculture, tourism, and the energy industry. Thus, the proposed project falls in line with the spatial development vision for the province.

4.2.3 Local Planning Legislation

4.2.3.1 John Taolo Gaetsewe Spatial Development Framework (John Taolo Gaetsewe District Municipality 2017)

The **vision** of the JTGDM SDF 2017 is that it will become a district in which all its residents…

• *… engage in viable and sustainable wealth-generating economic activities.*

The SDF states that a serious investment in and exploitation of renewable sources of energy will result in the district becoming self-reliant in the generation of electricity which will provide a sizeable injection into the national electricity grid.

The SDF notes that Strategic Integrated Project (SIP) 8 (Green Energy in support of the South African economy) of the National Infrastructure Plan (NIP, 2012) has significance to the JTGD with specific reference to mining development, provision of basic infrastructure and green energy (i.e. solar energy) respectively. Although solar energy is referenced specifically, wind energy is also a form of green energy and it is assumed that it would thus be supported by the SDF as it states that new energy sources must be investigated.

4.2.3.2 Ga-Segonyana Integrated Development Plan (Ga-Segonyana Local Municipality 2017-2018)

The Ga-Segonyana Local Municipality Integrated Development Plan (IDP) (2017-2018) recognises renewable energy projects (with an emphasis on solar PV projects) as potential new economic development opportunities. The development of the Kuruman WEF will therefore also be in line with the vision of the municipality to diversity the job market by creating sustainable economic growth and development opportunities.

One of the economic priority issues identified within the Ga-Segonyana Local Municipality Integrated Development Plan (IDP) (2017-2018) is the fairly high level of unemployment. Although close to three-quarters of the working age population in the Ga-Segonyana LM were employed in the formal sector and approximately 20% in the informal sector (Quantec Easy Data, 2017), the unemployment rate of 35% is much higher than the national unemployment rate. The IDP further states that the Local Municipality constitutes close to a quarter of the adult population with no schooling and are in need of employment opportunities. The proposed WEF project will create job opportunities and economic spin offs during the construction and operational phases (if an EA is granted by the DEA). It is estimated that approximately 420 employment opportunities will be created during the construction phase and approximately 35 during the operational phase. It should, however, be noted that employment during the construction phase will be temporary, whilst 25 employment opportunities being long-term during the operational phase.

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 project will therefore be supportive of the IDP's objective of facilitating job creation to address the high unemployment rate. during the construction phase will be temporary, whilst 25 employment opportunities being long-term during the operational phase.

4.2.3.3 Guidelines, Frameworks and Protocols

- Public Participation Guideline, October 2012 (Government Gazette 35769);
- DEADP and DEA Guidelines published in terms of the NEMA EIA Regulations, in particular:
  - Guideline on Alternatives (DEA, 2014);
  - Guideline on Transitional Arrangements (DEADP, March 2013);
  - Guideline on Alternatives (DEADP, March 2013);
  - Guideline on Public Participation (DEADP, March 2013);
  - National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008;

  - South African Good Practise Guidelines for Surveying Bats in Wind Energy Facility Developments – Pre-Construction (2016);
  - South African Good Practise Guidelines for Operational Monitoring for Bats at Wind Energy Facilities (2014);
  - Bird and Wind-Energy Best-Practice Guidelines. Best-Practice Guidelines for assessing and monitoring the impact of wind-energy facilities on birds in southern Africa (2015);
  - Guideline on Need and Desirability (DEADP, March 2013);
- Information Document on Generic Terms of Reference for EAPs and Project Schedules (March 2013);
- Integrated Environmental Management Information Series (Booklets 0 to 23) (Department of Environmental Affairs and Tourism (DEAT), 2002 – 2005);
- Guidelines for Involving Specialists in the EIA Processes Series (DEADP; CSIR and Tony Barbour, 2005 – 2007);
- United Nations Framework Convention on Climate Change (1997); and
- Kyoto Protocol (which South Africa acceded to in 2002).

4.2.4 International Finance Corporation Performance Standards

In order to promote responsible environmental stewardship and socially responsible development, the proposed Kuruman WEF will, as far as practicable, incorporate the environmental and social policies of the International Finance Corporation (IFC). These policies provide a frame of reference for lending institutions to review environmental and social risks of projects, particularly those undertaken in developing countries.

Through the Equator Principles, the IFC's standards are now recognised as international best practice in project finance. The IFC screening process categorises projects into A, B or C in order to indicate relative degrees of environmental and social risk. The categories are:

- *Category A* - Projects expected to have significant adverse social and/or environmental impacts that are diverse, irreversible, or unprecedented;
- *Category B* - Projects expected to have limited adverse social and/or environmental impacts that can be readily addressed through mitigation measures; and
- *Category C* - Projects expected to have minimal or no adverse impacts, including certain financial intermediary projects.

Accordingly, projects such as the proposed Kuruman WEF, are categorised as Category B projects. The EA Process for Category B projects examines the project's potential negative and positive environmental impacts and compares them with those of feasible alternatives (including the 'without project' scenario). As required for Category B projects a Scoping and EIA Process is being undertaken for the Kuruman WEF project.

Other Acts, standards and/or guidelines which may also be applicable will be reviewed in more detail as part of the specialist studies to be conducted for the EIA.

4.3 Principles for Scoping and Public Participation

The Public Participation Process (PPP) for this Scoping and EIA Process is being driven by a stakeholder engagement process that will include inputs from authorities, I&APs, technical specialists and the project proponent. Guideline 4 on "Public Participation in support of the EIA Regulations" published by 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 CA 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 as it:

- "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 processes;
- 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 briefing sessions, public meetings, written submissions or direct contact with members of the EIA 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, the PPP aims to generate issues that are representative of societal sectors, not each individual and will be designed to be inclusive of a broad range of sectors relevant to the proposed project; and

- 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.

4.4 Objectives of the Scoping Process

This Scoping Process is being planned and conducted in a manner that is intended to identify and provide sufficient information to enable the authorities to reach a decision regarding the scope of issues to be addressed in this EIA Process, and in particular to convey the range of specialist studies that will be included as part of the Environmental Impact Reporting Phase of the EIA, as well as the approach to these specialist studies.

As highlighted in Chapter 1 of this Scoping Report, within this context, the objectives of this Scoping Process (as per the 2014 EIA Regulations) are to:

- Identify and inform a broad range of stakeholders about the proposed development;
- Confirm the process to be followed and opportunities for stakeholder engagement;
- Clarify the project scope to be covered;
- Identify and confirm the preferred activity and technology alternative;
- Identify and confirm the preferred site for the preferred activity;
- Clarify the alternatives being considered and ensure due consideration of alternative options regarding the proposed development, including the "No-go" option;
- Conduct an open, participatory and transparent approach and facilitate the inclusion of stakeholder issues in the decision-making process;
- Identify and document the key issues to be addressed in the impact assessment phase (through a process of broad-based consultation with stakeholders) and the approach to be followed in addressing these issues; and
- Confirm the level of assessment to be undertaken during the impact assessment.

4.5 Tasks in the Scoping Phase

This section provides an overview of the tasks being undertaken in the Scoping Phase, with a particular emphasis on providing a clear record of the PPP followed. As discussed in Chapter 1 of this Scoping Report, a separate EIA process is being undertaken for the Kuruman Phase 2 WEF. Separate applications for Scoping and EIR have been submitted to DEA. A separate BA Process will also be undertaken for the construction of the proposed 132 kV transmission line to and associated electrical infrastructure at the Ferrum substation or at the Segame substation. The BA process will also constitute a separate application.

Even though separate applications will be submitted to the DEA for the Scoping and EIR as well as the BA processes and separate reports will be compiled for each, an integrated PPP will be followed. An integrated PPP for the proposed WEF and associated electrical infrastructure will entail that all public participation documents (such as newspaper advertisements, site notices, notification letters etc.) will serve to notify the public and organs of state of the joint availability of the EIA and BA reports for the abovementioned projects and will provide I&APs with an opportunity to comment on the reports. The

release of the BA and EIR reports for comment will be aligned to ensure that the relevant timeframes are met.

TASK 1: I&AP IDENTIFICATION, ANNOUNCEMENT OF THE PROJECT AND EIA PROCESS, REGISTRATION AND THE CREATION OF AN ELECTRONIC DATABASE

Prior to advertising the EIA Processes in the local print media an initial database of I&APs (including key stakeholders and organs of state) was developed for the Scoping Process. This was supplemented with input from the EIA Project Manager, CSIR, and the Project Applicant, Mulilo. Appendix C of this Scoping Report contains the current I&AP database. The I&APs on the current database have been informed of the availability of the Draft Scoping Report for comment.

The identification and registration of I&APs will be ongoing for the duration of the study. Stakeholders from a variety of sectors, geographical locations and/or interest groups can be expected to show an interest in the proposed project, for example:

- Local and Provincial Government Departments;
- Local interest groups, for example, Councillors and Rate Payers associations;
- Surrounding landowners;
- Farmer Organisations;
- Environmental Groups and NGOs; and
- Grassroot communities and structures.

In terms of the electronic database, I&AP details are being 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 Scoping Process will remain on the project database throughout the EIA Process and will be kept informed of all opportunities to comment and will only be removed from the database by request.

In order to notify and inform the public of the proposed project and invite I&APs to register on the project database, the project, BA and EIA Processes were advertised in one local newspaper (i.e. “Kathu Gazette” dated 24 February 2018), proof of which can be seen in Appendix D of the Draft Scoping Report**.**

Regulation 41 (2) (a) of the 2017 EIA Regulations requires that a notice board providing information on the project and EIA 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. To this end, site notice boards were placed at the farm gates and at various locations in Kuruman and at Kathu as reflected in Appendix D of this Draft Scoping Report.

TASK 2: ONGOING COMMUNICATION AND CAPACITY BUILDING

The process for this Scoping and EIA aims to ensure that people are involved from the outset, that we proactively solicit the involvement of stakeholders representing all three dimensions of sustainability (i.e. biophysical, social and economic dimensions), and that we provide them with sufficient and accessible information to contribute meaningfully to the process. In this manner, the PPP aims to build the capacity of stakeholders to participate.

In order to accommodate the varying needs of I&APs and develop their capacity to participate in the process, information sharing forms an integral and ongoing component of the EIA Process to ensure

effective public participation. The following provides an overview of how information sharing is being effected throughout the EIA Process in order to develop the capacity of I&APs to effectively engage in the PPP:

- **Website** – placing EIA related project information on the project website (i.e. https://www.csir.co.za/environmental-impact-assessment);
- **Language** – encouraging I&APs to use the language of their choice at meetings or during telephonic discussions and providing translations at meetings in Afrikaans, when required;
- **Newspaper Advertisements** - requesting I&APs to register their interest in the project, raise issues of concern or notifying I&APs of release of release of reports for public comment or of potential public meetings (if required to be held);
- **Letters to I&APs** - notifying them of the various stages of the EIA Process, availability of reports for comment and inviting them to attend potential public meetings (if required to be held). These letters will be sent via registered mail and email (where postal, physical and email addresses are available for I&APs and organs of state on the project database);
- **Report Distribution** – Electronic copies of the reports will be loaded continuously onto the project website as and when they become available and I&APs will be notified accordingly. Key organs of state will be provided with hard copies and/or electronic copies of the reports. In addition, hard copies of the Scoping, BA and EIA Reports will be provided at the local libraries for I&APs to access for viewing:
- Kuruman Public Library, Corner of Foskor & Voortrekker Street; and
- Kathu Public Library, 38 Kromhout Street, Kathu.

TASK 3: CONSULTATION WITH AUTHORITIES

All public participation documentation will reach the DEA, as well as other relevant authorities and organs of state included on the I&AP database. Additionally, consultation with relevant authorities on a one-on-one basis will be effected where necessary and notes from these meetings will be compiled summarising the main outcomes thereof.

Comments received on the Scoping Process from the authorities will be included in the Issues and Response Trail which will be included as an appendix to the Final Scoping Report (which will be submitted to the DEA for decision-making in line with Regulation 22 of the 2014 EIA Regulations).

TASK 4: TECHNICAL SCOPING WITH PROJECT PROPONENT AND EIA TEAM

The Scoping Process has been designed to incorporate two complementary components: a stakeholder engagement process that includes the relevant authorities and wider I&APs; and a technical process involving the EIA team and the project proponent (Mulilo).

The purpose of the technical Scoping Process is to draw on the past experience of the EIA team and the project proponent to identify environmental issues and concerns related to the proposed project, and confirm that the necessary specialist studies have been identified. Most of the specialists have worked with the CSIR on several other projects, as well as having experience from EIAs for other renewable energy projects in the Northern Cape. The specialists were therefore able to identify issues (as shown in Chapter 6 of this Scoping Report) to be addressed in the EIA based on their experience and knowledge of the area and type of activity. Their inputs have informed the scope and Terms of Reference for the specialist studies (as included in Chapter 7 of this Scoping Report). The findings of the Scoping Process with the public and the authorities will inform the specialist studies, which will only be completed after the public Scoping Process has been finalised.

TASK 5: REVIEW OF THE DRAFT SCOPING REPORT (CURRENT STAGE)

All I&APs on the project database have been invited to review the Draft Scoping Report for a 30 day period in line with Regulation 3 (8) and Regulation 21 (1) of the 2014 NEMA EIA Regulations, as amended.

The following mechanisms and opportunities were utilised to notify I&APs of the release of the Draft Scoping Report for comment:

- **Correspondence to I&APs** - Letter to notify I&APs of the release of the Draft Scoping Report and the comment period were sent via registered mail and email (where postal, physical and email addresses are available for I&APs and organs of state on the project database). The letter included a Comment and Registration Form;
- **Availability of Information** - the Scoping Report were made available for review by I&APs and key authorities through the following means:
  - The Scoping Report was placed on the project website (i.e. https://www.csir.co.za/environmental-impact-assessment);;
  - Hard copies of the Draft Scoping Report were placed at the:
    - Kuruman Public Library, Corner of Foskor & Voortrekker Street; and the
    - Kathu Public Library, 38 Kromhout Street, Kathu.
  - Key authorities were provided with either a hard copy and/or CD of the Draft Scoping Report.
  - Telephonic consultations were held with key I&APs and organs of state groups, as necessary.

All issues identified through the review of the Draft Scoping Report will be captured in an Issues and Responses Trail (as an Appendix to the Final Scoping Report), which will be submitted to the DEA for decision-making in line with Regulation 22 of the 2014 EIA Regulations, as amended.

TASK 6: SUBMISSION OF FINAL SCOPING REPORT TO THE DEA FOR DECISION-MAKING

The Final Scoping Report will be submitted to the DEA for decision-making. It will include proof of the PPP that was undertaken to inform organs of state and I&APs of the availability of the Scoping Report for the 30 day review (during Task 6, as explained above). To ensure ongoing access to information, a copy of the Final Scoping Report that will be submitted for decision-making will be placed on the project website. The DEA will have 43 days (from receipt of the Final Scoping Report) to either accept the Scoping Report with or without conditions, or refuse EA. This step marks the end of the PPP for the Scoping Phase. The PPP for the subsequent EIA Phase is presented in the Plan of Study for EIA (Chapter 7).

4.6 Schedule for the EIA

The proposed schedule for the EIA, based on the legislated EIA Process, is presented in Table 4.2. It should be noted that this schedule could be revised during the EIA Process, depending on factors such as the time required for decisions from authorities.

Table 4.2: Proposed Schedule for the Proposed Kuruman Wind Energy Facility (including the Scoping and EIA phases and the BA project)

KURUMAN WIND ENERGY FACILITY AND ASSOCIATED ELECTRICAL INFRASTRUCTURE PROJECT SCHEDULE

Phase	Task	Days	Feb-18				Mar-18				Apr-18				May-18				Jun-18				Jul-18				Aug-18				Sep-18				Oct-18				Nov-18				Dec-18				Jan-19				Feb-19				Mar-19				Apr-19			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	Compilation of Project Announcement (BID, Placement of Advert, Placement of Site Notice Boards) documentation	60																																																								
	Project Announcement (BID, Placement of Advert, Placement of Site Notice Boards)																																																											
	Specialists (including bat and bird specialists) to provide preliminary impact assessment																																																										
	Prepare Scoping Reports and Plan of Study for EIA (PSEIA)																																																										
End of Pre-Application Phase	Submission EA Application (EIA project)	43																																																									
Scoping Phase	Scoping Report public review period																																																										
	Collate comments received and integrate into Scoping Report																																																										
	Submission of Final Scoping Report and PSEIA to Competent Authority																																																										
End of Scoping Phase	Competent Authority to Accept Scoping Report or Refuse EA	44																																																									
EIA and BA Phase	Specialist studies Draft and Final Reports due following review by CSIR and Mulilo	49																																																									
	Compile Draft EIR, Draft BA Report and EMPRs	106																																																										
	Compile Application form for BA																																																										
	Draft EIR and Draft BA Report public review period; submit BA application to DEA																																																										
	Collate comments received and integrate into Final EIR, Final BA Report and EMPRs.																																																										
	Submission of Final EIR and Final BA Reports to Competent Authority for decision-making																																																										
End of EIA Phase	Competent Authority to Grant or Refuse EA	107																																																									
Notification Phase	Competent Authority to provide written feedback	14																																																								
	Notify I&APs of the EA decision																																																										

***+50days for exceptional circumstances*

	Public Participation Process
	CSIR (EAP) timeframes
	DEA (Competent Authority) timeframes
	Specialist studies (monitoring and input required)
	Compulsory PPP exclusion period

MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 1 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report

CHAPTER 5:

Project Alternatives

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TABLES

FIGURES

5 APPROACH TO THE ASSESSMENT OF ALTERNATIVES

This chapter discusses the alternatives that will be considered as part of the EIA Phase. The 2014 EIA Regulations, as amended (GN R326) 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:

a) property on which or location where the activity is proposed to be undertaken;
b) type of activity to be undertaken;
c) design or layout of the activity;
d) technology to be used in the activity;
e) operational aspects of the activity; and
f) includes the option of not implementing the activity".

Appendix 2 of the 2014 EIA Regulations, as amended, provides the following objectives, inter alia, of the Scoping Process in relation to alternatives:

- To identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks; and
- To identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment.

The Scoping Report is therefore required to provide a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including details of all the alternatives considered and the outcome of the site selection matrix.

Sections 24(4) (b) (i) and 24(4A) of the NEMA require an EIA to include investigation and assessment of impacts associated with alternatives to the proposed project. In addition, Section 24 (O) (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.

5.1 Assessment of Alternatives

5.1.1 Consideration of no-go alternative

The no-go alternative assumes that the proposed project will not go ahead i.e. it is the option of not developing the proposed Kuruman WEF. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. The following implications will occur if the no-go alternative is implemented:

- 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 proposed 225 MW facility is predicted to generate approximately 591 GWh per year which could power approximately 100 000 households (in a year).
- The no go alternative will not contribute to and assist the government in achieving its proposed renewable energy target of 17 800 MW by 2030;
- Additional power to the local grid will need to be provided via the Eskom grid, with approximately 90% coal-based power generation with associated high levels of CO_2 emissions and water consumption;
- Electricity generation will remain constant (i.e. no renewable energy generation will occur on the proposed site) and the local economy will not be diversified;
- Local communities will continue their dependence on agriculture production and government subsidies;
- There will be no opportunity for additional employment in an area, where job creation is identified as a key priority. Approximately 420 employment opportunities will be created during the construction period and approximately 35 employment opportunities (including 25 permanent positions) will be created during the operation period of the proposed project;
- 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; and
- 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.

Converse to the above, the following benefits could occur if the no-go alternative is implemented:

- Only the agricultural land use (game farming) will remain-no impact on agricultural land use will occur;
- No biodiversity (fauna and flora) will be removed or disturbed during the development of these facilities;
- No freshwater resources will be impacted upon during the construction of the WEF and associated electrical infrastructure;
- No birds or bats will be impacted upon-either through the loss of their habitat which can lead to displacement, mortalities due to collisions of birds and with wind turbines or caused by barotrauma for bats;
- No change to the current landscape will occur-the visual character of the area will remain unchanged;
- No heritage artefacts or palaeontological resources will be impacted on;
- No noise impacts either during the construction phase or during the operational phase when wind turbines are rotating; and
- No additional water use during the construction or operational phases of the proposed project.

While the no-go alternative will not result in any negative environmental impacts; it will also not result in any positive community development or socio-economic benefits. It will also 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 currently the preferred alternative**.

5.1.2 Land-use Alternatives – Preferred Activity

5.1.2.1 Agriculture

All farm portions forming part of the project is zoned for agricultural land-use, and is mainly used for game farming. Soils of the proposed wind farm site are dominated by rock outcrops and shallow, sandy, red soils on underlying rock, which are of the Hutton soil form. The major limitations to agriculture are the shallow, rocky soils and the limited climatic moisture availability. As a result of these limitations, the study area is totally unsuitable for cultivation and agricultural land use is limited to grazing.

As noted in Chapter 3 of this Scoping Report, agricultural potential is uniformly low across the affected farms and the choice of placement of the proposed facility on the farms therefore has no agricultural impacts of significance. The predominant land capability is classified as Class 8 – non-utilisable wilderness land. The limitations to agriculture are predominantly the aridity and lack of access to water, but on the ridges where the turbines are located, the shallow soil depths and rock outcrops are further limitations. The grazing capacity of the area on AGIS is classified as low at 20 hectares per large stock unit. **Hence, agricultural land use is not a preferred alternative**. The proposed wind farm 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.

5.1.3 Technology Alternatives (Renewable Energy Alternatives)

Where the "activity" is the generation of electricity from a renewable energy source, possible alternatives that could be considered on the project site include renewable energy technologies: Biomass, Hydro Energy and Solar Energy. However, based on the preliminary investigations undertaken by the Project Applicant, no other renewable energy technologies are deemed to be appropriate for the site. The unsuitability of other renewable energy developments for the site, as well as the potential risks and impacts of each, are discussed below.

5.1.3.1 Biomass Energy

The proposed project site lacks any abundant or sustainable supply of biomass. According to the South African Renewable Energy Resource Database (SARERD), the project site is identified as having a very low cumulative biomass energy potential (1-50 GJ/ha/yr (as shown in Figure 5.1), therefore, the implementation of a Biomass Facility at the proposed site in the Northern Cape is therefore considered to be an unfeasible and unreasonable alternative to the implementation of the proposed WEF.

Should biomass energy be selected for the site, significant negative socio-economic implications could be created as it would not be feasible in terms of operations. A biomass facility is also likely to result in unnecessary pollution due to waste generation (especially waste water generated during the operational phase of the biomass facility), traffic impacts and air emissions as a result of operations. A biomass facility is likely to create traffic impacts as the material required for the plant (i.e. biomass) would need to be transported to the site on a regular basis during the relevant seasons.

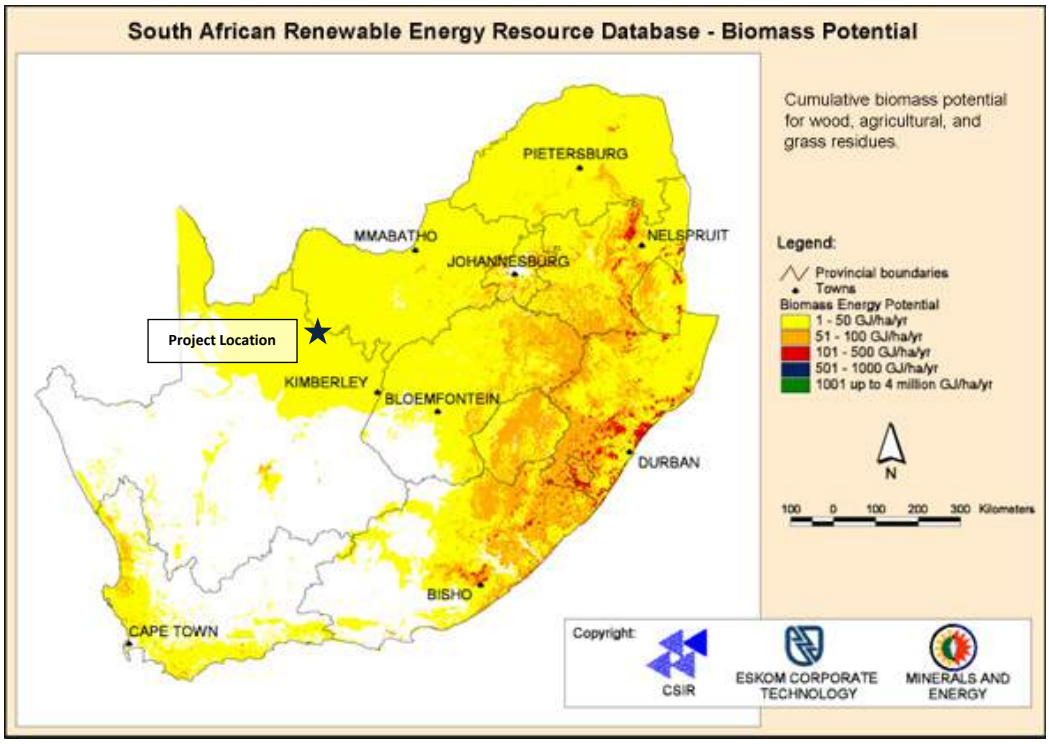

Figure 5.1: Biomass Potential (*Source*: SARERD, 2016)

5.1.3.2 Hydro Energy

The proposed project site lacks any large inland water bodies, which precludes the possibility of renewable energy from small/large scale hydro generation. In terms of micro hydro power potential, the SARERD has classified the proposed project site as "Not Suitable" (as shown in Figure 5.2), therefore, the implementation of a Hydro Energy Facility at the proposed site is therefore also considered to be an unfeasible and unreasonable alternative to the implementation of the proposed WEF.

Hydro power is also not noted as a renewable energy source in terms of the municipal IDP. As with biomass, a hydro power facility will be unfeasible and not possible at the proposed project site. If a hydro power facility was to be constructed instead of a wind facility, it will create significant negative socio-economic implications as it would not be feasible in terms of operations.

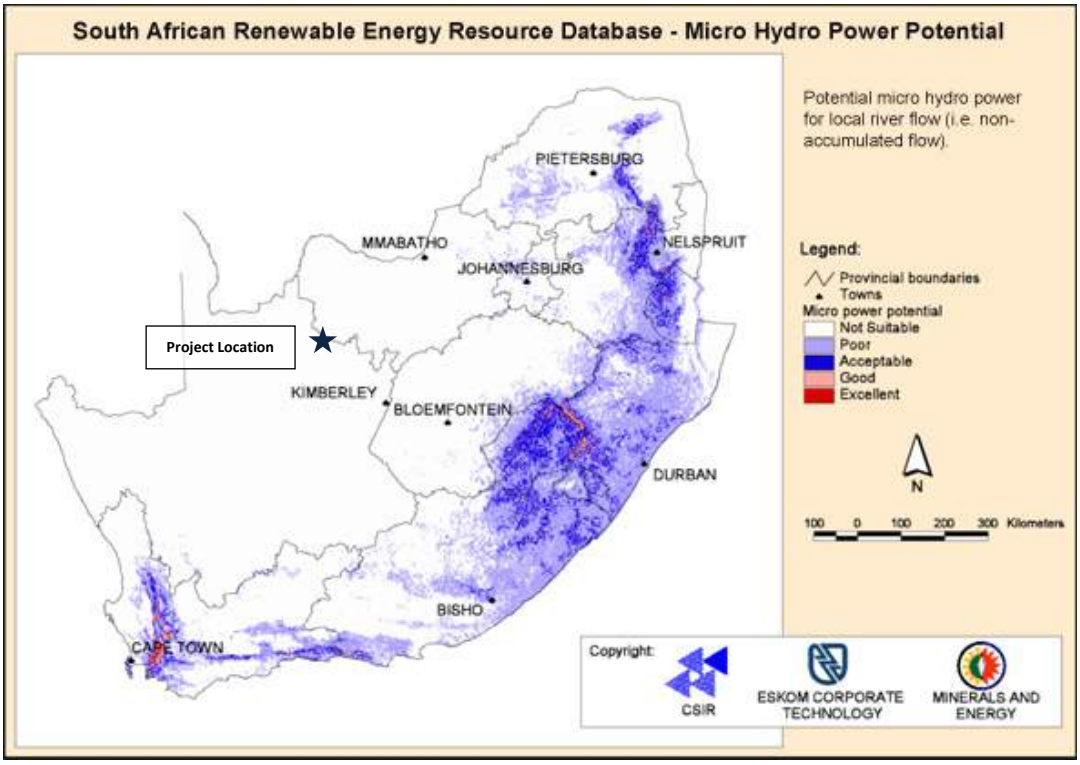

Figure 5.2: Micro Hydro Power Potential (Source: SARERD, 2016)

5.1.3.3 Wind and Solar Energy

- *REIPPPP and SEA for Wind and Solar PV in South Africa*

The Integrated Resource Plan for South Africa for the period 2010 to 2030 (referred to as "IRP2010") and the IRP Updated Report (2013) proposes to secure 17 800 MW of renewable energy capacity by 2030. The DoE has subsequently entered into a bidding process for the procurement of 3 725 MW of renewable energy from IPPs by 2016 and beyond, to enable the Department to meet this target. 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 Government Gazette 39111. The additional target allocated for wind energy, solar PV energy, and solar CSP energy is 3 040 MW, 2 200 MW, and 600 MW respectively.

In order to submit a bid, the proponent is required to have obtained an EA in terms of the EIA Regulations as well as several additional authorisations or consents.

5.1.3.4 Solar Energy

- *National Level Considerations: Solar Radiation*

The north-western part of South Africa has the highest Global Horizontal Irradiation[1] (GHI), relevant to PV installations and Direct Normal Irradiance[2] (DNI), relevant to CPV and tracking PV installations (Figure 5.3). Therefore, this section of South Africa is deemed the most suitable for the construction and operation of solar energy facilities as opposed to other areas and provinces within South Africa. For example, coastal regions within KwaZulu-Natal, Eastern Cape and Western Cape mainly have a solar radiation between 1 500 kWh/m^2 and 1 700 kWh/m^2 per annum, which would not provide the same return compared to a solar energy facility located within the north-western part of South Africa. The proposed site is located in the Northern Cape and is located within an area estimated to have the highest solar radiation of 3 000 kWh/m^2 per annum (as seen in Figure 5.3). This means that the generation of renewable energy from solar is not unfeasible but wind energy was chosen as the preferred technology alternative and the most feasible for the project applicant due to the terrain conditions on site.

Solar energy is 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 of solar PV facilities make it a less feasible alternative when compared to wind energy for this particular site. The most important limitation for PV development on this site is the topography. With sandy ridges there is limited flat suitable land on which to place large PV arrays. Solar panels need to be cleaned regularly and access to good quality water is required. Due to the scarcity of water in the area it will not be feasible to obtain sufficient water to clean the panels.

CSP technology is also not deemed feasible or sustainable for the same reason as solar PV panels, i.e. it requires large amounts of water and will therefore not be considered further. In addition, Government Gazette 39111 published on 18 August 2015, no additional procurement target was allocated for CPV.

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

[2] Direct Normal Irradiance is the amount of solar radiation received per unit area by a surface that is always held perpendicular (or normal) to the rays that come in a straight line from the direction of the sun at its current position in the sky.

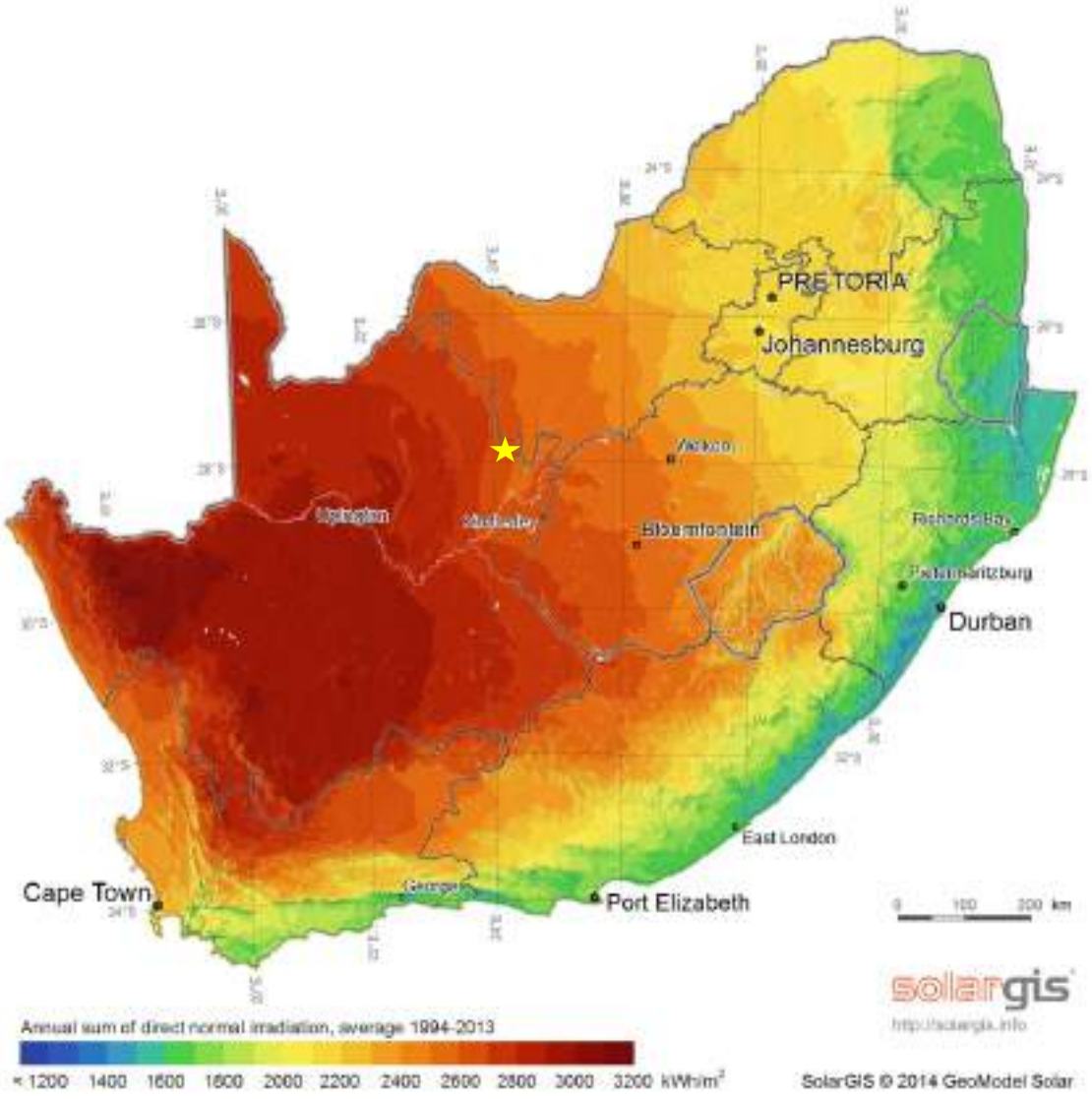

Figure 5.3: Solar Resource Availability in South Africa (*Source*: SolarGIS map© 2013 GeoModel Solar).

5.1.3.5 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.

Based on Mulilo's research of the Kuruman site as a potential site for the development of a WEF, the proposed land portions located near Kuruman/Kathu were selected as an area with a good wind resource. An on-site wind measuring mast has been installed to provide wind measurements to verify the presence of the resource. The process of collecting on-site wind data is necessary to confirm both the presence of the wind resource on-site and the bankable viability of the proposed project. The provision of at least 12 months on-site wind monitoring data also forms a requirement of the REIPPPP. Data received from consistent measurements for a year indicated that the wind resource at the proposed Kuruman site

is adequate for a wind farm. Furthermore, Government Gazette 39111 allocated a higher allocation target to wind energy compared to solar energy (i.e. 3 040 MW as opposed to 2 200 MW) which further supports the development of a WEF at this location.

Therefore, Mulilo has determined that the proposed Kuruman WEF is considered to be the preferred technology, as opposed to a solar energy facility, as it would be able to generate sufficient energy to support an economically viable wind energy project.

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

- The site has a good wind resource based on on-site measurements;
- Solar energy, a potential developable technology on site, would not be as economically viable compared to wind development at this location; and
- Government Gazette 39111 allocated a higher allocation target to wind energy compared to solar energy.

Since these alternative technologies considered were deemed unfavourable for the area and the site, no other renewable energy technologies alternatives will be further assessed during the EIA Phase.

5.1.4 Site Alternatives

As per the requirements listed within Appendix 2 (2) (g) (ix) of the 2014 EIA Regulations (as amended), a site selection matrix should be provided to show how the preferred site was determined through a site selection process. Within this context, it is assumed that the "site" referred to in the Regulations are the farms or land portions on which proposed Kuruman WEF will be located.

On a site specific level, the site selection factors of land availability, environmental sensitivities, distance to the national grid, site accessibility, topography, fire risk, current land use and landowner willingness were all considered to determine the feasible site.

5.1.4.1 Site Specific Considerations

The preferred site for the proposed Kuruman WEF extends over the following farm portions:

- Portion 2 of Farm Carrington 440;
- Portion 4 of Farm Carrington 440;
- Portion 1 of Farm Hartland 381;
- Remainder of Farm Woodstock 441; and
- Remainder of Farm Rossdale 382.

The Kuruman site was deemed to be a feasible site for the proposed WEF. A detailed outline of the outcomes of the site selection is detailed in Table 5.1.

Table 5.1: Site selection factors and suitability of the site for the development of the proposed Kuruman WEF

FACTOR	SUITABILITY OF THE PREFERRED SITE
Land Availability	The site is of a suitable size for the proposed project. The land available to develop at the development footprint of the Kuruman WEF extends approximately 7 239 ha, while only approximately 580 ha (8 % of the total area) will be required for the WEF (see Section 5.1.5 below)
Environmental Sensitivity	Although the site does contain environmental features that have to be avoided due to high environmental sensitivities, suitable land is still available, following these exclusions, to make the development feasible (see Section 5.1.5 below).
Wind speed Levels	Good
Distance to and availability of the Grid	The proposed WEF is located approximately 10 km from the proposed Ferrum substation or 50 km from the Segame substation. The connection of the WEF to a substation will be assessed with under a separate Basic Assessment process that will be undertaken for the electrical infrastructure associated with the proposed Kuruman WEF project.
Site Accessibility	The proposed main access road is located on D3420. This main access road connects to the main access road of Phase 1 on the boundary of the two phases. Turbines could therefore be delivered to the Phase 1 area via the proposed main access road of Phase 2.
Topography	The proposed WEF development area is situated in the savanna biome and consists of a series of parallel ridges with a general south-east to north-west orientation, known as the Kuruman Mountains, interspersed with broad valleys. The ridges consist of gentle slopes covered in short grassland with an open shrub layer, and a few exposed rocky ridges. The proposed turbines are located on the crest of the ridges in long, parallel lines. The elevation ranges roughly between 1500 – 1770 m.a.s.l. The maximum slopes that would be impacted by any footprint of the development are not likely to exceed 15%.
Fire Risk	The valleys are covered in tall grassland on red Kalahari sands with scattered trees. Two vegetation types are found in the WEF development area, namely Kuruman Mountain Bushveld and Kuruman Thornveld (Mucina & Rutherford 2006). Both these vegetation types have a low fire risk.
Current Land Use	Agriculture – Game farming
Landowner Willingness	The landowners have signed consents for the undertaking of the EIA process.

The **Kuruman WEF site is the preferred site and no other site alternatives will be considered in the EIA Phase.**

5.1.5 Development Footprint within the Site

The preferred site extends approximately 7 239 ha, while only approximately 580 ha will be required for the WEF (comprising 9 % of the total farm area). **The preferred development footprint of the Kuruman WEF on the site is shown in Figure 5.4 below**. The determination of the development footprint within the site was determined through a screening assessment of the site by the specialist team (specialists input have been provided and are included in Appendix E of this Scoping Report) and consultation with the landowners to identify possible areas that should be avoided (i.e. exclusion zones). 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 disobey the wishes of the landowners. The areas with feasible wind resource are, however limited to the ridges where the footprints are currently located.

Therefore, **no other alternative development footprints within the preferred site** will be considered during the EIA phase.

5.1.6 Layout Alternatives

During the EIA phase, the specialists will refine the sensitivity mapping for the development footprint. As a result, the preferred layout of the proposed Kuruman WEF within the development footprint will be undertaken during the EIA Phase, whereby any sensitive features identified will be avoided or mitigated by the proposed layout. Existing access roads will be used- no alternative access roads will be assessed or taken forward into the EIA phase. **The final recommended siting (i.e. layout) of the proposed Kuruman WEF within the preferred site and development footprint will be provided in the EIA Report, together with specialist recommendations**.

Figure 5.4: Preliminary environmental sensitivity map for the proposed Kuruman WEF (Phase 1 and 2) (site's boundary shown in a bold black border on the map)

5.2 Concluding Statement of Preferred Alternatives

As per Appendix 2, Section 2 (xi) of the 2014 amended EIA Regulations, and based on Section 5.1 above, the following alternatives will be taken forward into the EIA 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 Kuruman WEF. This alternative would result in no environmental impacts on the site or surrounding local area, as a result of the facility. It will provide a baseline against which other alternatives will be compared and considered during the EIA Phase. The no-go alternative will be assessed in detail by all the specialists on the project team.

- **Land Use (Activity) Alternative:**
    - The current land use is agriculture and this has been identified as an alternative land use for the site. The agricultural potential of the site is very low and not deemed feasible to assess further during the EIA Phase. The implementation of a WEF at the proposed project site is more favourable than the agricultural land use alternative and is therefore the preferred land use alternative.

- **Technology Alternatives:**
    - Given the above, the development of a WEF is the preferred technology to be developed on site because:
        - The site has a good wind resource based on-site measurements;
        - Solar energy, a potential developable technology on site, would not be as economically viable compared to wind development at this location;
        - Government Gazette 39111 allocated a higher allocation target to wind energy compared to solar energy.

- **Preferred Site and Development Footprint within the site:**
    - The preferred site for the proposed Kuruman WEF extends over the following farm portions:
        - Portion 2 of Farm Carrington 440;
        - Portion 4 of Farm Carrington 440;
        - Portion 1 of Farm Hartland 381;
        - Remainder of Farm Woodstock 441; and
        - Remainder of Farm Rossdale 382.
    - The development footprint within the site was determined through a screening assessment of the site by the specialist team (specialists input have been provided and are included in Appendix E of this Scoping Report) and consultation with the landowners to identify possible areas that should not be proposed for the development (i.e. exclusion zones). These have been excluded from the proposed development footprint. The current proposed development footprint of the proposed Kuruman WEF is approximately 580 ha.

- **Layout Alternatives:**
    - Layout alternatives for the project will be determined following the input from the various specialists. The studies will aim to identify various environmental sensitivities within the

development footprint that should be avoided, which will be taken into account during the determination of the proposed layout of the WEF.

- Existing access roads will be used- no alternative access roads will be assessed or taken forward into the EIA phase.

Note: Two different powerline routing alternatives will be discussed and assessed in the separate BA that will be conducted for the electrical infrastructure component of this project. These powerline routing alternatives will therefore not be discussed and included in this Scoping Report (or the EIA Report that will be submitted at a later stage).

MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 1 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report

CHAPTER 6:

Issues and Potential Impacts

CONTENTS

TABLES

FIGURES

6 ISSUES AND POTENTIAL IMPACTS

The purpose of this chapter is to present a synthesis of the key issues and potential impacts that have been identified thus far as part of the Scoping Process. These issues and impacts have been identified via the environmental status quo of the receiving environment (environmental, social and heritage features present on site) (discussed in Chapter 3 of this Scoping Report), a review of environmental impacts from other similar wind energy projects and scoping inputs from the specialists that form part of the project team. The Terms of Reference for the specialist studies that have been deemed necessary, based on the relevant issues and impacts discussed within this chapter, are incorporated into the Plan of Study for the EIA (discussed in Chapter 7 of this Scoping Report).

6.1 Scoping-level Impact Assessment

Based on the scoping-level inputs from the various specialists, a high-level preliminary impact scoping assessment was conducted and outlined in Table 6.1 below. The key issues for each field of study have been unpacked in the subsections below, including a description of the assessment to be undertaken in the EIA phase. Please see Chapter 7 for the Plan of Study (PoS) for EIA which includes the Methodology to be used by the specialists to assess impacts (Section 7.5) and the Terms of Reference for the specialist studies (Section 7.8).

Table 6.1: Scoping level assessment of potential risks/impacts of the proposed Mulilo Kuruman WEF Phase 1 project, including high-level mitigation measures.

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
VISUAL															
DESIGN PHASE															
Effect of design activities	Visual intrusion, dust emissions and light pollution and glare	Negative	Local	Long-term	Substantial	Very likely	High	Low	Moderate	No	Yes	• High visual impact zones should be viewed as zones where the number of turbines should be limited, where possible. • No turbines should be placed within 500 m of the N14 national road and R31 main road. • 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. • Select the alternatives that will have the least impact on visual receptor locations • Turbines should be painted plain white, as this is a less industrial colour (Vissering, 2011), unless another specialist recommends that one (1) or more of the turbine blades be painted an alternative colour in order to reduce an identified impact (for example as part of the Avifauna specialist's recommendations / mitigation measures). It is highly recommended that bright colours should not be permitted and that large, clear or obvious logos	Moderate	3	Medium

[1] Status: Positive (+) ; Negative (-)
[2] Site; Local (<10 km); Regional (<100); National; International
[3] Very short-term (instantaneous); Short-term (<1yr); Medium-term (1-10 yrs); Long-term (project duration); Permanent (beyond project decommissioning)

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												preferably not be used or be kept to an absolute minimum.			
CONSTRUCTION PHASE															
Effect of construction activities	Visual intrusion, dust and noise	Negative	Local	Short-term	Substantial	Very likely	High	Low	Moderate	No	Yes	• Carefully plan to minimize the construction period and avoid construction delays. • Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. • Make use of existing gravel access roads where possible. • Unless there are water shortages, ensure that dust suppression techniques are implemented on all access roads. • Maintain a neat construction site. • Cables should be buried underground where possible. • If possible, the operation and maintenance buildings should be painted with natural tones that fit with the surrounding environment. In addition, non-reflective surfaces should be utilised where possible.	Low	4	Medium
OPERATIONAL PHASE															
Effect of operational activities	Visual intrusion, dust emissions and light pollution and glare	Negative	Local	Long-term	Substantial	Very likely	High	Low	Moderate	No	Yes	• Turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). • If required, turbines should be replaced with the same model, or one of equal height and scale. Repeating elements of the same	Moderate	3	Medium

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												height, scale and form can result in unity and lessen the visual impact that would typically be experienced in a chaotic landscapes made up of diverse colours, textures and patterns (Vissering, 2011). • Unless there are water shortages, ensure that dust suppression techniques are implemented on all access roads. • Where practically possible, the operations and maintenance buildings should not be illuminated at night. • • Light fittings for security at night should reflect the light toward the ground and prevent light spill.			
DECOMMISSIONING PHASE															
Removal of WEF structures	Visual intrusion of remaining roads, platforms and slabs, and dust emissions.	Negative	Local	Short-Term	Substantial	Very likely	High	Low after decommissioning	Moderate	No	Yes	• Carefully plan to minimize the construction period and avoid construction delays. • Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. • Make use of existing gravel access roads where possible. • Unless there are water shortages, ensure that dust suppression techniques are implemented on all access roads. • Maintain a neat construction site.	Low	4	Medium
AGRICULTURE															
CONSTRUCTION PHASE															
Occupation of the land by the project infrastructure	Loss of agricultural land use	Negative	Site	Short term	Moderate	Very Likely	Low	Low	Low	No	No	• None	Not applicable	4	High

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
Change in land surface characteristics.	Erosion	Negative	Site	Medium term	Slight	Unlikely	Low	Low	Very low	No	Yes	• Implement an effective system of storm water run-off control. • Maintain vegetation cover.	Very low	5	High
Constructional activities that disturb the soil profile.	Loss of topsoil	Negative	Site	Medium term	Slight	Unlikely	Low	Low	Very low	No	Yes	• Strip, stockpile and re-spread topsoil during rehabilitation.	Very low	5	High
Vehicle traffic and dust generation	Degradation of veld vegetation	Negative	Site	Short term	Slight	Unlikely	Low	Low	Very Low	No	Yes	• Control vehicle passage and control dust	Very Low	5	High
OPERATIONAL PHASE															
Occupation of the land by the project infrastructure	Loss of agricultural land use	Negative	Site	Short term	Slight	Very Likely	Low	Low	Very low	No	No	• None	Not applicable	5	High
Change in land surface characteristics.	Erosion	Negative	Site	Medium term	Slight	Unlikely	Low	Low	Very low	No	Yes	• Implement an effective system of storm water run-off control. • Maintain vegetation cover.	Very low	5	High
Project land rental	Additional land use income	Positive	Site	Long term	Moderate	Very Likely	High	Low	Low	No	No	• None	Not applicable	4	High
DECOMMISSIONING PHASE															
Occupation of the land by the project infrastructure	Loss of agricultural land use	Negative	Site	Short term	Moderate	Very Likely	Low	Low	Low	No	No	• None	Not applicable	4	High
Change in land surface characteristics.	Erosion	Negative	Site	Medium term	Slight	Unlikely	Low	Low	Very low	No	Yes	• Implement an effective system of storm water run-off control. • Maintain vegetation cover.	Very low	5	High
Constructional activities that disturb the soil profile.	Loss of topsoil	Negative	Site	Medium term	Slight	Unlikely	Low	Low	Very low	No	Yes	• Strip, stockpile and re-spread topsoil during rehabilitation.	Very low	5	High
Vehicle traffic and dust generation	Degradation of veld vegetation	Negative	Site	Short term	Slight	Unlikely	Low	Low	Very Low	No	Yes	• Control vehicle passage and control dust	Very Low	5	High
TERRESTRIAL ECOLOGY: FAUNA AND FLORA															
CONSTRUCTION PHASE															
Habitat Loss	Impact on vegetation and plant species of conservation concern	-	Local	Long-term	Moderate	Very Likely	Low	Moderate	Moderate	Partly	Partly	• No development of turbines, roads or other infrastructure within No-Go areas. • Preconstruction walk-	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												through (by the specialist) of the development footprint to further refine the layout and reduce impacts on protected species 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.			
Habitat Loss	Faunal Impacts due to construction	-	Local	Short term	Substantial	Very Likely	Moderate	Moderate	Moderate	Partly	Partly	• 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 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	Low	3	High

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												should adhere to a low speed limit (40km/h for cars and 30km/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 development area such as construction camps or turbine construction sites must be lit at night due to continuous operations, this should preferably 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															
Disturbance	Increased soil erosion	-	Local	Long-term	Moderate	Likely	Moderate	Moderate	Moderate	Yes	Yes	• 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	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												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 erosion vulnerability as much as possible. • Use active rehabilitation and other passive measures during and after construction to minimise erosion at the site.			
Disturbance	Increased alien plant invasion	-	Local	Medium-term	Moderate	Likely	Moderate	Moderate	Moderate	Yes	Yes	• 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. • 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-	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												practice methods for the species concerned. The use of herbicides should be avoided as far as possible.			
Noise & Disturbance	Operational impacts on fauna	-	Local	Long-term	Moderate	Likely	Moderate	Moderate	Moderate	Partly	Partly	• 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 30cm 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.	Low	4	High
Habitat loss and disturbance	Impacts on Critical Biodiversity Area and Ecological Support Area	-	Local	Long-term	Moderate	Likely	Moderate	Moderate	Moderate	Partly	Partly	• 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 drainage areas and rocky outcrops	Low	4	High
DECOMMISSIONING PHASE															
Habitat loss and disturbance	Increased soil erosion	-	Local	Long-term	Moderate	Likely	Low	Moderate	Moderate	Yes	Yes	• All hard infrastructure should be removed and the footprint areas rehabilitated	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												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 5 years after decommissioning. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.			
Habitat loss and disturbance	Increased alien plant invasion	-	Local	Long-term	Moderate	Likely	Low	Moderate	Moderate	Yes	Yes	• 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 5 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	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												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 two 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.			
DECOMMISSIONING PHASE															
Habitat loss and disturbance	Cumulative habitat loss and impact on broad scale ecological processes	-	Regional	Long-term	Moderate	Likely	Low	Moderate	Moderate Risk (3)	Partly	Partly	• 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.	Low	4	High
FRESHWATER ECOLOGY															
CONSTRUCTION PHASE															
Clearance of land and vegetation for the WEF and ancillary infrastructure.	Physical disturbance and destruction of aquatic features (drainage lines)	Negative	Local	Short term	Moderate	Very Unlikely	High	Moderate	Low	Yes	Yes	• As far as possible avoid identified sensitive aquatic features, major drainage lines and associated buffers	Low	4	Medium
Construction or upgrading of the watercourse crossings as well as compacting soil within other construction footprints.	Altered drainage/flow patterns, increased runoff and sedimentation of related ecosystems	Negative	Local	Long term	Moderate	Very Likely	Moderate	Moderate	Moderate	No	Yes	• As far as possible avoid identified aquatic features, major drainage lines and associated buffers. • Limit hard surfaces on site to reduce runoff. • Keep the footprint of the disturbed area to the minimum and designated areas only. • Clear site only before a	Low	4	Medium

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												section is due to be constructed.			
Use of concrete and accidental spillage of hazardous chemicals, generation of sediment.	Impairment of water quality	Negative	Local	Very short-term	Slight	Unlikely	High	Moderate	Moderate	Yes	Yes	• Avoid the use of infill material or construction material with pollution / leaching potential when constructing or widening roads across drainage lines; • Dispose of concrete and cement-related mortars in an environmental sensitive. • Prohibit the mixing of concrete on exposed soils. • Construct temporary bunds around areas within drainage lines where cement is to be cast in-situ. • Minimise the area of disturbance and the amount of earthworks. • Construct silt fences and earthen dikes / diversions at operation footprint areas where sheet flow is expected, to retain and divert sediment-laden runoff.	Very Low	5	High
OPERATIONAL PHASE															
Inadequate maintenance and monitoring	Degradation of drainage lines	Negative	Site	Medium-term	Moderate	Unlikely	Moderate	Moderate	Moderate	Yes	Yes	• Eradicate alien and weed vegetation at each crossing and any areas accidentally disturbed. • Monitor each crossing after the first major flood event and each year after construction has been completed for at least 3 consecutive years to determine if any additional alien vegetation or erosion control measures are required.	Low	3	Medium
	Alteration of the natural hydrological regime	Negative	Local	Short-term	Moderate	Unlikely	High	Moderate	Low	Yes	Yes	• Rehabilitated the bed and the banks of the drainage lines to as close to their original condition as	Low	4	Medium

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												possible. • Inspect the crossings twice a year for three consecutive years once construction has been completed and after heavy rainfall events for the build-up of debris and sediment. Any debris noted must be removed.			
DECOMMISSIONING PHASE															
Inadequate rehabilitation	Degradation of drainage lines	Negative	Local	Medium-term	Slight	Likely	Moderate	Moderate	Low	Yes	Yes	• Demarcate each decommissioning footprint within a drainage line or buffer zone, clearly. All material used for demarcation purposes should be removed after decommissioning has been completed; • Allow only essential activities within the demarcated areas; • Remove all foreign material from each drainage line or buffer zone before moving to the next area; • Undertake rehabilitation of all disturbed areas concurrently with decommissioning activities, as far as practically possible. • Eradicate alien and weed vegetation within the drainage lines as well as within any additionally disturbed areas.	Very low	4	High
Removal of infrastructure	Impairment of water quality	Negative	Site	Short-term	Slight	Unlikely	High	Moderate	Low	Yes	Yes	• Minimise the area of disturbance and the amount of earthworks. • Divert storm water runoff from disturbed areas into a sediment trapping device. Ensure it is not channelled directly into a drainage line. • Construct silt fences and earthen dikes / diversions at areas where sheet flow is	Very low	5	Medium

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												expected, to retain and divert sediment-laden runoff. • Construct silt fences / traps in areas prone to erosion, to retain sediment-laden runoff. • Check all sediment trapping devices weekly to ensure devices are cleared and repaired when needed. • Check each area where decommissioning has taken place within a watercourse or associated buffer zone for erosion damage and sedimentation after every heavy rainfall event, until an indigenous vegetation cover of at least 50% has been reached within disturbed areas. • Use excavators instead of bulldozers where required to remove construction material from drainage lines; consolidate the entry and exit points to reduce scouring. • Engineer disturbed areas to coincide as close as possible to original contours. Ensure that excavated vegetation and soil mounds are not left unattended (recreate original contours).			
BATS															
CONSTRUCTION PHASE															
Clearing of vegetation	Foraging habitat loss	Negative	Site	Long-Term	Moderate	Very likely	Moderate	Low	Low	Yes	Yes	• Adhere to the planned footprint areas and attempt to re-use all pathways and laydown/storage areas.	Very low	5	High
OPERATIONAL PHASE															

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
Moving turbine blades	Bat mortalities (resident)	Negative	Local	Long-Term	Substantial	Likely	Moderate	Moderate	Moderate	No	Yes	• Turbine layout adjustments where turbines in High sensitivity buffers need to be moved outside of these buffers. And where needed reducing blade movement at selected turbines and high-risk bat activity times/weather conditions (curtailment). Acoustic deterrents are developed well enough to be experimented with if needed.	Low	4	High
Moving turbine blades	Bat mortalities (migrating)	Negative	Regional	Long-Term	Severe	Unlikely	Moderate	Moderate	Moderate	No	Yes	• Turbine layout adjustments where turbines in High sensitivity buffers need to be moved outside of these buffers. And where needed reducing blade movement at selected turbines and high-risk bat activity times/weather conditions when bats may be migrating (curtailment). Acoustic deterrents are developed well enough to be experimented with if needed.	Low	4	Low
Light pollution	Increased mortality probability	Negative	Local	Long-Term	Substantial	Likely	Moderate	Moderate	Moderate	Yes	Yes	• Only use lights with low sensitivity motion sensors that switch off automatically when no persons are nearby, to prevent the creation of regular insect gathering pools.	Low	4	High
Mortalities of cave bat population	Cave ecosystem collapse	Negative	Regional	Long-Term	Severe	Unlikely	Low	High	Moderate	No	Yes	• Turbine layout adjustments where turbines in High sensitivity buffers need to be moved outside of these buffers. And where needed reducing blade movement at selected turbines and high-risk bat activity times/weather conditions when bats may be migrating	Low	4	Low

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												(curtailment). Acoustic deterrents are developed well enough to be experimented with if needed.			
CUMULATIVE IMPACTS															
Increased number of turbines	Increased mortality probability	Negative	Regional	Long-Term	Substantial	Likely	Moderate	Moderate	Moderate	Yes	Yes	• Mitigations must be applied, when needed, for all phases of the Kuruman WEFs and all turbine layout adjustments must respect sensitivity maps. Where needed reducing blade movement at selected turbines and high-risk bat activity times/weather conditions (curtailment). Acoustic deterrents are developed well enough to be experimented with if needed.	Low	4	High
BIRDS															
CONSTRUCTION PHASE															
Avifauna	Displacement of priority species due to habitat transformation	Negative	Local	Long term	Substantial	Likely	Moderate	Low	Moderate	No	Yes	• The recommendations of the specialist ecological study must be strictly adhered to. • Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum. • Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a rehabilitation specialist.	Moderate	3	Medium
Avifauna	Displacement of priority species due to disturbance associated	Negative	Local	Short term	Substantial	Likely	High	Low	Moderate	No	Yes	• The ECO must, during audits/site visits, make a concerted effort to look out	Low	4	Medium

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
	with the construction activities											for breeding activities of priority species, and such efforts may include the training of construction staff to identify such species, followed by regular questioning of staff as to the regular whereabouts on site of the species. If any priority species are confirmed to be breeding (e.g. if a nest site is found), construction activities within 500 m of the breeding site must cease, and the avifaunal specialist will be contacted immediately for further assessment of the situation and instruction on how to proceed.			
Avifauna	Mortality of priority species due to collisions with the turbines. Avoidance of turbines. Disruption of local bird movement patterns. Internal cabling routes on site.	Negative	International (Lesser Kestrels are Palearctic summer migrants)	Long term	Substantial	Likely	High	Low	Moderate	No	Yes	• A 100m no-turbine set-back buffer zone (other infrastructure is allowed) is recommended around selected ridge edges to minimise the risk of collisions for slope soaring species; • A 300m no turbine buffer zone (other infrastructure allowed) is recommended around selected water points; • Care should be taken not to create habitat for prey species that could draw Verreaux's Eagles into the area and expose them to collision risk. Rock piles must be removed from site or covered with topsoil to prevent them from becoming habitat for Rock Hyrax; • One blade of each turbine should be painted black to reduce the potential for motion smear and thereby			

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												reduce the risk of raptor collisions; • The avifaunal specialist, in consultation with external experts and relevant NGO's such as BLSA, should determine annual mortality thresholds for priority anticipated to be at risk of collision mortality, prior to the wind farm going operational; and • If actual collision rates approach the pre-determined threshold levels, curtailment of turbines should be implemented for high risk situations. • Should internal overhead lines be required, the bird specialist should assess and approve the design and recommend additional mitigation measures where appropriate. All structures must be bird friendly.			
OPERATIONAL PHASE															
Avifauna	Mortality of priority species due to collisions with the turbines. Avoidance of turbines. Disruption of local bird movement patterns.	Negative	International (Lesser Kestrels are Palearctic summer migrants)	Long term	Substantial	Likely	High	Low	Moderate	No	Yes	• Formal monitoring should be resumed for period of two years once the turbines have been constructed, as per the most recent edition of the best practice guidelines (Jenkins et al. 2011). The exact scope and nature of the post-construction monitoring will be informed on an ongoing basis by the result of the monitoring through a process of adaptive management. The purpose of this would be (a) to establish if and to what extent displacement of priority species has occurred through the	Low	4	Medium

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												altering of flight patterns post-construction, and (b) to search for carcasses at turbines. • In the event of a massive influx of Lesser Kestrels due to an eruption of insects, pro-active curtailment must be implemented under the guidance of the avifaunal specialist. A site-specific regime must be designed in consultation with the wind farm operator which will specify the duration of the curtailment period as well as the specific time of the day when the turbines will be curtailed.			
DECOMMISSIONING PHASE															

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
Avifauna	Displacement of priority species due to disturbance associated with the decommissioning activities	Negative	Local	Short term	Substantial	Likely	High	Low	Moderate	No	Yes	• Restrict the construction activities to the footprint area. • Do not allow any access to the remainder of the property during for the duration of the decommissioning activities. • Measures to control noise and dust should be applied according to current best practice in the industry. • Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. • The ECO must then, during audits/site visits, make a concerted effort to look out for breeding activities of priority species, and such efforts may include the training of staff to identify such species, followed by regular questioning of staff as to the regular whereabouts on site of the species. If any priority species are confirmed to be breeding (e.g. if a nest site is found), activities within 500m of the breeding site must cease, and the avifaunal specialist will be contacted immediately for further assessment of the situation and instruction on how to proceed.	Low	4	Medium
HERITAGE (INCL. ARCHAEOLOGY AND PALAEONTOLOGY)															
CONSTRUCTION PHASE (Direct impacts)															
Construction of roads and infrastructure related to the WEF.	Destruction of heritage resources including archaeology palaeontology and cultural landscape resources.	Negative	Site	Long-Term	Substantial	Very likely	Low	High	High	No	Yes	• A field assessment and full HIA as per section 38(3) of the NHRA will be undertaken during the EIA phase to assess the actual	Moderate	4	Medium

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												heritage resources on site.			
OPERATIONAL PHASE (Indirect Impacts)															
Activities related to the WEF.	Destruction of heritage resources including archaeology palaeontology and cultural landscape resources	Negative	Site	Long-Term	Substantial	Likely	Low	High	High	Yes	Yes	• Should there be any heritage resources found on site, the development of a Heritage Conservation Management Plan for the WEF is recommended to ensure that heritage resources are continuously managed throughout the operational phase.	Low	3	Medium
CUMULATIVE IMPACTS															
Construction of roads and infrastructure related to the WEF.	Destruction of heritage resources including archaeology palaeontology and cultural landscape resources.	Negative	Site	Long-Term	Substantial	Very likely	Low	High	High	No	Yes	• A field assessment and full HIA as per section 38(3) of the NHRA will be undertaken during the EIA phase to assess the actual heritage resources on site.	Moderate	4	Medium
SOCIO-ECONOMIC															
CONSTRUCTION PHASE															
Increase in production and GDP-R	Local Economy will be stimulated	Positive	National	TBD	Substantial	Very likely	High	N/A	Moderate	No	Yes	• Procure locally, where feasible	Moderate	5	Medium
Temporary employment	Unemployment figures will slightly decrease	Positive	National	TBD	Moderate	Very likely	High	N/A	Low	No	Yes	• Offer skills development programme to serve energy market in region and create local employability	Low	5	Medium
Skills development and enhancement	Skills levels in municipality and for benefitting individuals will improve	Positive	National	Permanent	Moderate	Likely	Low	N/A	Low	No	Yes	• Offer skills development programme to serve energy market in region	Low	5	High
Change in sense of place	The noise, vehicular movement and visual results of the construction activities will change the sense of place.	Negative	Site	TBD	Substantial	Likely	Moderate	Moderate	Moderate	No	Yes	• Adhere to noise and visual specialist recommendations.	Low	3	Low
Household income attainment	Employment in the construction of the windfarm will result in	Positive	National	TBD	Moderate	Likely	High	N/A	Low	No	Yes	• Offer skills development programme to create local employability and thus local	Low	4	High

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	household income earnings for benefitting households.											household earnings increase			
Increased demand for housing, services and social facilities	The in-migration of migrant labour and job seekers will place pressure on local government in the provision of housing, services and social facilities.	Negative	Local	Medium term	Moderate	Likely	Moderate	Moderate	Moderate to High	No	Yes	• Manage recruitment process to control expectations and unnecessary in-migration	Low	4	High
Increase in theft related crimes	The unmet expectations of job attainment and the large number of unemployed individuals increases the chances of theft related crimes.	Negative	Local	Short term	Substantial	Likely	Moderate	Moderate to high	Moderate	Yes	Yes	• Implement controlled access to project site.	Low	5	High
Potential health risks for employees due to asbestos prevalence	The inactive asbestos mines pose a health risk for personnel that will be working on site.	Negative	Regional	Short term	Slight	Unlikely	Low	Moderate	Very Low	Yes	Yes	• Engage with air quality specialist to determine risk levels to asbestos exposure which will dictate safety and health plan to be employed on site.	Low	4	Low
OPERATIONAL PHASE															
Increase in production and GDP-R	Local Economy will be stimulated	Positive	National	TBD	Moderate	Very likely	High	N/A	Low	No	Yes	• Procure locally, where feasible	Low	4	Medium
Employment creation	Long term job opportunities will be made	Positive	National	TBD	Moderate	Very likely	High	NA	Low	No	Yes	• Offer skills development programme to serve energy market in region and create local employability	Low	3	Medium
Skills development and enhancement	Skills levels in municipality and for benefitting individuals will improve	Positive	National	Permanent	Slight	Likely	Low	NA	Very Low	No	Yes	• Offer skills development programme to serve energy market in region and create local employability	Very Low	4	Medium
Change in sense of place	The presence of 47 wind turbines will change the current sense of place through the visual impact.	Negative	Site	TBD	Substantial	Likely	Moderate	High	Moderate	No	Yes	• Strictly adhere to visual specialist recommendations	Low	3	Medium
Household income attainment	Employment in operations and maintenance of the windfarm will result in	Positive	Local	TBD	Moderate	Likely	High	N/A	Low	No	Yes	• Offer skills development programme to create local employability and thus local household earnings	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
	household income earnings for benefitting households.											increase			
Increase in government revenue	The rates, payroll taxes and Value Added Tax paid to local government will increase government revenue	Positive	Local	TBD	Slight	Very likely	High	N/A	Very low	No	Yes	• No enhancement measures applicable	Very low	N/A	Medium
Potential health risks for employees due to asbestos prevalence	The inactive asbestos mines pose a health risk for personnel that will be working on site	Negative	Regional	Short term	Slight	Unlikely	Low	Moderate	Very low	Yes	Yes	• Engage with air quality specialist to determine risk levels to asbestos exposure which will dictate safety and health plan to be employed on site.	Low	4	Low
DECOMMISSIONING PHASE															
Local Economy stimulation	The cost of the removal and disconnection of the wind turbines will stimulate economic activity.	Positive	Regional	TBD	Slight	Likely	High	N/A	Very low	No	Yes	• Procure locally, where feasible	Very low	4	Medium
Temporary employment creation	Job opportunities will be created	Positive	Regional	TBD	Slight	Likely	High	N/A	Very low	No	Yes	• Hire local labour with experience in decommissioning which can be sourced from one of the numerous surrounding wind energy projects.	Very low	4	Medium
Change in sense of place	The removal of 47 wind turbines that will have been located on the site for a long term duration will be removed and change the sense of place	Neutral	Site	TBD	Substantial	Very likely	High	High	Low	No	Yes	• Adhere to visual specialists' recommendations	Low	3	Medium
CUMULATIVE IMPACTS															
Potential increase in crime	The unmet expectations of job attainment and the large number of unemployed individuals increases the chances of theft related crime on numerous approved and proposed energy sites	Negative	Regional	Medium term	Substantial	Likely	Moderate	Moderate	Moderate	Yes	Yes	• Implement controlled access to project site.	Moderate	4	Medium
Change in sense of place	The numerous energy development concentrated in this	Neutral	Regional	Long term	Substantial	Very likely	High	High	Moderate	No	Yes	• Adhere to visual specialist's recommendations	Moderate	3	Medium

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
	region will shift the identity of place to be more industrial.														
Demographic changes due to influx of job seekers	The influx into the region will possibly be immense due to the numerous projects in the area attracting migrant job seekers.	Negative	Regional	Medium term	Substantial	Likely	Low	Moderate	Moderate	No	Yes	• Manage recruitment process to control expectations and unnecessary in-migration	Moderate	3	Medium
Improved energy supply and opportunities for LED	Phase 1 of the Kuruman WEF development will provide an environmentally friendly form energy which will serve the economy in a positive manner.	Positive	Regional	TBD	Substantial	Likely	High	N/A	Moderate	No	Yes	• No enhancement measures applicable.	Moderate	N/A	Medium
TRANSPORTATION															
CONSTRUCTION PHASE															
Construction vehicle traffic on-site	Traffic congestion and delays	Negative	Regional	Short term	Substantial	Very likely	High	N/a	Substantial	No	Yes	• 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.	Moderate	3	Medium
OPERATIONAL PHASE															
The traffic generated during this phase will be minimal and will have a nominal impact on the surrounding road network.															
DECOMMISSIONING PHASE															
Construction vehicle traffic on-site	Traffic congestion and delays	Negative	Regional	Short term	Substantial	Very likely	High	N/a	Substantial	No	Yes	• Stagger turbine component transportation from site. • Reduce the deconstruction period. • Stagger the disassembling of the turbines.	Moderate	3	Medium

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												• 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.			
CUMULATIVE IMPACTS															
Construction vehicle traffic on-site	Traffic congestion and delays	Negative	Regional	Short term	Substantial	Very likely	High	N/a	Substantial	No	Yes	• At present it is unknown whether turbine components will be manufactured locally or imported. This has a significant impact in the identification of mitigation measures as the port of entry and delivery route to the proposed site cannot be finalized. • The potential mitigation measures mentioned in the construction and decommissioning phases are general measures that would normally be recommended to mitigate the impact on the road network. When the manufacturing location of the turbine components has been established, the delivery route can be finalized and more detailed potential mitigation measures can be provided.	Moderate	3	Medium
NOISE															
CONSTRUCTION PHASE															
Noise pollution stemming from construction activities. Increase in noise level at receptors. Disturbing noises. Noises exceeding	Various construction activities taking place simultaneously during the day may increase ambient sound levels due to air-borne noises.	Negative	Local	Short	Moderate	Improbable	High	Moderate	Low	No	Yes, but not required	• Ensure equivalent A-weighted rural daytime noise levels below 45 dBA at potentially sensitive receptors.	Very low	5	High

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
the SANS 10103 rating levels.	Increased noises or disturbing noises may increase annoyance levels with project. Noise levels could reach 56 dBA during construction.											• Ensure that maximum noise levels at potentially sensitive receptors be less than 35 dBA during night-time; • Prevent or limit the generation of disturbing or nuisance noises such as blasting; • Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors; • Ensuring compliance with the National Noise Control Regulations; • No wind turbines to be developed within a 500 m buffer area from identified NSDs.			
	Various construction activities taking place simultaneously at night may increase ambient sound levels due to air-borne noises	Negative	Local	Short	Substantial	Probable	High	Moderate	Low	Yes	Yes, but not required		Low	4	High
OPERATIONAL PHASE															
Noise pollution stemming from operation of WEF	Wind turbines operating simultaneously at night. Increases in ambient sound levels at receptors due to air-borne noises from the wind turbines. Increased noises may increase annoyance levels with project. Noise levels could reach 42 dBA during the operation phase.	Negative	Regional	Long term	Substantial	Probable	High	Significant	Low	No	Yes, but required	• Ensure that the change in ambient sound levels as experienced by a Potentially Sensitive Receptors is less than 7 dBA; • Ensure that total noise levels are less than 42 dBA at all potential noise-sensitive receptors; • Prevent the generation of nuisance noises; • Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors.	Low	4	High
GEOHYDROLOGY															
CONSTRUCTION PHASE															
Construction of storage and labour accommodation yards	Groundwater contamination	Neutral	Site	Short- term	Slight	Unlikely	High	Low	Low	Yes	Yes	• All reasonable measures must be taken to prevent soil and groundwater contamination. • Vehicles to be correctly	Very low	5	High

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												serviced			
Stormwater outflows	Groundwater contamination	Neutral	Site	Short- term	Slight	Unlikely	High	Low	Very low	Yes	Yes	• All reasonable measures must be taken to prevent soil, storm water outflows, and groundwater contamination	Very low	5	High
Accidental oil spillage / fuel leakage	Groundwater contamination	Neutral	Site	Short -term	Slight	Extremely unlikely	High	Low	Low	Yes	Yes	• Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. • Any engines that stand in one place for any length of time must have drip trays. • Diesel fuel storage tanks should be above ground on an impermeable surface in a bunded area. • Construction vehicles and equipment should also be refuelled on an impermeable surface. • If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material. • Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes	Very low	5	High
OPERATIONAL PHASE															
Storm water outflow impact on groundwater	Groundwater contamination	Neutral	Site	Medium- term	Slight	Very Unlikely	High	Low	Low	Yes	Yes	• All reasonable measures must be taken to prevent soil, storm water outflows and groundwater contamination	Very low	5	High
Accidental oil spillage / fuel leakage	Groundwater contamination	Neutral	Site	Short- term	Slight	Extremely unlikely	High	Low	Low	Yes	Yes	• Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. • Any engines that stand in one place for any length of time must have drip trays.	Very low	5	High

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
												• Diesel fuel storage tanks should be above ground on an impermeable surface in a bunded area. • Vehicles and equipment should also be refuelled on an impermeable surface. • If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material. • Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.			
DECOMMISSIONING PHASE															
Accidental oil spillage / fuel leakage	Groundwater contamination	Neutral	Site	Short- term	Slight	Extremely unlikely	High	Low	Low	Yes	Yes	• Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. • Any engines that stand in one place for an excessive length of time must have drip trays. • Diesel fuel storage tanks should be above ground on an impermeable surface in a bunded area. • Vehicles and equipment should also be refuelled on an impermeable surface. • If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material. • Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes	Very low	5	High
CUMULATIVE IMPACTS															

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
Accidental oil spillage / fuel leakage	Groundwater contamination	Neutral	Site	Short- term	Slight	Extremely unlikely	High	Low	Low	Yes	Yes	• Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. • Any engines that stand in one place for any length of time must have drip trays. • Diesel fuel storage tanks should be above ground on an impermeable surface in a bunded area. • Vehicles and equipment should also be refuelled on an impermeable surface. • If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material. • Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.	Very low	5	High
Storm water outflow impact on groundwater	Groundwater contamination	Neutral	Site	Medium-term	Slight	Very Unlikely	High	Low	Low	Yes	Yes	• All reasonable measures must be taken to prevent soil, storm water outflows and groundwater contamination	Very low	5	High

6.2 Ecology: Terrestrial and Freshwater

6.2.1 Key Issues

The proposed Kuruman WEF Phase 1 development will result in the loss of approximately 100 ha of currently intact vegetation during the construction phase. The proposed development site will also have a low level impact on protected tree species and fauna through habitat loss and mortality. The proposed development will also result in a number of actions including:

- Impact on CBA 2 and ESA;
- Impact on SCC;
- Direct and indirect faunal impacts;
- Increased alien plant invasion;
- Increased erosion; and
- Cumulative impact on habitat loss and broad-scale ecological processes.

The construction phase is a relatively short term undertaking, although "intensive" in terms of the rapid physical changes that arise on site. The operational phase is more benign in nature, with limited staff and limited activity in and around the proposed WEF facility. Given this, it is expected that the following impacts of an ecological nature may arise during the construction, operational and decommissioning phases.

6.2.1.1 Terrestrial Ecology Impacts

- **Construction Phase**
  - Impact on vegetation and plant SCC (i.e. protected tree species); and
  - Direct and indirect faunal impacts.

- **Operational Phase**
  - Increased soil erosion;
  - Increased alien plant invasion;
  - Impacts on fauna; and
  - Impacts on CBA 2 and ESA.

- **Decommissioning Phase**
  - Increased alien plant invasion;
  - Increased soil erosion; and
  - Direct and indirect impacts on fauna.

- **Cumulative Impacts**
  - Cumulative habitat loss and impact on broad-scale ecological processes.

The impacts associated with the development of the proposed Kuruman WEF are likely to be of moderate to low significance after mitigation. While it is clear that the site has a variety of potentially sensitive species and habitats present, specific actions should be taken to minimise and reduce these impacts as far as possible. As such, there do not appear to be any major issues or impacts that cannot be mitigated to a low level and from a terrestrial ecology perspective, there are no reasons to prevent the development from proceeding to the next phase. The impacts on terrestrial fauna and flora will be further assessed in the Ecological Impact Assessment during the EIA Phase.

6.2.1.2 Freshwater Impacts

The following impacts on the freshwater resources have been identified in the scoping phase:

- **Construction Phase**
  - Physical disturbance and destruction of aquatic features and major drainage lines;
  - Altered drainage patterns, increased runoff and sedimentation of related ecosystems; and
  - Impairment of water quality.
- **Operational Phase**
  - Physical disturbance and destruction of aquatic features and major drainage lines; and
  - Alteration of the natural hydrological regime.
- **Decommissioning Phase**
  - Degradation of aquatic features and major drainage lines; and
  - Impairment of water quality.
- **Cumulative Impacts**
  - Proliferation of alien and invasive plant species; and
  - Erosion of drainage lines.

6.2.2 Assessment to be undertaken during the EIA Phase for the Terrestrial Ecological Impacts

A full Terrestrial Ecology impact assessment will be prepared and included in the EIA Report which will assess the terrestrial ecological impacts of the proposed project.

Based on the results of the current study and the features of the site, the following activities and outputs are planned to inform the EIA Phase of the development:

- Characterize the faunal communities at the site in greater detail. The information obtained from the camera traps that have been deployed at the site will be analysed and included in the EIA. This will be complemented with the information from the small mammal trapping and reptile surveys conducted, which have not been fully detailed here.
- Characterize the plant communities of the site in greater detail. A full plant species list has been collected from the site and while the vegetation patterns at the site have been described here is broad terms, some additional detail in this regard is still available.
- Provide a more detailed assessment of cumulative impact associated with the development of the site. Including an assessment of the extent of habitat lost to wind energy development in the area to date and the likely future potential loss from the current as well as other proposed developments in the area.
- Evaluate, based on the site attributes and final layout of the development, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
- Assess the impacts identified above in light of the site-specific findings and the final layout for assessment in the EIA Phase to be provided by the developer.

6.2.3 Assessment to be undertaken during the EIA Phase for Freshwater Impact

A full Freshwater Ecology Impact Assessment will be prepared and included in the EIA Report to assess the potential impacts to sensitive aquatic features and drainage lines. The freshwater ecology impact assessment will be conducted in accordance with the requirements of Appendix 6 of the 2014 NEMA EIA Regulations, as amended.

6.3 Visual Impacts

6.3.1 Key Issues

The activities that will be undertaken as part of the construction and operation phases of the proposed Kuruman WEF project that will result in potential visual impacts are discussed below. The potential visual issues identified by the specialists during the scoping phase of this EIA process include the following:

- Potential scarring in the landscape caused by site clearance and earthworks for access roads and assembly platforms, particularly on the steeper slopes;
- Potential visual clutter in the landscape of the on-site substation, operational and maintenance structures, and connecting powerlines;
- Potential visual intrusion and increased dust emissions during construction from heavy machinery and truck traffic; and
- Visual effect of wind turbines on the ridge skylines.

Please note that any additional issues may be added during the public participation process.

The potential impacts identified during the scoping phase of the visual assessment are outlined below:

- **Construction Phase**
  - Potential visual intrusion, dust and noise caused by heavy construction vehicles and cranes;
  - Potential visual effect of construction camp and material stockpiles;
  - Potential visual scarring caused by earthworks for roads and platforms, as well as site clearance and borrow-pits; and
  - Potential visual pollution caused by littering and wind-blown packaging materials.

- **Operational Phase**
  - Potential visual intrusion of the rural landscape resulting from large-scale wind turbines located on ridge lines and higher plateaus;
  - Potential visual clutter caused by substation and operations/maintenance structures and overhead powerlines;
  - Potential alteration of the visual character of the area;
  - Potential alteration of the night time visual environment as a result of operational, navigation and security lighting, as well as navigational lighting on top of the wind turbines; and
  - Potential visual effect on surrounding farmsteads and the Oryx Trail Game Lodge.

- **Decommissioning Phase**
  - Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;
  - Potential impacts of increased dust emissions from decommissioning activity activities and related traffic; and
  - Potential visual effect of remaining infrastructure such as roads, platforms and concrete slabs on the landscape after decommissioning of the WEF.

- **Cumulative Impacts**
  - Combined visual impacts from several renewable energy facilities in the broader area could potentially alter the sense of place and visual character of the area.

6.3.2 Assessment to be undertaken during the EIA Phase

A full Visual Impact Assessment will be prepared and included in the EIA Phase, in order to assess the potential visual impacts of the proposed development on the surrounding communities and regional setting. The Visual Impact Assessment will investigate the above and other concerns raised during the Scoping and EIA phases. The cumulative impact on the landscape and visual receptors of other similar projects in the region will also be assessed.

6.4 Heritage (including Archaeology and Cultural Landscape)

6.4.1 Key Issues

Both direct (destruction through the proposed project activities) and indirect (destruction through unintended consequences or deviations from the authorised work and footprint, and through visual intrusion into a sensitive area) impacts may occur during the construction, operation and decommissioning of the proposed WEF.

The potential heritage issues identified during the scoping phase of this EIA process include:

- The destruction or disturbance of archaeological sites and their immediate contexts;
- The destruction or disturbance of graves or burial sites;
- The destruction or disturbance of built heritage resources; and
- Visual intrusion into the cultural landscape which might erode its association with intangible heritage.

These issues were identified based on a desktop study, which found that the heritage resources along the routes proposed for development of the WEF are only partially recorded. Impacts on the cultural landscape and built heritage resources, as well as all other identified heritage resource types may be impacted at all phases of the development except for palaeontological resources which should not be affected during the operational phase.

The potential impacts identified during the construction and operational phases of the proposed project in the scoping assessment are:

- Potential direct and indirect impacts to archaeological and heritage resources; and
- Potential direct and indirect impacts to the pastoralist cultural landscape of heritage and historical significance, include a loss of ‘sense of place’.

6.4.2 Assessment to be undertaken during the EIA Phase

A full Heritage Impact Assessment will be undertaken and included in the EIA Report, which will include an assessment of the potential impacts associated with the proposed development on the heritage features present on site and the mitigation measures to be implemented to adequately protect these heritage features.

6.5 Palaeontology

6.5.1 Key Issues

The proposed WEF development footprint is geologically underlain by Precambrian sediments and lavas of the Transvaal Supergroup, including the Ghaap Group (marine carbonates of the Campbell Rand Subgroup followed by banded iron formations of the Asbestos Hills Subgroup) and Postmasburg Group (Ongeluk Formation lavas). Most of these rock units are of low palaeontological sensitivity. However, the Campbell Rand carbonates near Kuruman may be stromalite-rich and therefore of high sensitivity. Late Caenozoic superficial sediments include windblown sands (Kalahari Group), colluvial and other surface gravels, alluvium and pedocretes (e.g. calcretes). Most of these younger sediments are of low sensitivity but older alluvial deposits along major drainage lines, as well as calcretes need to be inspected for fossils (e.g. mammalian remains).

The potential impacts identified during the scoping assessment are:

- **Construction Phase**
  - Potential direct impact to palaeontological resources (mainly of Precambrian stromatolites).

- **Operational Phase**
  - Potential direct and indirect impact to palaeontological resources (mainly of Precambrian stromatolites) during operational activities or upgrades.

6.5.2 Assessment to be undertaken during the EIA Phase

Despite the low paleontological sensitivity of the area, a Palaeontological Heritage Assessment will be included in the EIA Report that will include recommendations for inclusion in the EMPr.

6.6 Bats

6.6.1 Key Issues

Wind energy facilities have the potential to impact bats directly and indirectly through collisions, barotrauma resulting in mortality and habitat modification (Horn et al. 2008; Rollins et al. 2012; Kunz et al. 2007b). Habitat loss and displacement impacts for the proposed Kuruman WEF are relatively small and should not pose a significant risk because the project footprint (i.e. turbines, roads) is small. Direct impacts to bats will be limited to species that make use of the airspace in the rotor-swept zone of the wind turbines.

The following impacts to bats have been identified in the scoping phase:

- **Construction Phase**
  - Roost disturbance;
  - Roost destruction; and
  - Habitat modification i.e. destruction of foraging habitat.

- **Operational Phase**
  - Bat mortality during commuting and/or foraging and during migration by colliding with the operational wind turbines and/or due to barotrauma;
  - Cave ecosystem collapse due to bat mortalities of cave dwelling bat populations; and

- Displacement and reduced foraging opportunities for bats due to light pollution.

- **Decommissioning Phase**
  - No impacts identified.

- **Cumulative impacts**
  - Increased area of potential bat mortality impact by turbine blades due to proposed neighbouring Kuruman WEF Phase 2.

The bat monitoring data presented suggest that the development of the proposed Kuruman WEF can be achieved without unacceptable risks to bats. The majority of the proposed turbines are situated in areas where low levels of bat activity were recorded, on the ridges, and as such they are less sensitive to development with regards to impacts on bats.

6.6.2 Assessment to be undertaken in the EIA phase

A 12-month preconstruction bat monitoring programme is currently being undertaken for the project in accordance with the South African Good Practice Guidelines for Surveying Bats in Wind Energy Facility Developments – Pre-Construction (2016). This monitoring commenced in January 2016, but was put on hold by the developer, after which it resumed in May 2017 and will be completed in May 2018. Specific surveys that need to be carried out during the EIA phase are a roost survey of caves and any buildings as possibly being occupied by bats.

A full Bat Impact Assessment will be prepared and included in the EIA phase (including the 12-month preconstruction bat monitoring data). The impact assessment presented in this scoping report, as well as the bat sensitivity map will be revised upon completion of the additional bat monitoring (i.e. acoustic and roost surveys). The outcome of the bat EIA study will be a description of bat activity at the project, an evaluation of potential risks/impacts to bats (including cumulative impacts), recommendations for the WEF layout and preferred grid route and design mitigation measures to reduce impacts, including an environmental management plan for the project. If required, operational mitigation measures will also be provided.

6.7 Birds

6.7.1 Key impacts birds

It is important to assess the impacts of wind energy facilities, and to base this assessment on a thorough investigation of the local avifauna prior to construction, which is being done for the proposed development. A 12-month preconstruction bird monitoring programme is currently being undertaken for the project in line with Best Practice Guidelines applicable at the time of the surveys (Jenkins *et al.* 2015).

The main impacts of WEFs and their associated infrastructure have been identified as displacement through disturbance and habitat destruction, mortality through collisions with turbines and/or powerlines and electrocution on live power infrastructure (Drewitt & Langston 2006; Percival 2005; Van Rooyen 2000).

- **Construction Phase**
  - Displacement of priority species due to habitat transformation / destruction;
  - Displacement of priority species due to disturbance and noise associated with the construction activities.

- **Operational Phase**
  - Bird mortality due to collisions with operational wind turbines.
- **Decommissioning Phase**
  - Displacement of priority species due to disturbance and noise associated with decommissioning activities.
- **Cumulative Impacts**
  - Displacement of priority species due to habitat transformation; and
  - Mortality of priority species due to collisions with operational wind turbines.

Impacts at this stage are not viewed as being of an extent or significance so as to preclude development and it is the specialists' opinion that the project may proceed to the EIA phase. The level of priority species activity at the proposed project site is regarded as moderate to low. The level of Verreaux Eagle activity is regarded as low, and it is unlikely that the development would pose a highly significant risk to this or any other species, except for a potentially moderate to higher risk to Kori Bustard and Secretarybird. This will be further assessed in the EIA Phase.

6.7.2 Assessment to be undertaken during the EIA Phase

During the EIA Phase, a full Bird Impact Assessment will be prepared and included in the EIA Report which will include the following activities:

- Incorporate more on site data, from all monitoring site visits;
- Provide greater confidence in the findings;
- Develop a more detailed site sensitivity map to inform the project layout;
- Assess the cumulative impacts of the proposed development when considering other developments in the area; and
- Develop an operational phase monitoring framework.

6.8 Soils and Agricultural Potential

The significance of all agricultural impacts is low due to two important factors. Firstly, the actual footprint of disturbance of the wind farm (including associated infrastructure and roads) is very small in relation to the land available for grazing on the affected farm portions (<2% of the surface area). All agricultural activities will be able to continue unaffectedly on all parts of the farm other than the small development footprint for the duration of and after the project. Secondly, soils of the proposed wind farm site are dominated by rocky outcrops and shallow, sandy, red soils on underlying rock with limited climatic moisture availability making it totally unsuitable for cultivation. These factors also mean that cumulative regional effects as a result of other surrounding developments also have low significance.

- **Construction Phase**
  - Loss of agricultural land use due to direct occupation by the infrastructural footprint of the proposed development for the duration of the project. This will take affected portions of land out of agricultural production;
  - Soil erosion as the result of wind or water. This may be due to alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources;
  - Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's capability for supporting vegetation; and

- Degradation of veld vegetation beyond the direct facility footprint due to constructional disturbance and potential trampling by vehicles.

- **Operational Phase**
  - Loss of agricultural land use due to direct occupation by the infrastructural footprint of the development for the duration of the project. This will take affected portions of land out of agricultural production;
  - Soil erosion as the result of wind or water. This may be due to alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources; and
  - Additional land use income will be generated by the farming enterprise through the leasing agreements with land owners. This provides the farming enterprise with increased cash flow and rural livelihood thus improving financial sustainability.

- **Decommissioning Phase**

  - Loss of agricultural land use due to direct occupation by the infrastructural footprint of the development for the duration of the project. This will take affected portions of land out of agricultural production;
  - Soil erosion as the result of wind or water. This may be due to alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources;
  - Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's capability for supporting vegetation; and
  - Degradation of veld vegetation beyond the direct facility footprint due to constructional disturbance and potential trampling by vehicles.

- **Cumulative Impacts**

  - Regional loss of agricultural land use due to cumulative occupation by the infrastructural footprint of all renewable energy developments within 50 km from the proposed development area. This will take affected portions of land out of agricultural production, but the cumulative impact is low because of the limited agricultural potential of all land in the area.

Due to the low agricultural potential of the site, and the consequent low agricultural impact, there are no restrictions relating to agriculture which preclude authorisation of the proposed development and therefore, from an agricultural impact point of view, the development should proceed to the EIA Phase.

6.8.1 Assessment to be undertaken during the EIA Phase

A full Soils and Agricultural Impact Assessment specialist study will be prepared and included in the EIA Report, in order to assess the potential impacts of the proposed development on the surrounding communities and regional setting. The Assessment will investigate the above and other concerns raised during the Scoping Phase of the EIA.

6.9 Socio-Economic impacts

6.9.1 Key Issues

The Socio-Economic Impact Assessment is being undertaken to determine the potential social and economic impacts (both positive and negative) that may occur due to the proposed development of the Kuruman WEF.

The following key issues, based on the project aspects (construction, operation and decommissioning phase) have been identified:

- **Construction phase**
    - Increase in production and GDP-R due to capital expenditure;
    - Temporary employment creation due to construction activities;
    - Skills development and enhancement due to construction activities;
    - Household income attainment due to employment opportunities;
    - Increased demand for housing and social facilities due to influx of migrant labour and job seekers;
    - Possible Health Risks for employees due to Asbestos prevalence in region;
    - Potential increase in theft related crimes due to high unemployment rate, social ills, and increased movement of people in area; and
    - Change in sense of place due to construction activities (visibility of WEF infrastructure and impact on tourism and surrounding property values).

- **Operational phase**
    - Increase in production and GDP-R due to operating expenditure (diversification of land-use for other income streams to landowner);
    - Long-term employment creation due to operation and maintenance activities of the WEF;
    - Skills development and enhancement due to operation activities at the WEF;
    - Household income attainment due to employment opportunities;
    - Increase in local government revenue due to rates and taxes;
    - Possible Health Risks for employees due to Asbestos prevalence in region;
    - Benefits from community development plans and income for other local sectors; and
    - Change in sense of place due to visual impact of operational wind turbines.

- **Decommissioning phase**
    - Local economy stimulation due to decommissioning costs;
    - Temporary employment creation as a result of decommissioning activities (influx of people);
    - Possible Health Risks for employees due to Asbestos prevalence in region; and
    - Change in sense of place due to removal of wind turbines (increase in tourism and surrounding property values).

- **Cumulative Impacts**
    - Potential increase in crime;
    - Change in sense of place;
    - Demographic changes due to influx of job seekers; and
    - Contribution towards reginal and national energy security.

6.9.2 Assessment to be undertaken during the EIA

A full Socio-Economic specialist study will be prepared and included in the EIA Report. The relevant management actions will be incorporated into the EMPr that will form part of the EIA Report.

6.10 Transportation impacts

The local road network consists of numerous unsurfaced gravel roads that traverse the various farm portions. The proposed internal roads will link with two of the external roads at two locations. For Phase 1 of the proposed Kuruman WEF, access will be provided via the partially surfaced road D3441, located to the east of the site and accessed via the N14. No existing access road currently exists along D3441 to the proposed WEF site. The proposed turbine and internal road layout indicates that the main access road to the WEF will be constructed on D3441, approximately 3 km from the surfaced single-carriageway 2-way road N14 linking Kuruman with Upington. An additional option for access to the WEF Phase 1 area would be via gravel road D3420, located to the south of the site and accessed via the R31 to the east of the site linking Kuruman with Danielskuil.

The most suitable South African port to import the turbine components is the Port of Ngqura, which is located 1,057 km travel distance from the site. This Port is a deep-water port geared for handling large container ships and has large laydown areas available for storage of wind turbine components. The preferred route for abnormal load vehicles will be from the port, heading north on the N10 to Britstown (passing Middelburg) and onto the N12 towards Kimberley. At Kimberley, the abnormal load vehicle will travel on the R31 to Barkly West. Due to geometric constraints at Barkly West, the abnormal load vehicle will take the R374, R371 and R370 gravel roads as a detour, which will connect the abnormal load vehicle to the R31. At Danielskuil, the abnormal vehicle will head north to Kuruman.

The potential transportation or traffic related issues identified during the scoping phase of this EIA process include:

- **Construction Phase**
  - Noise, dust and exhaust pollution due to construction related traffic including transportation of people, construction materials, water and equipment to and from the development site, as well as abnormal trucks delivering turbine components to the site; and
  - Noise, dust and exhaust pollution due to the construction of access roads, excavations of turbine footings, trenching for electrical cables and other ancillary construction works that will temporarily generate increased traffic.

- **Operational Phase**
  - Noise, dust and exhaust pollution due to increased traffic by operational and maintenance staff, as well as security on the internal on-site road network.

- **Decommissioning Phase**
  - Noise, dust and exhaust pollution due to construction related traffic including transportation of people, construction materials, water and equipment to and from the development site, as well as abnormal trucks transporting turbine components from the site.

- **Cumulative Impacts**
  - Increased traffic congestion and/or delays on the surrounding road network (i.e. N14 and R31) due to construction vehicles and abnormal trucks transporting turbine components.

It is critical to ensure that the abnormal load vehicles will be able to move safely and without obstruction along the preferred routes. 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. The EMPr must include a dust monitoring programme for the on-site and unsurfaced local access roads used during the construction and decommissioning phases.

6.10.1 Assessment to be undertaken during the EIA Phase

A full Transportation Impact Assessment will be prepared and included in the EIA Report.

6.11 Noise Impacts

Potential noise-related impacts resulting from the construction and operational phases of this proposed WEF can only be modelled and correctly calculated once more information regarding the duration of construction, equipment to be used and possible locations of major ancillary activity sites are known. It is anticipated that during operation of the development, the large majority of the WEF site will continue with agricultural use as it is current land use. The only development related activities on-site will be routine servicing and unscheduled maintenance. The noise impact from maintenance activities is insignificant, with the main noise source being the operating wind turbine blades and the nacelle.

The following potential noise impacts have been identified during the scoping phase:

- **Construction Phase**
  - Increase in ambient sound levels as a result of construction activities during the day.

- **Operational Phase**
  - Increase in ambient sound levels as result of operational wind turbines at night.

- **Decommissioning Phase**
  - Increase in ambient sound levels as a result of construction activities during the day; and
  - Ambient sound levels to return to pre-construction levels as a result of turbines which ceased operations.

Based on a scoping level desktop assessment, as well as a basic predictive model to identify potential issues of concern, the proposed project will result in increased noise levels in the area as wind turbines do emit noises at sufficient levels to propagate over large distances. The fact that there would be a number of wind turbines operating simultaneously in an area where there are noise-sensitive developments increase the possibility that a noise impact could occur. However, at this preliminary stage it is impossible to determine whether the significance of this noise impact would be low, medium or high and what potential impact it could have on the quality of living for the surrounding receptors. Previous studies have indicated that with the implementation of correct mitigation measures (especially a sufficient setback or buffer zone) it would be possible to minimize the potential noise risks and reduce the noise impacts to a more acceptable medium or low significance.

6.11.1 Assessment to be undertaken during the EIA Phase

The potential noise impact associated with the proposed WEF will be investigated in more detail during the EIA Phase and a full Noise Impact Assessment will be prepared and included in the EIA Report. In this regard the following will be included in the Noise Impact Assessment:

- Development of a digital terrain model of the area using the topographical contours of the area;
- Development of a noise propagation model using the data as received from the developer to estimate the potential noise level from the WEF;
- The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected), as well as the extent of the impact;
- The potential significance of the identified issues will be calculated based on the evaluation of the issues/impacts; and
- The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required) with recommendations.

6.12 Geohydrology Impacts

For the development of the proposed Kuruman WEF the developer intends to make use of existing boreholes (if available and if suitable) in agreement with current landowners to source groundwater for purposes of both the construction and operational phases of the project. During the construction phase (anticipated duration of 18 months, with the highest use during the first 6 months) an average of 409,640 liters per week will be abstracted; use includes the construction of turbine foundations, roads and dust suppression, thereafter approximately 100 L/week during the operational phase. Groundwater will be stored in suitable containers or reservoir tanks (or similar) during the operational phase. The option exist to drill and authorise additional boreholes on site should the existing daily yield not suffice.

The proposed WEF project and its associated activities can potentially impact the groundwater quality of the aquifer, although the probability of this occurring is low. The primary groundwater quality alteration concern is the high vulnerability area towards the north-eastern portion of the Kuruman WEF Phase 1 site despite the low groundwater potential. Possible contamination sources include contaminated storm water outflows, vehicle oil spillage and fuel leakage during the construction phase.

The following potential impacts to the groundwater and geohydrological resources have been identified during the scoping phase:

- **Construction Phase**
  - Potential impact on the groundwater as a result of the construction of storage yards and temporary labour accommodation;
  - Potential impact of increased storm water outflows; and
  - Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.

- **Operational Phase**
  - Potential impact of increased storm water outflows; and
  - Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.

- **Decommissioning Phase**
  - Potential impact on groundwater quality as a result of accidental oil spillages and fuel leakages.

- **Cumulative Impacts**
  - Long term surface source pollution may lead to the formation of sinkholes in the Karst aquifer towards the north east of the study area, assuming the general groundwater flow direction is towards the north east.

6.12.1 Assessment to be undertaken during the EIA Phase

A full Geohydrological Impact Assessment will be prepared and included in the EIA Report.

6.13 Conclusion

On-site impacts can be reduced to acceptable levels through avoidance, minimisation and appropriate mitigation measures to avoid or reduce potential impacts. Therefore, potential impacts associated with the Kuruman WEF project are anticipated to mainly be of very **low to moderate negative significance after mitigation**, whilst some positive socio-economic impacts of high significance are anticipated.

6.14 Cumulative Impacts

The cumulative impacts will be assessed by identifying other solar and wind energy within 50 km of the proposed Kuruman WEF that have been approved (i.e. positive EA has been issued) or the EIA is currently underway.

Cumulative effects associated with these similar types of projects include *inter alia*:

- Habitat destruction, loss and fragmentation;
- Removal of vegetation and impact on SCC;
- Impact on fauna, including mortality and displacement;
- Avifaunal collisions and mortalities (birds and bats);
- Loss of avifaunal habitat which lead to displacement;
- Impact on aquatic resources;
- Impact on heritage resources (including archaeology, palaeontology and cultural landscape);
- Loss of agricultural land;
- Increase in stormwater run-off and erosion;
- Increase in water requirements;
- Traffic generation and associated impacts on roads;
- Noise impact;
- Visual impact;
- Socio-economic impacts, including social upliftment and job creation; as well as generation of additional income stream for the landowners; and
- Upgrade of infrastructure and contribution of renewable energy into the National Grid.

The projects that are being undertaken or are proposed to be undertaken within 50 km of the proposed project are detailed in Table 6.2 and are also shown in Figure 6.1.

Table 6.2: EIA Processes currently underway within 50 km of the proposed Kuruman WEF project

DEA Reference number	Project title	Applicant	EAP	MW	Status
Wind Energy Projects					
To be Announced	Kuruman Wind Energy Facility (WEF) Phase 2 near Kuruman, Northern Cape Province	Mulilo Renewable Project Developments (Pty) Ltd	Council of Scientific and Industrial Research (CSIR)	200	In process
Solar PV Projects					
14/12/16/3/3/2/819	The 75MW AEP Legoko Photovoltaic Solar Facility on Portion 2 of the Farm Legoko 460, Kuruman Rd within the Gamagara Local Municipality in the Northern Cape Province	AEP Lekogo Solar (Pty) Ltd	Cape Environmental Assessment Practitioners	75	Approved
14/12/16/3/3/2/820	The 75MW AEP Mogobe Photovoltaic Solar Facility on portion 1 of the farm Legoko 460 and farm Sekgame 461, Kuruman Rd within the Gamagara Local Municipality in the Northern Cape Province	AEP Mogobe Solar (Pty) Ltd	Cape Environmental Assessment Practitioners	75	Approved
12/12/20/1858/1	Kathu Solar Energy Facility near Kathu, Northern Cape Province	Renewable Energy Investments South Africa Pty Ltd	Savannah Environmental Consultants (Pty) Ltd	75	In process
12/12/20/1858/2	Kathu Solar Energy Facility 25MW Phase 2 near Kathu, Northern Cape Province	Lokian Trading and Investments	Savannah Environmental Consultants (Pty) Ltd	25	Approved
12/12/20/1860	Proposed establishment of the Sishen Solar Farm on Portion 6 of Wincanton 472 near Kathu, Northern Cape Province	VentuSA Energy Pty Ltd	Savannah Environmental Consultants (Pty) Ltd	74	In process
12/12/20/1906	Proposed construction of solar farm for Bestwood, Kgalagadi District Municipality, Northern Cape Province	Kathu Property Developers Pty Ltd	Rock Environmental Consulting (Pty) Ltd	75	Approved
12/12/20/1994 12/12/20/1994/1 12/12/20/1994/2 12/12/20/1994/3	The Proposed Construction Of Kalahari Solar Power Project On The Farm Kathu 465, Northern Cape Province	Group Five Pty Ltd	WSP Environmental (Pty) Ltd	480	Approved

DEA Reference number	Project title	Applicant	EAP	MW	Status
12/12/20/2566	A 19MW Photovoltaic Solar Power Generation Plant On The Farm Adams 328 Near Hotazel, Northern Cape Province	Aurora Power Solutions (Pty) Ltd	EScience Associates (Pty) Ltd	19	In process
12/12/20/2567	The Proposed 150MW Adams Photo-Voltaic Solar Energy Facility On The Farm Adams 328 Near Hotazel Northern Cape Province	Aurora Power Solutions (Pty) Ltd	EScience Associates (Pty) Ltd	150	Approved
14/12/16/3/3/1/474	Construction of the Roma Energy Mount Roper Solar Plant on the Farm Mount Roper 321, Kuruman, Ga-Segonyana Local Municipality	Roma Energy Mount Roper (Pty) Ltd	EnviroAfrica Environmental Consultants (Pty) Ltd	10	In process
14/12/16/3/3/1/475	The Proposed Construction Of Keren Energy Whitebank Solar Plant On Farm Whitebank 379, Kuruman, Northern Cape Province	Keren Energy Whitebank (Pty) Ltd	EnviroAfrica Environmental Consultants (Pty) Ltd	10	Approved
14/12/16/3/3/2/273	The Proposed San Solar Energy Facility And Associated Infrastructure On A Site Near Kathu, Gamagara Local Municipality, Northern Cape Province	San Solar Energy Facility (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	75	Approved
14/12/16/3/3/2/616	Proposed renewable energy geneartion project on Portion 1 of the Farm Shirley No. 367, Kuruman RD, Gamagara Local Municipality, Shirley Solar Park	Danax Energy (Pty) Ltd	AGES Limpopo (Pty) Ltd	75	Approved
14/12/16/3/3/2/761	Proposed 75 MW Perth-Kuruman Solar Farm on the remainder of the farm Perth 276 within the Joe Morolong Local Municipality, Northern Cape Province	Agulhas-Hotazel Solar Power (Pty) Ltd	Strategic Environmental Focus (Pty) Ltd	75	In process
14/12/16/3/3/2/762	The 75MW Perth-Hotazel Solar Farm and its associated infrastructure on the Remainder of the Farm Perth 276 within the Joe Morolong Local Municipality in Northern Cape Province	Agulhus-Hotazel Solar Power (Pty) Ltd	Strategic Environmental Focus (Pty) Ltd	75	In process
14/12/16/3/3/2/911	Proposed 75MW AEP Kathu Solar PV Energy Facility on the Remainder of the Farm 460 Legoko near Kathu within the Gamagara local Municipality in the Northern Cape Province	AEP Kathu Solar (Pty) Ltd	Cape Eprac	75	Approved
14/12/16/3/3/2/934	Kagiso Solar Power Plant near Hotazel, Northern Cape Province	Kagiso Solar Power Plant (RF) (Pty) Ltd	Environamics cc	115	In process

DEA Reference number	Project title	Applicant	EAP	MW	Status
14/12/16/3/3/2/935	Proposed 115 Megawatt (MW) Boitshoko Solar Power Plant on the Remaining Extent of Portion 1 of The Farm Lime Bank no. 471, near Kathu in the Gamagara Local Municipality, Northern Cape	Boitshoko Solar Power Plant (RF) (Pty) Ltd	Environamics cc	115	Approved
14/12/16/3/3/2/936	Tshepo Solar Power Plant near Hotazel, Northern Cape	Tshepo Solar Power Plant (RF) (Pty) Ltd	Environamics cc	115	In process

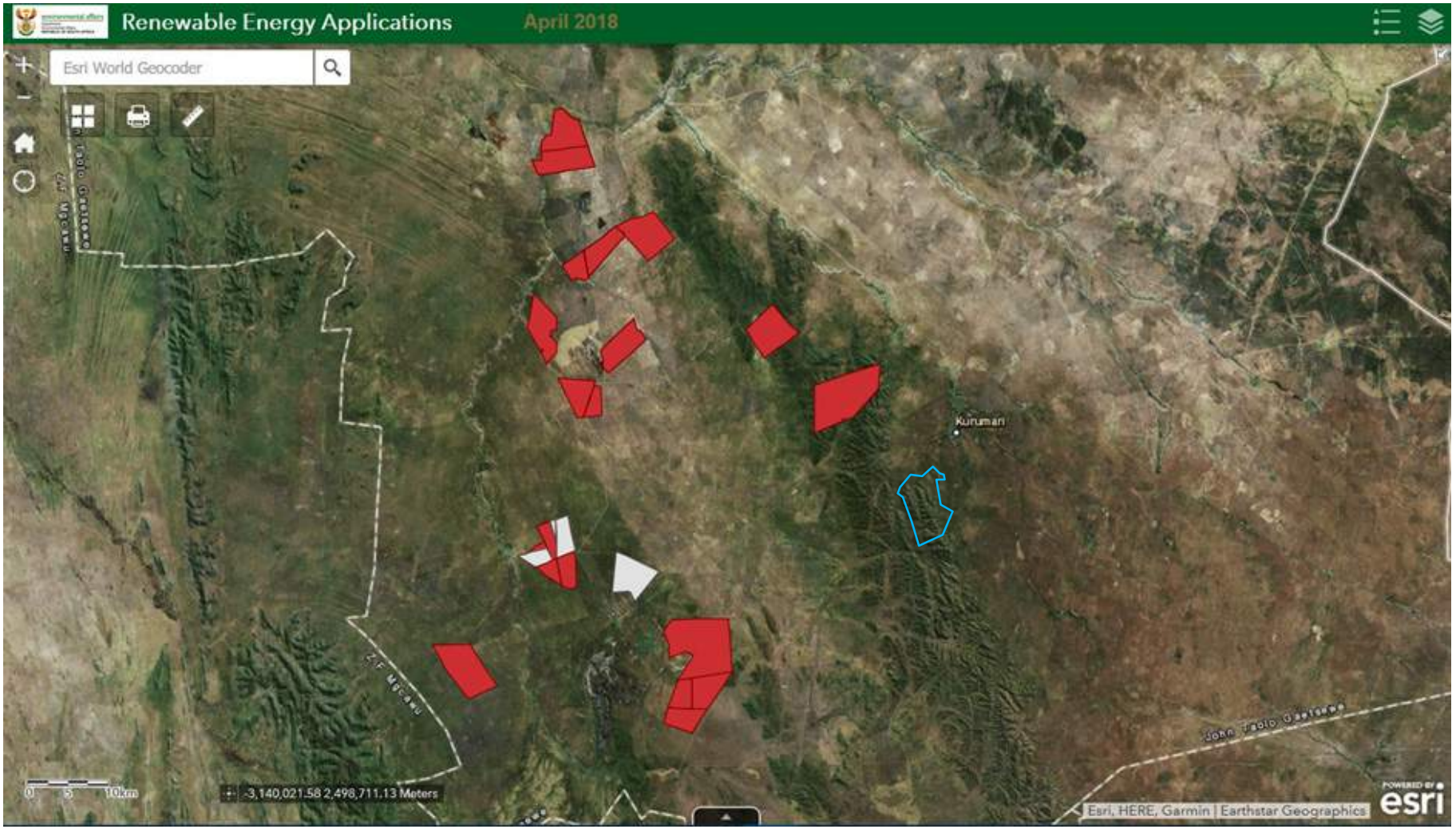
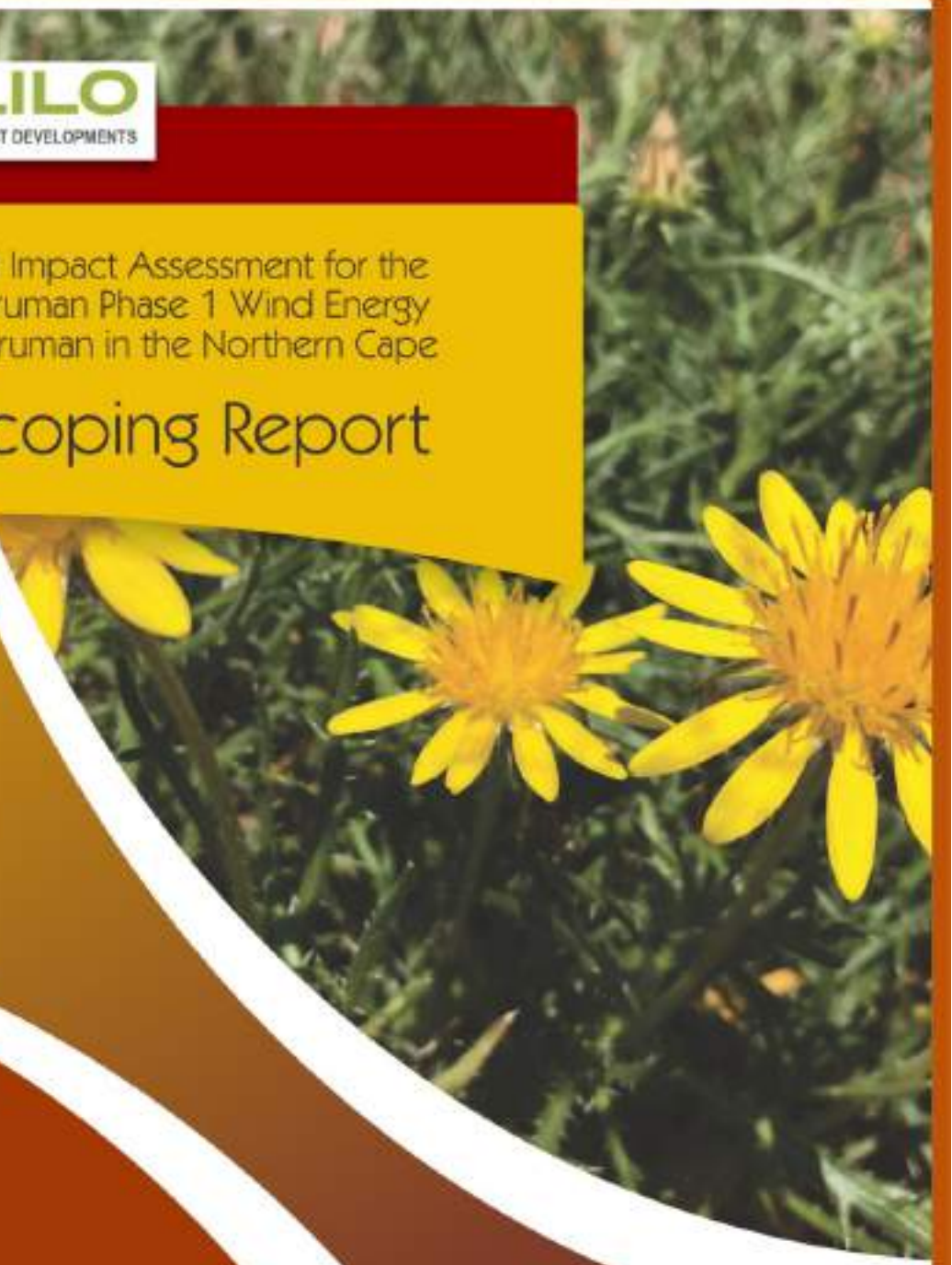


Figure 6.1: Other Renewable Energy (Solar PV) Facilities proposed within 50 km of the proposed Kuruman WEF Phase 1 site (site boundary in blue).

MULILO
RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 1 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report



CHAPTER 7:
Plan of Study for EIA

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7 PLAN OF STUDY FOR EIA

This chapter presents the Plan of Study for the EIA (PSEIA), which sets out the process to be followed in the EIA Phase (as required by the NEMA EIA Regulations of December 2014, (as amended). The PSEIA is based on the outcomes of the Scoping Phase (to date) and provides the Terms of Reference (ToR) for the specialist studies that have been identified, the alternatives that will be considered and assessed, as well as the PPP that will be undertaken during the EIA Phase.

7.1 Purpose of EIA and Requirements of the EIA Regulations

The purpose of the EIA Phase is to:

- Address issues that have been identified through the Scoping Process;
- Assess alternatives to the proposed activity in a comparative manner;
- Assess all identified impacts and determine the significance of each impact; and
- Recommend actions to avoid/mitigate negative impacts and enhance benefits.

The EIA Phase consists of three parallel and overlapping processes:

- Central assessment process through which inputs are integrated and presented in an EIA Report that is submitted for approval to the DEA and other commenting authorities (Sections 7.2, 7.3, and 7.4);
- Undertaking of a PPP whereby findings of the EIA Phase are communicated and discussed with I&APs and responses are documented (Section 7.3);
- Undertaking of specialist studies that provide additional information/assessments required to address the issues raised in the Scoping Phase (Sections 7.5, 7.6 and 7.7).

Table 7.1 below shows the requirements for the PSEIA in accordance with Appendix 2 (1) (h) of the 2017 NEMA EIA Regulations.

Table 7.1/...

Table 7.1: Requirements for Plan of Study for EIA in accordance with the 2017 NEMA EIA Regulations

Section of the EIA Regulations: Appendix 2 (1) (h)	Requirements for a PSEIA in the Scoping Report in terms of Appendix 2 of the 2017 NEMA EIA Regulations (GN R326)	Location in this Chapter
i	A plan of study for undertaking the EIA process to be undertaken, including - ▪ a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;	Section 7.7
ii	▪ a description of the aspects to be assessed as part of the environmental impact assessment process;	Section 7.6
ii	▪ aspects to be assessed by specialists;	Section 7.6
iv	▪ a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;	Section 7.5
v	▪ a description of the proposed method of assessing duration and significance;	Section 7.5
vi	▪ an indication of the stages at which the competent authority will be consulted;	Section 7.3 and Section 7.4
vii	▪ particulars of the public participation process that will be conducted during the environmental impact assessment process;	Section 7.3 and Section 7.4
viii	▪ a description of the tasks that will be undertaken as part of the environmental impact assessment process; and	Section 7.2, Section 7.3, Section 7.4 and Section 7.8.
ix	▪ identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	Section 7.9

7.2 Overview of Approach to Preparing the EIA Report and EMPr

The results of the specialist studies and other relevant project information for the Kuruman WEF will be summarised and integrated into the EIA Report. The EIA Report will be released for a 30-day I&AP and authority review period, as outlined in Sections 7.3 and 7.4 of this chapter. All registered I&APs on the project database will be notified in writing of the release of the EIA Report for review. At this stage it is not anticipated that there will be a need for a public meeting/s to be held. However, should it be deemed necessary (based on feedback on the Scoping Process) or following requests from I&APs, one public meeting can be arranged during this review period. Alternatively, following requests from stakeholders, several focus group meetings with key I&APs and stakeholders can be arranged. The purpose of these meetings (if deemed necessary) will be to provide an overview of the outcome and recommendations from the specialist studies, as well as provide opportunity for comment.

Comments raised, through written correspondence (emails, comments, forms) and at meetings (public meeting and/or focus group meetings) will be captured in a Comments and Responses Trail for inclusion in the EIA Report that will be submitted to the DEA for decision-making in terms of Regulation 23 (1) (a) of the 2014 EIA Regulations (as Amended). Comments raised will be responded to by the EIA team and/or the applicant. These responses will indicate how the issue has been dealt with in the EIA Process. Should the comment received fall beyond the scope of this EIA, clear reasoning will be provided. All comments

received (and the associated responses from the EIA team) will be attached as an appendix to the EIA Report for submission to the DEA.

The EIA Report will include an EMPr, which will be prepared in compliance with the relevant regulations (i.e. Appendix 4 of the 2014 NEMA EIA Regulations (as Amended)). This EMPr will be based broadly on the environmental management philosophy presented in the ISO 14001 standard, which embodies an approach of continual improvement. Actions in the EMPr will be drawn primarily from the management actions in the specialist studies for the construction and operational phases of the project. If the project components are decommissioned or re-developed, this will need to be done in accordance with the relevant environmental standards and clean-up/remediation requirements applicable at the time.

7.3 Public Participation Process

The key steps in the PPP for the EIA Phase are described below. This approach will be confirmed with the provincial and national environmental authorities through their review of the PSEIA.

The PPP for the Scoping Process is described in Chapter 4 of this Scoping Report. As discussed in Chapter 1 and Chapter 4 of this Scoping Report, an integrated PPP will be undertaken for the Kuruman EIA as well as the BA project (i.e. Kuruman – Transmission Lines). Separate EIA and BA Reports will be compiled and these will be made available for comment in an integrated manner. All advertisements, notification letters and emails etc. will serve to notify the public and organs of state of the joint availability the EIA and BA reports for the above-mentioned projects and will provide I&APs with an opportunity to comment on the reports. As previously noted, the BA Report will be released with the EIA Report in order to comply with the timeframes stipulated in the 2014 NEMA EIA Regulations (as Amended). The schedule of these processes is outlined in Table 4.1 included in Chapter 4 of this Scoping Report.

TASK 1: I&AP REVIEW OF THE EIA REPORT AND EMPR

The first stage in the process will entail the release of the EIA Report for a 30-day I&AP and stakeholder review period. Relevant organs of state and I&APs will be informed of the review process in the following manner:

- Placement of one advertisement in the “Kathu Gazette” local newspaper to notify potential I&APs of the availability of the EIA Report for comment;
- A letter will be sent via registered mail and email to all registered I&APs and organs of state (where postal, physical and email addresses are available) on the database. The letter will include notification of the 30-day comment period for the EIA Report, as well as an invitation to attend the public meeting and/or focus group meetings, if required. The letter will include an Executive Summary of the EIA Report and a Comment and Registration Form;
- A public meeting could possibly be held during the review of the EIA Report, if warranted, and if there is substantial public interest during the EIA Phase. Furthermore, telephonic consultations with key I&APs will take place, upon request; and
- Focus Group Meeting(s) with key authorities involved in decision-making for this EIA (if required and requested).

The EIA Reports will be made available and distributed through the following mechanisms to ensure access to information on the project and to communicate the outcome of specialist studies:

- Copies of the report will be placed at the Kuruman and Kathu local libraries for I&APs to access for viewing;
- Key authorities will be provided with either a hard copy and/or CD of the EIA Report;

- The EIA Report will be uploaded to the project website (i.e.https://www.csir.co.za/environmental-impact-assessment); and
- Telephonic consultations will be held with key I&AP and organs of state groups, as necessary.

TASK 2: COMMENTS AND RESPONSES TRAIL

A key component of the EIA Process is documenting and responding to the comments received from I&APs and the authorities. The following comments on the EIA Reports will be documented:

- Written and emailed comments (e.g. letters and completed comment and registration forms);
- Comments made at public meetings and/or focus group meetings (if required);
- Telephonic communication with CSIR project team; and
- One-on-one meetings with key authorities and/or I&APs (if required).

The comments received during the 30-day review of the EIA Report will be compiled into a Comments and Responses Trail for inclusion in an appendix to the EIA Report that will be submitted to the National DEA in terms of Regulation 23 (1) (a) for decision-making. The Comments and Responses Trail will indicate the nature of the comment, as well as when and who raised the comment. The comments received will be considered by the EIA team and appropriate responses provided by the relevant member of the team and/or specialist. The response provided will indicate how the comment received has been considered in the EIA Report for submission to the National DEA and in the project design or EMPrs.

TASK 3: COMPILATION OF EIA REPORT FOR SUBMISSION TO THE DEA

Following the 30-day commenting period of the EIA Report and incorporation of the comments received into the reports, the EIA Report (i.e. hard copies and electronic copies) will be submitted to the DEA for decision-making in line with Regulation 23 (1) of the 2014 EIA Regulations (as Amended). In line with best practice, I&APs on the project database will be notified via email (where email addresses are available) of the submission of the EIA Report to the DEA for decision-making.

The EIA Report that is submitted for decision-making will also include proof of the PPP that was undertaken to inform organs of state and I&APs of the availability of the EIA Report for the 30 day review (during Task 1, as explained above). To ensure ongoing access to information, copies of the EIA Report that are submitted for decision-making and the Comments and Response Trail (detailing comments received during the EIA Phase and responses thereto) will be placed on the project website https://www.csir.co.za/environmental-impact-assessment).

The DEA will have 107 days (from receipt of the EIA Report) to either grant or refuse EA (in line with Regulation 24 (1) of the 2014 EIA Regulations (as Amended)).

TASK 4: EA AND APPEAL PERIOD

Subsequent to the decision-making phase, if an EA is granted by the DEA for the proposed project, all registered I&APs and stakeholders on the project database will receive notification of the issuing of the EA and the appeal period. Regulation 4 (1) of the 2014 EIA Regulations (as Amended) states that after the Competent Authority has reached a decision, it must inform the Applicant of the decision, in writing, within 5 days of such decision. Regulation 4 (2) if the 2014 EIA Regulations (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 and its respective timelines.

The following process will be followed for the distribution of the EA (should such authorisation be granted by the DEA) and notification of the appeal period:

- Placement of one advertisement in the "Kathu Gazette" local newspaper to notify I&APs of the EA and associated appeal process;
- A letter will be sent via registered mail and email to all registered I&APs and organs of state (where postal, physical and email addresses are available) on the database. 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 uploaded to the project website (https://www.csir.co.za/environmental-impact-assessment); and
- All I&APs on the project database will be notified of the outcome of the appeal period in writing.

7.4 Authority Consultation during the EIA Phase

Authority consultation is integrated into the PPP, with additional one-on-one meetings held with the lead authorities, where necessary. It is proposed that the Competent Authority (DEA) as well as other lead authorities will be consulted at various stages during the EIA Process. At this stage, the following authorities have been identified for the purpose of this EIA Process (additional authorities might be added to this list as the EIA Process proceeds):

- National DEA;
- Department of Environment and Nature Conservation of the Northern Cape Province;
- DWS of the Northern Cape Province;
- Department of Energy of the Northern Cape Province;
- Department of Mineral Resources of the Northern Cape Province;
- Eskom Holdings SOC Ltd;
- Transnet SOC Ltd;
- South African National Parks;
- World Wildlife Fund (WWF);
- Department of Social Development;
- National Energy Regulator of South Africa;
- National DAFF;
- DAFF of the Northern Cape Province;
- Department of Agriculture, Land Reform & Rural Development of the Northern Cape Province;
- Department of Public Works, Roads and Transport of the Northern Cape Province;
- Department of Labour;
- Birdlife South Africa;
- Square Kilometer Array Radio Telescope (SKA);
- South African Radio Astronomy Observatory (SARAO);
- South African Heritage Resources Agency (SAHRA);
- Ngwao Boswa Kapa Bokoni (Heritage Northern Cape);
- South African Civilian Aviation Authority;
- South African National Road Agency Limited;
- Gamagara Local Municipality;
- Ga-Segonyana Local Municipality, and the
- John Taolo Gaetsewe District Municipality.

The authority consultation process for the EIA Phase is outlined in Table 7.2 below.

Table 7.2: Authority Communication Schedule

STAGE IN EIA PHASE	FORM OF CONSULTATION
During the EIA Process	Site visit for authorities (including DEA), if required.
During preparation of EIA Report	Communication with the DEA on the outcome of Specialist Studies, if required.
On submission of EIA Report for decision-making	Meetings with dedicated departments, if requested by the DEA, with jurisdiction over particular aspects of the project (e.g. Local Authority) and potentially including relevant specialists.

7.5 Approach to Impact Assessment and Specialist Studies

This section outlines the assessment methodology and legal context for specialist studies, as recommended by the DEA 2006 Guideline on Assessment of Impacts.

7.5.1 Generic ToR for the Assessment of Potential Impacts

The identification of potential impacts should include impacts that may occur during the construction, operational and decommissioning phases of the development. The assessment of impacts is to include 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 project can be assessed. The process of identification and assessment of impacts will include:

- 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.

As per the DEAT Guideline 5: Assessment of Alternatives and Impacts the following methodology is to be applied to the predication and assessment of impacts. Potential impacts should be 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. The cumulative impacts will be assessed by identifying other wind and solar energy project proposals and other applicable projects, such as construction and upgrade of electricity generation, and transmission or distribution facilities in the local area (i.e. within 50 km of the proposed Kuruman WEF) that have been approved (i.e. positive EA has been issued) or is currently

underway. The proposed and existing relevant projects that will be considered as part of the cumulative impacts in the EIA Phase are provided in Chapter 6 of this Scoping Report.

- **Nature of impact** - this reviews the type of effect that a proposed activity will have on the environment and should include "what will be affected and how?"

- **Status** - Whether the impact on the overall environment (social, biophysical and economic) will be:
  - Positive - environment overall will benefit from the impact;
  - Negative - environment overall will be adversely affected by the impact; or
  - Neutral - environment overall will not be affected.

- **Spatial extent** – The size of the area that will be affected by the impact:
  - Site specific;
  - Local (<2 km from site);
  - Regional (within 30 km of site);
  - National; or
  - International (e.g. Greenhouse Gas emissions or migrant birds).

- **Intensity** – The anticipated severity of the impact:
  - High (severe alteration of natural systems, patterns or processes);
  - Medium (notable alteration of natural systems, patterns or processes); or
  - Low (negligible alteration of natural systems, patterns or processes).

- **Duration** – The timeframe during which the impact will be experienced:
  - Temporary (less than 1 year);
  - Short term (1 to 6 years);
  - Medium term (6 to 15 years);
  - Long term (the impact will cease after the operational life of the activity); or
  - Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient).

- **Reversibility of the Impacts** - the extent to which the impacts are reversible assuming that the project has reached the end of its life cycle (decommissioning phase) will be:

  - 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 Resource Loss caused by impacts** – 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) will be:

- 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 will further be assessed in terms of the following:

- **Probability** –The probability of the impact occurring:
    - Improbable (little or no chance of occurring);
    - Probable (<50% chance of occurring);
    - Highly probable (50 – 90% chance of occurring); or
    - Definite (>90% chance of occurring).

- **Consequence**–The anticipated severity of the impact:
    - Extreme (extreme alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they permanently cease);
    - Severe (severe alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);
    - Substantial (substantial alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);
    - Moderate (notable alteration of natural systems, patterns or processes, i.e. where the environment continues to function but in a modified manner); or
    - Slight (negligible alteration of natural systems, patterns or processes, i.e. where no natural systems/environmental functions, patterns, or processes are affected).

- **Significance** – To determine the significance of an identified impact/risk, the consequence is multiplied by probability (qualitatively as shown in Figure 7.1 below). The 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, very high) against a predefined set of criteria (as shown in Figure 7.1 below).

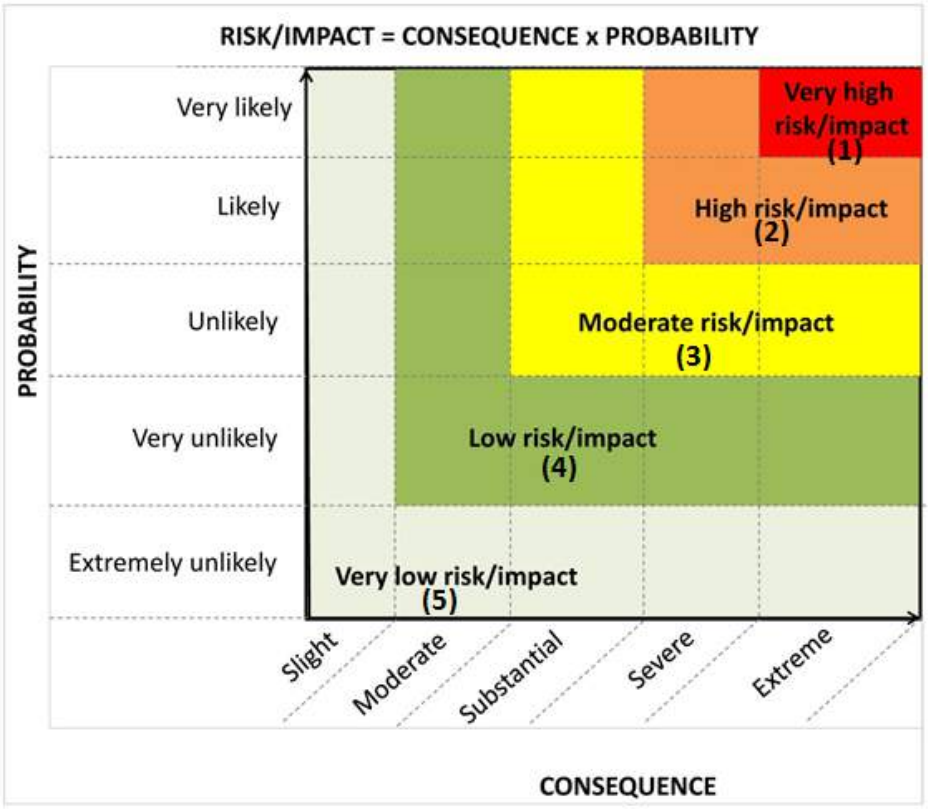

Figure 7.1: Guide to assessing risk/impact significance as a result of consequence and probability.

- **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); or
    - High (the risk/impacts will result in a considerable alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making);
    - Very high (the risk/impacts 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 (i.e. the project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating)).

The above assessment must be described in the text (with clear explanation provided on the rationale for the allocation of significance ratings) and summarised in an impact assessment Table in a similar manner as shown in the example below (Table 7.3).

- **Confidence** – The degree of confidence in predictions based on available information and specialist knowledge:
    - Low;

- Medium; or
- High.

- **Ranking -** With the implementation of mitigation measures, the residual impacts/risks must be ranked as follow in terms of significance:

    - Very low = 5;
    - Low = 4;
    - Moderate = 3;
    - High = 2; and
    - Very high = 1.

Impacts will then be collated into the EMPr and these will include the following:

- Quantifiable standards for measuring and monitoring mitigatory measures and enhancements will be set. This will include 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 will be stated;
- Positive impacts will be identified and augmentation measures will be identified to potentially enhance positive impacts where possible.

Other aspects to be taken into consideration in the assessment of impact significance are:

- Impacts will be evaluated for the construction and operation phases of the development. The assessment of impacts for the decommissioning phase will be 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 will be 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 will, where possible, take into consideration the cumulative effects associated with this and other facilities/projects which are either developed or in the process of being developed in the local area; and
- The impact assessment will attempt to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

Table 7.3 is to be used by specialists for the rating of impacts.

Table 7.3: Example of Table for Assessment of Impacts or Aspects

Impact pathway	Nature of potential impact/risk	Status[1]	Extent[2]	Duration[3]	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk = consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ impact (after mitigation)	Ranking of impact/ risk	Confidence level
VISUAL IMPACTS															
CONSTRUCTION PHASE															
Effect of construction activities	Visual intrusion, dust, and noise	Negative	Local	Short-term	Substantial	Very Likely	High	Low	Moderate	No	Yes	Careful siting of construction camp. Implementation of EMPr.	Moderate	3	Medium

[1] Status: Positive (+) ; Negative (-)
[2] Site; Local (<10 km); Regional (<100); National; International
[3] Very short-term (instantaneous); Short-term (<1yr); Medium-term (1-10 yrs); Long-term (project duration); Permanent (beyond project decommissioning)

7.6 Impacts or aspects to be assessed as part of the EIA process

The impacts or aspects that will be assessed as part of the EIA process through the specialist studies/input have been summarised below in Table 7.4 for ease of reference. The identification process undertaken to identify impacts and the relevant studies required for the EIA phase are outlined in Chapter 6 of this report.

Table 7.4: Summary of aspects/impacts identified and to be addressed as part of the EIA Process in the specialist studies/input

Specialist Study/Input	Issues or Aspects to be addressed
Ecological Impact Assessment: Terrestrial and Freshwater	**Terrestrial Ecology Impacts** The proposed development will result in the loss of approximately 100 ha of vegetation during the construction phase. The proposed development site will also have an impact on SCC and fauna through mortality and habitat loss. The proposed development will result in a number of impacts including: ▪ Impacts on vegetation and plant SCC; ▪ Direct and indirect faunal impacts; ▪ Increased erosion; ▪ Increased alien plant invasion; ▪ Impacts on CBA 2 and ESA; ▪ Cumulative impact on habitat loss and broad-scale ecological processes; and ▪ Cumulative impact-Decreased ability to meet future conservation targets **Freshwater Ecology Impacts** The potential impacts of the proposed project are most likely associated with surface, vegetation and land clearing during site preparation and construction. These impacts include: ▪ Physical disturbance and destruction of aquatic features (ephemeral rivers, wetlands, pans) and major drainage lines; and ▪ Altered drainage patterns, increased runoff and sedimentation of related ecosystems.
Visual Impact Assessment	The potential visual impacts of the development of the proposed Kuruman WEF identified by the visual specialists during the scoping phase of this EIA process include the following: ▪ Potential scarring in the landscape caused by earthworks for access roads and assembly platforms, particularly on the steeper slopes; ▪ Visual effect of wind turbines on the ridge skylines; ▪ Potential visual clutter in the landscape of on-site substation, O&M structures; and ▪ Dust emissions during construction from heavy machinery and truck traffic.
Heritage Impact Assessment (Archaeology and Cultural	The potential heritage impacts associated with the development of the proposed Kuruman WEF identified during the scoping phase of this EIA process include:

Specialist Study/Input	Issues or Aspects to be addressed
Landscape)	▪ The destruction or disturbance of archaeological sites and their immediate contexts; ▪ The destruction or disturbance of graves and their immediate contexts; ▪ Visual intrusion into the cultural landscape which might erode its association with intangible heritage. All other identified heritage resource types may be impacted at all phases of the development except for palaeontological resources which should not be affected during the operational phase.
Desktop Palaeontological Impact Assessment	The only palaeontologically highly sensitive areas in this region are the small outcrop areas of Precambrian Ghaap Group carbonate rocks (limestones / dolomites) that occur on the southwest outskirts of Kuruman (e.g. close to Segame substation) and at intervals along the eastern escarpment of the Kuruman Mountains. The small outcrop areas of Precambrian Ghaap Group carbonate rocks along the eastern escarpment contain a range of well-preserved stromatolites (fossil microbial mounds), as well as displaying geoscientifically important stratigraphic and sedimentological features. They should therefore, if possible, be avoided. Hence, though of low probability, any find will be of considerable importance. The potential impact identified during the scoping phase: The destruction or disturbance of palaeontological materials (isolated fossils) either directly or indirectly during the construction and decommissioning phases.
Bird Impact Assessment	The main potential impacts identified for the proposed WEF and its associated infrastructure during the construction, operational and decommissioning phases are: ▪ Displacement through disturbance and habitat destruction or loss; ▪ Mortality through collisions with operational turbines and/or overhead powerlines; ▪ Electrocution of birds from electrical infrastructure including overhead powerlines; and ▪ Disruption of local bird movement patterns.
Bat Impact Assessment	Wind energy facilities have the potential to impact bats directly and indirectly through collisions, barotrauma resulting in mortality and habitat modification. Habitat loss and displacement impacts for the proposed Kuruman WEF are relatively small and should not pose a significant risk because of the project footprint. Direct impacts to bats will be limited to species that make use of the airspace in the rotor-swept zone of the wind turbines, these impacts include: ▪ Roost disturbance and destruction; ▪ Habitat modification; ▪ Bat mortality during commuting and/or foraging and during migration by colliding with the operational wind turbines and/or due to barotrauma; and ▪ Displacement and reduced foraging opportunities for bats.

Specialist Study/Input	Issues or Aspects to be addressed
Noise Impact Assessment	The main potential noise impacts identified during the construction and operational phases have been identified as: ▪ Increase in ambient sound levels as a result of construction activities during the day and night; and ▪ Increase in ambient sound levels as a result of operational wind turbines at night.
Socio-Economic Assessment	The following potential key socio-economic impacts have been identified during the scoping phase for the construction, operation, and decommissioning phases of the project: ▪ Staff required to construct, operate and decommission the WEF and associated infrastructure on site, will cause an influx of people; ▪ The WEF and associated infrastructure will be visible which may have an impact on tourism and surrounding property values; ▪ The landowner will have an alternative land-use for his property, which will diversify his income stream; ▪ The project developer would need to employ people to work on the project and potentially source materials from local businesses, thereby creating local employment opportunities and income for other sectors; ▪ The project developer would need to spend their Social and Economic Development (SED) budget in the local area, thereby providing benefits to the local communities; and ▪ Loss of project expenditure during decommissioning.
Agricultural and Soil Potential Assessment	The following potential key impacts on agricultural resources have been identified during the construction, operation, and decommissioning phases: ▪ Loss of agricultural land use due to direct occupation by the infrastructural footprint of the development for the duration of the project. This will take affected portions of land out of agricultural production; ▪ Soil erosion as the result of wind or water. This may be due to alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction-related land surface disturbance, vegetation removal, and the establishment of hard standing areas, surfaces, and roads. Erosion will cause loss and deterioration of soil resources; ▪ Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (leveling, excavations, road surfacing etc.) and resultant decrease in that soil's capability for supporting vegetation; and ▪ Degradation of veld vegetation beyond the direct facility footprint due to constructional disturbance and potential trampling by vehicles.
Transportation/Traffic Impact Assessment	The following potential traffic-related impacts were identified during the construction, operation and decommissioning phases of the project:

Specialist Study/Input	Issues or Aspects to be addressed
	▪ Noise, dust and exhaust pollution due to the increased vehicles trips on the internal on-site roads; ▪ Noise, dust and exhaust pollution due to the increased vehicles trips on the local unsurfaced access roads; ▪ Noise, dust v exhaust pollution due to the increased vehicles trips on the high-order local road (R31); and ▪ Noise, dust and exhaust pollution due to the increased vehicles trips on the N14.
Geohydrological Impact Assessment	The following potential impacts of the proposed WEF project activities on groundwater and geohydrological resources are predicted: ▪ Impact on the groundwater as a result of potential spillages during the construction of storage facilities and temporary labour accommodation; ▪ Potential impact of increased storm water outflows during the construction and operational phase; and ▪ Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages during the construction, operational and decommissioning phases. It is anticipated that any construction activities such as the excavation and installation of foundations and piling will have minimal to no impact on the groundwater of the site or region, as the groundwater level is fairly deep.

7.7 Alternatives to be assessed in the EIA Phase

A description of the alternatives that will be assessed or considered during the EIA Phase is provided in Chapter 5 of this Scoping Report. However, they have been summarised below for ease of reference:

- **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 Kuruman WEF. This alternative would result in no environmental impacts on the site or surrounding local area, as a result of the facility. It will provide a baseline against which other alternatives will be compared and considered during the EIA Phase. The no-go alternative will be assessed in detail by all the specialists on the project team.
- **Land Use (Activity) Alternative:**
  - The current land use is agriculture and this has been identified as an alternative land use for the site. The agricultural potential of the site is very low and not deemed feasible to assess further during the EIA Phase. The implementation of a WEF at the proposed project site is more favourable than the agricultural land use alternative and is therefore the preferred land use alternative.

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

- The site has a good wind resource based on WASA data and on-site measurements;
- Government Gazette 39111 allocated a higher allocation target to wind energy compared to solar energy.

- **Preferred Site and Development Footprint within the site:**
  - The preferred site for the proposed Kuruman WEF Phase 1extends over the following farm portions:

    - Remainder (RE) of Rossdale Farm 382;
    - Portion 1 of Hartland Farm 381;
    - Portion 2 of Hartland Farm 381,
    - Portion 2 of Carrington Farm 440;
    - Portion 4 of Carrington Farm 440; and
    - RE of Woodstock Farm 441.

  - The determination of the development footprint within the site was determined through a screening assessment of the site by the specialist team (specialists input have been provided and are included in Appendix G of this Scoping Report) and consultation with the landowners to identify possible areas that should not be proposed for the development (i.e. exclusion zones). These have been excluded from the proposed development footprint. The proposed development footprint of the proposed Kuruman WEF is approximately 584 ha.

- **Layout Alternatives:**
  - Layout alternatives for the project will be determined following the input from the various specialists during the EIA phase. The studies will aim to identify various environmental sensitivities within the development footprint that should be avoided, which will be taken into account during the determination of the proposed layout of the WEF.
  - Existing access roads will be used- no reasonable and feasible alternative access road options exist to be assessed or taken forward into the EIA phase.

It is important to note that where alternatives are not feasible or will not be assessed, a motivation has been provided in Chapter 5 of this Scoping Report. The preferred alternatives will be assessed during the EIA Phase.

7.8 ToRs for the Specialist Studies

The ToRs for the specialist studies will essentially consist of the generic assessment requirements and the specific issues identified for each discipline. The ToRs will be updated to include relevant comments received from I&APs and authorities during the 30-day review of the Scoping Report.

The following specialist studies have been identified based on the issues identified to date, as well as potential impacts associated with the project. The ToR for each specialist study is discussed in detail below. The specialist studies and associated specialists are shown in Table 7.5 below. Additional specialist studies could possibly be commissioned as a result of issues raised during the Scoping Process.

Table 7.5: Specialist Studies and Associated Specialists for the proposed Kuruman WEF

ROLE/STUDY TO BE UNDERTAKEN	ORGANISATION	NAME
Bat Impact Assessment	Animalia Consultants (Pty) Ltd	Werner Marais
Bird Impact Assessment	Chris van Rooyen Consulting	Chris van Rooyen
Freshwater Assessment	EnviroSwift (Pty) Ltd	Natasha van de Haar
Geohydrology Assessment	Geohydrological and Spatial Solutions International (Pty) Ltd	Julian Conrad
Heritage Impact Assessment (Archaeology and Cultural Landscape)	Cedar Tower Services (Pty) Ltd	Nicholas Wiltshire
Noise Impact Assessment	Enviro-Acoustic Research cc	Morné de Jager
Palaeontological Impact Assessment	Private, sub-contracted by Cedar Tower Services (Pty) Ltd	Dr John Almond
Socio-Economic Impact Assessment	Urban-Econ Development Economists (Pty) Ltd	Elena Broughton
Soils and Agricultural Potential Assessment	Private	Johann Lanz
Terrestrial Ecology (fauna and flora)	3Foxes Biodiversity Solutions	Simon Todd
Transportation Impact Assessment	JG Afrika (Pty) Ltd	Adrian Johnson
Visual Impact Assessment	SiVEST SA (Pty) Ltd	Stephan Jacobs

Generic ToR for all the specialist studies:

- Adhere to the requirements of specialist studies as outlined in Appendix 6 of the 2014 NEMA EIA Regulations, as amended;
- Assess the no-go alternative very explicitly in the impact assessment section;
- Assess cumulative impacts by identifying other wind and solar energy project proposals and other applicable projects, such as construction and upgrade of electricity generation, transmission or distribution facilities in the local area (i.e. within 50 km of the proposed Kuruman WEF project) that have been approved (i.e. positive EA has been issued) or the EIA is currently underway.

7.8.1 Terrestrial Ecology Impact Assessment: Fauna and Flora

Table 7.4 and Chapter 6 of this Scoping Report highlights the impacts that will be addressed in the Terrestrial Ecological Impact Assessment as part of the EIA Phase of the proposed project. Based on the impacts identified, the potential impacts arising should be considered in terms of both the construction, operational and decommissioning phases. The possible impacts arising as a consequence of the implementation of the proposed project will be considered through the undertaking of a **detailed Terrestrial Ecological Impact Assessment (including terrestrial fauna and flora)**. The findings of the Terrestrial Ecological Impact Assessment will be used to inform the project layout by avoiding no-go areas.

The ToR for the Terrestrial Ecological Impact Assessment includes the following:

- a description of the environment that may be affected by a specific activity and the manner in which the environment may be affected by the proposed project;
- a description and evaluation of environmental issues and potential impacts (including assessment of direct, indirect and cumulative impacts) that have been identified;

- a statement regarding the potential significance of the identified issues based on the evaluation of the aspects/impacts;
- an indication of the methodology used in determining the significance of potential environmental impacts;
- an assessment of the significance of direct, indirect and cumulative impacts of the development (use the CSIR methodology to determine the significance of potential impacts as provided in Section 7.5 of this Chapter);
- a description and assessment of all alternatives including the no-go alternative;
- an assessment of cumulative impacts of other solar and wind energy projects as well as other relevant projects (i.e. powerlines) within an area of 50 km from the proposed site (please refer to the projects listed in Table 6.2 of Chapter 6 of this report);
- recommendations regarding practical mitigation measures for potential impacts, for inclusion in the EMPr;
- an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- a description of any assumptions, uncertainties, limitations and gaps in knowledge;
- a description of the relevant legal requirements;
- an environmental impact statement which contains:
- a summary of the key findings of the environmental impact assessment;
- an assessment of the positive and negative implications of the proposed activity;
- a comparative assessment of the positive and negative implications of identified alternatives; and
- address all relevant comments received during the Scoping and EIA phases of the project.

7.8.2 Freshwater Ecology Impact Assessment

The ToR for the Freshwater Impact Assessment includes the following activities:

- a description of the environment (aquatic resources) that may be affected by a specific activity and the manner in which the environment may be affected by the proposed project;
- a description and evaluation of environmental issues and potential impacts (including assessment of direct, indirect and cumulative impacts) that have been identified;
- a statement regarding the potential significance of the identified issues based on the evaluation of the aspects/impacts;
- an indication of the methodology used in determining the significance of potential environmental impacts ; (the CSIR methodology to determine the significance of potential impacts as provided to the specialist must be used (as outlined in Section 7.5 of this Chapter);
- an assessment of the significance of direct and indirect impacts of the development. Use the CSIR methodology to determine the significance of potential impacts as outlined in Section 7.5 of this Chapter);
- a description and assessment of all alternatives including the no-go alternative;
- an assessment of cumulative impacts of other solar and wind energy projects as well as other relevant projects (i.e. powerlines) within an area of 50 km from the proposed site (please refer to the projects listed in Table 6.2 of Chapter 6 of this report);
- identify no-go areas or buffers to inform the project layout;
- recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the EMPr;
- an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- a description of any assumptions uncertainties and gaps in knowledge;

- an environmental impact statement which contains:
- a summary of the key findings of the environmental impact assessment;
- an assessment of the positive and negative implications of the proposed activity;
- a comparative assessment of the positive and negative implications of identified alternatives; and
- the specialist study must address all relevant comments raised during the Scoping and EIA phases.

7.8.3 Bird Impact Assessment

The ToR for the Bird Impact Assessment to be undertaken:

- Provide a description of the current environmental conditions, in sufficient detail so that there is a baseline description/status quo against which impacts can be identified and measured i.e. suitability of the project area with regards to bird habitat/foraging, important vegetation features etc.;
- Provide a description of species composition and conservation status in terms of protected, endangered or vulnerable bird species. This description will include species which are likely to occur within, traverse across or forage within the proposed project area, as well as species which may not necessarily occur on site, but which are likely to be impacted upon as a result of the proposed development;
- Conduct field work to identify bird species presence at the proposed site;
- Compile a detailed list of bird species present on site, including SCC;
- Identification of issues and potential impacts related to birds, which are to be considered in combination with any additional relevant issues that may be raised through the PPP;
- Identify and assess potential direct and indirect impacts on birds within the site during the construction, operation and decommissioning phases of the project. Provide an assessment of the irreversibility of impacts, and the irreplaceability of lost resources. Use the CSIR methodology to determine the significance of potential impacts as outlined in Section 7.5 of this Chapter;
- Provide an assessment of the different possible ranges, e.g.: hub height: 80 - 140 m; rotor diameter: 100 - 160 m; Blade length: 50 - 80 m, minimum bottom clearance: 30 m, max tip height 230 m;
- Assess the cumulative impacts by identifying other REFs such as wind and solar and other applicable projects, such as construction and upgrade of electricity generation, and transmission or distribution facilities in the local area (i.e. within 50 km of the proposed WEF). These include projects that have been approved (i.e. positive EA has been issued), have been constructed or projects for which an Application for Environmental Authorisation has been lodged with the Competent Authority (see Table 6.2 in Chapter 6 of this report for a list of projects);
- Assess possible alternatives identified where relevant, including the no-go alternative;
- Compilation of a bird sensitivity map or identification of buffer zones and no-go areas to inform the project layout;
- Provide input to the EMPr, including mitigation and monitoring requirements to avoid or reduce negative impacts during construction, operation and decommissioning of the project. Provide additional management and monitoring requirements, as relevant;
- In addition to the specialist study, undertake a 12 month pre-construction bird monitoring programme (i.e. commissioned by Mulilo). The results and recommendations of this monitoring programme (including data of all four seasons) should be included in the specialist study and EMPr that will be included in the EIA Report;

- Provide a description of any assumptions, uncertainties, limitations and gaps in knowledge;
- Provide a description of the relevant legal context and requirements; and
- Incorporate and address issues and concerns raised during the Scoping Phase of the EIA where they are relevant to the specialist's area of expertise.

7.8.4 Bat Impact Assessment

The ToR for the Bat Impact Assessment to be undertaken:

- Provide a description of the current environmental conditions, in sufficient detail so that there is a baseline description/status quo against which impacts can be identified and measured i.e. suitability of the project area with regard to bat habitat/foraging, important vegetation features, etc.;
- Provide a description of species composition and conservation status in terms of protected, endangered or vulnerable bird species. This description will include species which are likely to occur within, traverse across or forage within the proposed project area, as well as species which may not necessarily occur on site, but which are likely to be impacted upon as a result of the proposed development;
- Conduct field work to identify bat species presence at the proposed site;
- Compile a detailed list of bat species present on site, including SCC;
- Identification of issues and potential impacts related to bats, which are to be considered in combination with any additional relevant issues that may be raised through the PPP;
- Identify and assess potential direct and indirect impacts on bats within the site during the construction, operation and decommissioning phases of the project. Provide an assessment of the irreversibility of impacts, and the irreplaceability of lost resources. Use the CSIR methodology to determine the significance of potential impacts as as outlined in Section 7.5 of this Chapter;
- Provide an assessment of the different possible ranges, e.g.: hub height: 80 - 140 m; rotor diameter: 100 - 160 m; Blade length: 50 - 80 m, minimum bottom clearance: 30 m, max tip height 230 m;
- Assess the cumulative impacts by identifying other REFs such as wind and solar and other applicable projects, such as construction and upgrade of electricity generation, and transmission or distribution facilities in the local area (i.e. within 50 km of the proposed WEF). These include projects that have been approved (i.e. positive EA has been issued), have been constructed or projects for which an Application for Environmental Authorisation has been lodged with the Competent Authority (see Table 6.2 in Chapter 6 of this report for a list of projects);
- Assess possible alternatives identified where relevant, including the no-go alternative.
- Compilation of a bat sensitivity map or identification of buffer zones and no-go areas to inform the project layout;
- Provide input to the EMPr, including mitigation and monitoring requirements to avoid or reduce negative impacts during construction, operation and decommissioning of the project. Provide additional management and monitoring requirements, as relevant.
- In addition to the specialist study, undertake a 12 month pre-construction bat monitoring programme (i.e. commissioned by Mulilo). The results and recommendations of this monitoring programme (including data of all four seasons) should be included in the specialist study and EMPr that will be included in the EIA Report;
- Provide a description of any assumptions, uncertainties, limitations and gaps in knowledge;
- Provide a description of the relevant legal context and requirements; and

- Incorporate and address issues and concerns raised during the Scoping and EIA phases of the EIA where they are relevant to the specialist's area of expertise.

7.8.5 Visual Impact Assessment

The ToR for the Visual Impact Assessment includes the following activities:

- Describe, in sufficient detail, the existing landscape and visual conditions of the surrounding region to form a baseline against which impacts can be measured and compared;
- Describe the regional and local landscape features;
- Identify visually sensitive receptors;
- Identify and assess potential visual impacts (direct and indirect) that may occur during construction, operational and decommissioning phases of the development. Use the CSIR methodology to determine the significance of potential impacts as outlined in Section 7.5 of this Chapter;
- Assess a max tip height of 230 m comprising 140 m hub height, 160 m rotor diameter, 80 m blade length plus 10 m nacelle, to ensure that the worst-case scenario is assessed;
- Assess all alternatives, including the no-go alternative;
- Assessment cumulative visual impacts by identifying other REFs such as wind and solar and other applicable projects, such as construction and upgrade of electricity generation, and transmission or distribution facilities in the local area (i.e. within 50 km of the proposed WEF). These include projects that have been approved (i.e. positive EA has been issued), have been constructed or projects for which an Application for Environmental Authorisation has been lodged with the Competent Authority (see Table 6.2 in Chapter 6 of this report for a list of projects);
- Determine mitigation and/or management measures to be included in the EMPr which could be implemented to reduce the effect of negative impacts, or enhance the effect of positive impacts, as far as possible;
- Provide a description of any assumptions, uncertainties, limitations and gaps in knowledge;
- Provide a description of the relevant legal context and requirements; and
- Incorporate and address issues and concerns raised during the Scoping and EIA Phases of the project where they are relevant to the specialist's area of expertise.

7.8.6 Soils and Agricultural Potential Assessment

The following ToR applies to this study:

- Based on existing data as well as a field soil survey, describe and map soil types (soil forms) and characteristics (soil depth, soil colour, limiting factors, and clay content of the top and sub soil layers);
- Describe the topography of the site;
- Describe historical and current land use, agricultural infrastructure, as well as possible alternative land use options;
- Describe the erosion, vegetation and degradation status of the land;
- Determine and map the agricultural potential across the site;
- Determine and map the agricultural sensitivity to development across the site, including "no-go" areas, setbacks/buffers, as well as any red flags or risks associated with soil and agricultural impacts;

- Identify relevant legislation and legal requirements relating to soil and agricultural potential impacts;
- Identify and assess all potential impacts (direct, indirect of the construction, operational and decommissioning phases of the proposed development) on soils and agricultural potential, and note the economic consequences of the proposed development on soils and agricultural potential. Use the CSIR methodology to determine the significance of potential impacts as outlined in Section 7.5 of this Chapter;
- Assess all alternatives, including the no-go alternative;
- Assessment cumulative impacts by identifying other REFs such as wind and solar and other applicable projects, such as construction and upgrade of electricity generation, and transmission or distribution facilities in the local area (i.e. within 50 km of the proposed WEF). These include projects that have been approved (i.e. positive EA has been issued), have been constructed or projects for which an Application for Environmental Authorisation has been lodged with the Competent Authority (see Table 6.2 in Chapter 6 of this report for a list of projects);
- Provide recommended mitigation measures, management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts to be included in the EMPr;
- Provide a description of any assumptions, uncertainties, limitations and gaps in knowledge;
- Provide a description of the relevant legal context and requirements; and
- Incorporate and address issues and concerns raised during the Scoping and EIA phases of the project where they are relevant to the specialist's area of expertise.

7.8.7 Heritage Impact Assessment (Archaeology, and Cultural Landscape) as well as a Desktop Palaeontology study

The following ToR has been specified for the Heritage Impact Assessment:

- Describe the existing area to be directly affected by the proposed project in terms of its current cultural, historical, and archaeological characteristics and the general sensitivity of these components to change;
- Undertake a detailed field examination of the project site to identify archaeological sites and heritage features (e.g. stone age artefacts, graves etc.) within or in the region of the development area;
- Describe the type and location of known archaeological sites in the study area, and characterize all heritage items that may be affected by the proposed project;
- Prepare and undertake a desktop study on the palaeontology of the proposed project area. Describe the existing area to be directly affected by the proposed project in terms of its current palaeontological characteristics and the general sensitivity of these components to change;
- Describe the type and location of known palaeontological sites and features in the study area, and characterize all heritage items that may be affected by the proposed project;
- Record sites of palaeontological and archaeological relevance if present (photos, maps, aerial or satellite images, GPS co-ordinates, and stratigraphic columns);
- Describe the baseline environment and determine the status quo in relation to the specialist study;
- Evaluate the potential for occurrence of archaeological features within the study area and at the turbine sites;
- Identify if any permits are required from the relevant Heritage Authority, in terms of the NHRA, for the proposed project activities;

- Identification of issues and potential direct, indirect and cumulative heritage impacts, which are to be considered in combination with any additional relevant issues that may be raised through the PPP;
- Identify and assess potential direct, indirect and cumulative impacts of the proposed project on the palaeontological, archaeological heritage features, and cultural and historical components for the construction, operational and decommissioning phases of the project. Use the CSIR methodology to determine the significance of potential impacts as outlined in Section 7.5 of this Chapter;
- Assess all alternatives, including the no-go alternative;
- Assessment cumulative impacts by identifying other REFs such as wind and solar and other applicable projects, such as construction and upgrade of electricity generation, and transmission or distribution facilities in the local area (i.e. within 50 km of the proposed WEF). These include projects that have been approved (i.e. positive EA has been issued), have been constructed or projects for which an Application for Environmental Authorisation has been lodged with the Competent Authority (see Table 6.2 in Chapter 6 of this report for a list of projects);
- Provide recommendations and suggest appropriate mitigation measures (if required), for the recording, sampling and dating of any archaeological sites that could potentially be destroyed as a result of the proposed project;
- Provide recommendations regarding archaeological heritage management on site, including conservation measures to ensure that the impacts are avoided or limited;
- Provide input to the EMPr, including mitigation measures and monitoring requirements for all phases of the proposed development to ensure that the impacts on the archaeology and archaeology are avoided or limited;
- Identify any rehabilitation measures that can be reasonably applied with the completion of the construction works;
- Provide a detailed archaeology sensitivity map of the site and identify any no-go areas from a cultural, historical and archaeological perspective;
- Provide a description of any assumptions, uncertainties, limitations and gaps in knowledge;
- Provide a description of the relevant legal context and requirements; and
- Incorporate and address issues and concerns raised during the Scoping and EIA phases where they are relevant to the specialist's area of expertise.

7.8.8 Noise Impact Assessment

The purpose of the Noise Impact Assessment is to estimate the potential impact of noise emanating from the proposed WEF on noise sensitive receptors within and beyond the WEF boundaries. The Noise Impact Assessment will include:

- Undertake a preliminary (scoping) study mainly in accordance with Section 7 of the South African National Standard (SANS) 10328:2008 ("Methods for environmental noise impact assessments in terms of NEMA"). This will include:
    - Identification and description of the noise sources associated with the proposed development;
    - Identification of potential noise sensitive areas or receptors that could be impacted upon by noise emanating from the proposed development;
    - Estimation of the acceptable rating level of noise on identified noise sensitive areas;
    - Estimation of the noise emissions from the identified noise sources and estimation of the expected rating level of noise at the identified noise sensitive areas;

  - Estimation and assessment of the noise impacts on identified noise sensitive areas or receptors in accordance with SANS 10103:2008 and the National Noise Control Regulations;
  - Consideration of possible alternative noise mitigation procedures;
  - Determine whether the proposed development has significant acoustical implications;
  - Recommend whether a full noise impact assessment be conducted.
- A description of the current environmental conditions from a noise perspective in sufficient detail so that there is a baseline description/status quo against which impacts can be identified and measured i.e. sensitive noise receptors, etc.;
- A review of detailed information relating to the project description in order to precisely define the environmental risks in terms of noise emissions;
- Identification of issues and potential impacts related to noise emissions, which are to be considered in combination with any additional relevant issues that may be raised through the PPP;
- Identification of relevant legislation and legal requirements;
- A description of the regional and local features;
- Calculation of baseline noise measurements (i.e. of the existing ambient noise (day and night time));
- Modelling of the future potential noise impacts during all phases of the proposed development taking into consideration sensitive receptors;
- Identification of buffer zones and no-go areas to inform the turbine layout (if relevant);
- Identify and assess all potential impacts (direct, indirect) of the construction, operational and decommissioning phases of the proposed development. Use the CSIR methodology to determine the significance of potential impacts as outlined in Section 7.5 of this Chapter;
- Assess all alternatives, including the no-go alternative;
- Assessment cumulative impacts by identifying other REFs such as wind energy facilities in the local area (i.e. within 50 km of the proposed WEF). These include projects that have been approved (i.e. positive EA has been issued), have been constructed or projects for which an Application for Environmental Authorisation has been lodged with the Competent Authority (see Table 6.2 in Chapter 6 of this report for a list of projects);
- Provide recommended mitigation measures, management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts to be included in the EMPr;
- Provide a description of any assumptions, uncertainties, limitations and gaps in knowledge; and
- Incorporate and address issues and concerns raised during the Scoping and EIA phases where they are relevant to the specialist's area of expertise.

7.8.9 Transportation Impact Assessment

The Terms of Reference for a TIA is as per the requirements of the South Africa Committee of Transport Officials, South African Traffic Impact and Site Traffic Assessment Manual, TMH16, Vol. 1, Version 1, August 2012. The scope covers the following:

- Description of the extent of the development, including location and land-use/s;
- Description of the phased development of the facility (if applicable);
- Record of liaison with authorities;
- Record of site visits, if required;
- Description of the local and potentially affected road network, including planning and comment on the road condition, where information is available;
- Description of latent developments in the vicinity of the facility that may also have an impact on the local road network;

- Assessment of the required site access, parking and internal circulation;
- Assessment of expected trip generation (construction and operational phases);
- Capacity analysis (construction and operational phases);
- An assessment of the expected total E80's (heavy axle loading) for the life cycle of the facility;
- Assessment of public transport and non-motorised transport;
- Recommendations and conclusions with regards to the required traffic and transport related road upgrades;
- Assess impacts on the relevant main roads to be affected: N14 and R31;
- Identify and assess all potential impacts (direct, indirect) of the construction, operational and decommissioning phases of the proposed development. Use the CSIR methodology to determine the significance of potential impacts as outlined in Section 7.5 of this Chapter;
- Assess all alternatives, including the no-go alternative;
- Assessment cumulative impacts by identifying other REFs such as wind and solar and other applicable projects, such as construction and upgrade of electricity generation, and transmission or distribution facilities in the local area (i.e. within 50 km of the proposed WEF). These include projects that have been approved (i.e. positive EA has been issued), have been constructed or projects for which an Application for EA has been lodged with the Competent Authority (see Table 6.2 in Chapter 6 of this report for a list of projects);
- Provide recommended mitigation measures, management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts to be included in the EMPr;
- Provide a description of any assumptions, uncertainties, limitations and gaps in knowledge; and
- Incorporate and address issues and concerns raised during the Scoping and EIA phases where they are relevant to the specialist's area of expertise.

7.8.10 Socio-Economic Impact Assessment

The Socio-Economic Impact Assessment will include:

- A review of the current socio-economic conditions in sufficient detail so that there is a baseline description/status quo against which impacts can be identified and measured. Consult secondary data sources (published documentation) to obtain basic socio-economic baseline demographics;
- Obtain socio-economic information from the land owners to inform the study;
- Identify and assess all potential impacts (direct, indirect) of the construction, operational and decommissioning phases of the proposed development. Use the CSIR methodology to determine the significance of potential impacts as outlined in Section 7.5 of this Chapter;
- Assess all alternatives, including the no-go alternative;
- Assessment cumulative impacts by identifying other REFs such as wind and solar and other applicable projects, such as construction and upgrade of electricity generation, and transmission or distribution facilities in the local area (i.e. within 50 km of the proposed WEF). These include projects that have been approved (i.e. positive EA has been issued), have been constructed or projects for which an Application for Environmental Authorisation has been lodged with the Competent Authority (see Table 6.2 in Chapter 6 of this report for a list of projects);
- Provide recommended mitigation measures, management actions and monitoring requirements, to reduce negative measures and to enhance positive socio-economic impacts to be included in the EMPr;
- Provide a description of any assumptions, uncertainties, limitations and gaps in knowledge; and
- Incorporate and address issues and concerns raised during the Scoping and EIA phases where they are relevant to the specialist's area of expertise.

7.8.11 Geohydrology Impact Assessment

The Terms of Reference for the Geohydrological Impact Assessment covers the following scope:

- Identify significant features or disturbances within the proposed project area and define any environmental risks in terms of geohydrology and the proposed project infrastructure;
- Conduct a desktop study and describe the existing environment in terms of geohydrology (including hydrogeological characterization of aquifers types, sensitivity and vulnerability), and groundwater (quality, quantity, use, potential for industrial or domestic use) in the area surrounding the proposed development;
- Conduct a on site assessment to determine the location of any boreholes and to collect groundwater samples (where possible) to ascertain the water quality;
- Develop a sensitivity map indicating the presence of sensitive areas, "no-go" areas, setbacks/buffers, as well as the identification of red flags or risks associated with geohydrological impacts;
- Highlight any gaps in baseline data and provide a description of confidence levels;
- Assess potential direct, indirect and cumulative impacts resulting from the construction, operational and decommissioning phases of the proposed project on the surrounding geohydrology;
- Identify any relevant legal and permit requirements that may be required in terms of groundwater/geohydrological impacts likely to be generated as a result of the proposed project;
- Provide mitigation, monitoring and management measures in order to minimize any negative geohydrological impacts and enhance the positive impacts;
- Assess the consequences and significance of potential groundwater contamination; and
- If necessary, recommend groundwater management and monitoring for the proposed site.

7.9 Mitigation Measures

Identified mitigation measures to be considered as part of the EIA Phase:

7.9.1 Terrestrial Ecology

- Fine-scale habitat and SCC population mapping to inform the final layout to ensure that impact on these features can be minimised through avoidance at the design stage;
- No development of turbines, roads of other infrastructure within no-go areas;
- Preconstruction walk-through by the specialist of the development footprint to further refine the layout and reduce impacts on SCC through micro-siting of the turbines and access roads;
- Avoidance of identified areas of high fauna importance at the design stage;
- Search and rescue for reptiles and other vulnerable species during construction, before areas are cleared;
- Limiting access to the site and ensuring that construction staff and machinery remain within the demarcated construction areas during the construction phase;
- Environmental induction for all staff and contractors on-site;
- Avoiding areas of high wind erosion vulnerability as much as possible;
- Using net barriers, active rehabilitation and other measures during and after construction to minimise sand movement at the site;
- Alien management plan to be implemented during the operational phase of the development, which makes provision for regular alien clearing and monitoring;

- Rehabilitation of disturbed areas that are not regularly used after construction;
- 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 30 cm of the ground as tortoises become stuck against such fences and are electrocuted to death;
- 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 wetlands.

7.9.2 Freshwater Ecology

- Avoid identified sensitive aquatic features (ephemeral rivers, wetlands, pans), major drainage lines and associated buffers;
- Adequate implementation of proposed mitigation measures and best practice by all WEFs in the vicinity;
- Avoid identified aquatic features (ephemeral rivers, wetlands, pans), major drainage lines and associated buffers;
- Limit hard surfaces on site to reduce runoff;
- Keep the footprint of the disturbed area to the minimum and designated areas only;
- Clear site only before a section is due to be constructed;
- Adequate implementation of proposed mitigation measures and best practice by all WEFs in the vicinity.

7.9.3 Visual

- Siting of wind turbines in a cohesive visual formation (avoiding individual outliers);
- Avoidance of significant highpoints (peaks) and steep slopes (>1:5 gradient) where possible;
- Use of visual buffers as per guidelines;
- Locate substation and O&M buildings in unobtrusive, low-lying positions, avoiding ridgelines where possible;
- Access roads kept as narrow as possible and existing roads used as far as possible;
- Locate the construction camp, batching plant and related storage/stockpile areas in unobtrusive positions in the landscape where possible;
- Employment of dust suppression measures.
- Implementation of litter control measures;
- Adherence to the EMPr, monitored by an ECO.

7.9.4 Archaeology

- Based on the available information sourced during the Scoping phase, the proposed development is likely to impact on heritage resources and as such, it is recommended that a complete Heritage Impact Assessment is required during the EIA Phase that assesses impacts to landscape character, secondary (and possibly primary) impacts on built environment resources, archaeological resources, graves and burial grounds, fossil heritage and mining heritage; and
- Should there be any finds of heritage importance within the proposed development footprint during the EIA phase, the development of a Heritage Conservation Management Plan for the

WEF is recommended to ensure that heritage resources are continuously managed throughout the operational and decommissioning phases.;

7.9.5 Palaeontology

- Avoid the small outcrop areas of Precambrian Ghaap Group carbonate rocks present along the eastern escarpment containing a range of well-preserved stromatolites (fossil microbial mounds), as well as displaying geo-scientifically important stratigraphic and sedimentological features.

7.9.6 Bats

- Avoid construction activities near confirmed roosts which include buildings, trees and rocky crevices;
- A confirmed roost has been found at the project which has been buffered by 1 km. Trees in woodland areas and other buildings on or bordering the site have been buffered by 200 m as a precaution but these should be surveyed to confirm presence of bats to determine if these buffers are necessary. No construction activities should take place within these buffers if any roosts are identified during the EIA phase;
- It is recommended that a bat specialist surveys the confirmed turbine locations and all other proposed site infrastructure for the presence of roosts during the EIA phase;
- The WEF can be designed and constructed in such a way as to avoid the destruction of potential roosts, particularly trees, rocky crevices (if blasting is required) and buildings;
- No construction activities with the potential to physically affect any bat roosts will be permitted without the express permission of a suitably qualified bat specialist following appropriate investigation and mitigation;
- If occupied roosts are confirmed these should be buffered based on best practice guidance, which includes a minimum of a 200 m buffer;
- A site-specific Construction Phase Environmental Management Plan (CEMP) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. All contractors are to adhere to the CEMP and should apply good environmental practice during construction;
- During construction, laydown areas and temporary access roads should be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation, while designated no-go areas must be enforced i.e. no off road driving;
- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and a habitat restoration plan must be developed by a specialist and included within the (CEMP);
- This impact must be reduced by limiting the removal of vegetation as far as possible. A site-specific CEMP must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. All contractors are to adhere to the CEMP and should apply good environmental practice during construction;
- During the design and EIA phases, the bat specialist should conduct a site walkthrough, covering the final road and power line routes as well as the final turbine positions, to identify any roosts/activity of sensitive species, as well as any additional sensitive habitats;
- There are several mitigation options available to reduce the potential for bat mortality to occur or to reduce bat mortality. Designing the layout of the project to avoid areas that are more frequently used by bats may reduce the likelihood of mortality and should be the primary mitigation measure. For the Kuruman WEF, low lying areas should be avoided. Continuous pre-

construction monitoring may help to refine such areas which can form exclusion zones which must be adhered to as a primary form of mitigation;

- If mortality does occur, the level of mortality should be considered by a bat specialist to determine if this is at a level where further mitigation needs to be considered. Mitigation options may include using ultrasonic deterrents, raising the cut-in speeds of turbines and turbine blade feathering. Any operational minimization strategy (i.e. curtailment) should be targeted during specific seasons and time periods for specific turbines coincident with periods of increased bat activity;
- It is advised that both pre-construction and operational monitoring data are used to confirm the need for above mentioned mitigation measures such as curtailment and to determine at what stage of the development such mitigation needs to be implemented, if at all;
- There are several mitigation options available to reduce the potential for bat mortality to occur or to reduce bat mortality. Designing the layout of the project to avoid areas that are more frequently used by bats may reduce the likelihood of mortality and should be the primary mitigation measure. For the Kuruman WEF, low lying areas should be avoided. Continuous pre-construction monitoring may help to refine such areas which can form exclusion zones which must be adhered to as a primary form of mitigation;
- Bats should be prevented from entering any possible artificial roost structures (e.g. roofs of buildings, road culverts and wind turbines) by ensuring that they are sealed in such a way as to prevent bats from entering. If bats colonise WEF infrastructure, a suitably qualified bat specialist should be consulted before any work is undertaken on that infrastructure and before attempting to remove any bats. Ongoing maintenance and inspections of buildings must be carried out to ensure no access to bats;
- Avoid decommissioning activities near roosts which include buildings, trees and rocky crevices;
- Limit decommissioning activities to daylight hours.

7.9.7 Birds

- High traffic areas and buildings such as offices, batching plants, storage areas etc., should where possible be situated in areas that are already disturbed;
- Existing roads and farm tracks should be used where possible;
- The minimum footprint areas of infrastructure should be used wherever possible, including road widths and lengths;
- Sensitive zones and no-go areas (e.g. nesting areas) are to be avoided;
- No off-road driving;
- Environmental Control Officers (ECO) to oversee activities and ensure that the site specific CEMP is implemented and enforced;
- Prior to construction, the avifaunal specialist should conduct a site walkthrough, covering the final road and power line routes as well as the final turbine positions, to identify any nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities may need to be excluded;
- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the CEMP;
- A site specific CEMP must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMP and should apply good environmental practice during construction;
- Prior to construction, the avifaunal specialist should conduct a site walkthrough, covering the final road and power line routes as well as the final turbine positions, to identify any nests/breeding/roosting activity of sensitive species, as well as any additional sensitive

habitats. The results of which may inform the final construction schedule, including abbreviating construction time, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise;

- Sensitive zones and no-go areas are to be designated by the specialist (e.g. nesting sites) and must be avoided;
- Environmental Control Officers to oversee activities and ensure that the site specific CEMP is implemented and enforced;
- Turbines must not be constructed within any High Sensitivity Zones to be identified after pre-construction monitoring is concluded;
- The hierarchy of sensitivity zones to be identified should be considered where possible;
- Develop and implement a carcass search programme for birds during the first two years of operation, in line with the applicable (i.e. at the start of operations at the wind farm) South African monitoring guidelines;
- Develop and implement a 24 month post-construction bird activity monitoring program that mirrors the pre-construction monitoring surveys completed by Chris van Rooyen Consulting and is in line with the applicable South African post-construction monitoring guidelines. This program must include thorough and ongoing nest searches and nest monitoring;
- Frequent and regular review of operational phase monitoring data (activity and carcass) and results by an avifaunal specialist. This review should also establish the requirement for continued monitoring studies (activity and carcass) throughout the operational and decommissioning phases of the development;
- The above reviews should strive to identify sensitive locations at the development including turbines and areas of increased collisions with power lines that may require additional mitigation. If unacceptable impacts are observed (in the opinion of the bird specialist and independent review), the specialist should conduct a literature review specific to the impact (e.g. collision and/or electrocution) and provide updated and relevant mitigation options to be implemented. As a starting point for the review of possible mitigations, the following may need to be considered:
- Further operational mitigation measures to be researched, by the appointed bird specialist and the appropriate selected mitigation implemented, if post construction monitoring reveal high levels of impacts;
- Electrical infrastructure should not be constructed in 'no-go areas' and construction of infrastructure must consider avifaunal sensitivity zones and avoid areas of higher sensitivities where possible;
- Attach appropriate marking devices [Bird Flight Diverters (BFDs)] on all spans of all new overhead power lines to increase visibility;
- Develop and implement a carcass search programme for birds during the first two years of operation, in line with the South African monitoring guidelines (Jenkins *et al*. 2015).
- Place new power lines on the WEF underground where possible;
- Any new overhead power lines must be of a design that minimizes electrocution risk by using adequately insulated 'bird friendly' structures, with clearances between live components of 1.8 m or greater and which provides a safe bird perch;
- A site specific Operational Environmental Management Plan (OEMP) must be implemented, which gives appropriate and detailed description of how operational and maintenance activities must be conducted to reduce unnecessary disturbance. All contractors are to adhere to the OEMP and should apply good environmental practice during all operations;
- The on-site WEF manager (or a suitably appointed Environmental Manager) must be trained by an avifaunal specialist to identify the potential priority species and Red Data species as well as the signs that indicate possibly breeding by these species. If a priority species or Red Data species is found to be breeding (e.g. a nest site is located) on the operational Wind Farm, the

nest/breeding site must not be disturbed and an avifaunal specialist must be contacted for further instruction;

- Operational phase bird monitoring, in line with applicable guidelines, must be implemented and must include monitoring of all raptor nest sites for breeding success;
- No turbines should be placed in no-go areas to be identified through pre-construction monitoring, while associated infrastructure should be avoided where possible in these areas.
- Turbines must not be constructed within any high sensitivity zones identified through pre-construction monitoring and impact assessment;
- The lowest feasible number of turbines should be constructed for the required MW output. Therefore, fewer larger (i.e with a higher MW output) turbine models should be favoured where possible;
- Preferred turbine placement in areas of low sensitivity, and decreasing preference through to high sensitivity zones identified through pre-construction monitoring;
- Lighting on turbines to be of an intermittent and coloured nature rather than constant white light to reduce the possible impact on the movement patterns of nocturnal migratory species.
- One blade of each turbine should be painted black to reduce the potential for motion smear and thereby reduce the risk of raptor collisions.
- A site specific Environmental Management Plan (EMP) must be implemented, which gives appropriate and detailed description of how decommissioning activities must be conducted. All contractors are to adhere to the EMP and should apply good environmental practice during decommissioning;
- ECO to oversee activities and ensure that the site specific environmental management plan (CEMP+ OEMP) is implemented and enforced;
- The appointed ECO must be trained by an avifaunal specialist to identify the potential priority species and Red Data species as well as the signs that indicate possible breeding by these species. The ECO must then, during audits/site visits, make a concerted effort to look out for such breeding activities of Red Data species, and such efforts may include the training of construction staff (e.g. in Toolbox talks) to identify Red Data species, followed by regular questioning of staff as to the regular whereabouts on site of these species. If any of the Red Data species are confirmed to be breeding (e.g. if a nest site is found), decommissioning activities within 500 m of the breeding site must cease, and an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed;
- Prior to decommissioning, an avifaunal specialist should conduct a site walkthrough, covering the entire power line routes as well as the turbine areas, to identify any nests/breeding/roosting activity of sensitive species, as well as any additional sensitive habitats. The results of which may inform the final decommissioning schedule in close proximity to that specific area, including abbreviating activity times, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise.

7.9.8 Soils and Agricultural potential

- Recommended mitigation measures include implementation of an effective system of storm water run-off control and the maintenance of vegetation cover to mitigate erosion; topsoil stripping and re-spreading to mitigate loss of topsoil; restricted vehicle access; and dust control;
- Implement an effective system of storm water run-off control. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize the soil against erosion;
- Strip, stockpile and re-spread topsoil during rehabilitation;

- Control vehicle passage and control dust.

7.9.9 Socio-Economic

- A 'locals first' policy with regard to labour needs;
- A complaints register must be available on site during the construction phase;
- The applicant and the contractor should implement an HIV/AIDS awareness programme for all workers at the outset of the construction phase;
- Arrangement must be made to enable workers from outside the area to return home over the weekends/regular intervals. This would reduce the risk posed by non-local construction workers to local family structures and social networks;
- Engage communities with respect to their possible involvement during construction in providing supporting services such as catering, temporary housing of workers, transportation, etc.;
- Implementing the measures recommended in other specialist reports (primarily the minimisation of visual, noise and ecological impacts) which will also minimise tourism and property value impacts;
- The fair and transparent application of the DoE's requirements for local benefit enhancement will require extensive interactions and engagement with the local community and its representatives. The applicant should therefore ensure that adequate time and resources are devoted to these activities;
- Employ labour intensive construction methods, where economically feasible and technically possible;
- Establish a local skills desk to identify the skills set of the local residents available for the construction and operational phases of the WEF;
- Support local businesses as far as possible;
- When devising enterprise development initiatives, the focus should be on creating sustainable and self-sufficient enterprises. This would mean that following the operational phase, these enterprises may be able to continue to operate.

7.9.10 Transportation

- Regular dust suppression methods on internal local roads (water spraying) if required;
- Maintenance and repairs of local roads.

7.9.11 Noise

- Where possible only allow construction activities during the day. If night-time construction activities are required, do not operate closer than 400 m from any receptors (prevent noise impact of high significance);
- The developer must investigate any reasonable and valid noise complaint if registered by a receptor staying within 2 000 m from location where construction activities are taking place or operational wind turbine. A complaints register must be kept on site;
- The potential noise impact must again be evaluated should the layout be changed where any wind turbines are located closer than 1 000 m from a confirmed NSD;
- The potential noise impact must again be evaluated should the developer make use of a wind turbine with a maximum sound power emission level exceeding 108.4 dBA re 1 pW.

7.9.12 Geohydrology

- All reasonable measures must be taken to prevent soil and groundwater contamination;
- All reasonable measures must be taken to prevent soil, storm water outflows, and groundwater contamination;
- Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. Any engines that stand in one place for an excessive length of time must have drip trays. Diesel fuel storage tanks should be above ground on an impermeable surface in a bunded area. Construction vehicles and equipment should also be refueled on an impermeable surface. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.

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RENEWABLE PROJECT DEVELOPMENTS

Environmental Impact Assessment for the proposed Kuruman Phase 1 Wind Energy Facility near Kuruman in the Northern Cape

Draft Scoping Report

CHAPTER 8:

References

CONTENTS

8. REFERENCES

Broughton, E. 2018. Socio-Economic Impact Study for the Proposed Development of the Phase 1 and Phase 2 Kuruman Wind Energy Facility near Kuruman, Northern Cape Province: Scoping Report. Urban-Econ Development Economists, Hatfield.

De Jager, M. 2018: Noise Report for Scoping purposes: Establishment of the Phase 1 of the Kuruman Wind Farm close to Kuruman, Northern Cape Province. Enviro-Acoustic Research, Pretoria.

DEAT. 2004. 'Overview of Integrated Environmental Management', *Integrated Environmental Management Information Series*, Information (Department of Environmental Affairs and Tourism (DEAT)), pp 0–21.

Department of Water Affairs (DWA). 2015. The groundwater dictionary. 2nd ed. http://www.dwa.gov.za/Groundwater/Groundwater_Dictionary/

Gamagara Local Municipality. 2017–2022. Draft Integrated Development Plan. Gamagara Local Municipality, Northern Cape Province.

Ga-Segonyana Local Municipality. 2017–2018. Integrated Development Plan. Ga-Segonyana Local Municipality, Northern Cape Province.

Gibb, A. & Jacobs, S. 2018. Scoping and Environmental Impact Assessment for the Proposed Development of the Kuruman Phase 1 Wind Energy Facility near Kuruman, Northern Cape Province: Scoping Report. SiVEST SA (Pty) Ltd, Rivonia.

John Taolo Gaetsewe District Municipality. 2017. Draft Spatial Development Framework. John Taolo Gaetsewe District Municipality, Northern Cape Province.

Lanz, J. 2018. Scoping and Environmental Impact Assessment for the Proposed Development of the Kuruman Phase 1 Wind Energy Facility near Kuruman, Northern Cape Province: SCOPING REPORT.

Marais, W. 2018. Bat Specialist Impact Assessment for the Proposed Development of the Phase 1 Kuruman Wind Energy Facility, Kuruman, Northern Cape Province: Scoping Report. Animalia Consultants (Pty) Ltd, Cape Town.

Monadjem, A., Taylor, P.J., Cotterill, F.P.D., Schoeman, M.C. 2010. Bats of Southern and Central Africa: A Biogeographic and Taxonomic Synthesis. Wits University Press, Johannesburg.

Mucina L. & Rutherford M.C. (eds). 2006. *The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Mulder, D., Conrad, J. & Paxton, N. 2018. Geohydrological Assessment – Scoping and Environmental Impact Assessment for the Proposed Development of the Phase 1 and Phase 2 Kuruman Wind Farm Facility, Kuruman, Northern Cape Province: Scoping Report. GEOSS – Geohydrological and Spatial Solutions International (Pty) Ltd, Stellenbosch.

Northern Cape Provincial Spatial Development Framework (PSDF). 2012. Department of Cooperative Governance, Human Settlements and Traditional Affairs, Northern Cape.

Statistics South Africa. 2011. Census 2011 Municipal Report, Northern Cape, Report 03-01-51. Statistics South Africa, Pretoria.

Taylor, P.B., Navarro, R.A., Wren-Sargent, M., Harrison, J.A. & Kieswetter, S.L. 1999. *Coordinated waterbird Counts in South Africa, 1992-1997*. Avian Demography Unit, Cape Town.

The World Bank Climate Change Knowledge Portal available at http://sdwebx.worldbank.org/climateportal/

Todd, S. 2018. Scoping and Environmental Impact Assessment for the Proposed Development of the Kuruman Phase 1 Wind Energy Facility near Kuruman, Northern Cape Province: Scoping Report. 3Foxes Biodiversity Solutions, Cape Town.

Van de Haar, N. 2018. Specialist Freshwater Assessment for the Proposed Development of the Kuruman Phase 1 Wind Energy Facility near Kuruman, Northern Cape Province: Scoping Report. EnviroSwift (Pty) Ltd, Cape Town.

Van Rooyen, B. 2018. Bird Impact Assessment for the Proposed Development of the Kuruman Phase 1 Wind Energy Facility near Kuruman, Northern Cape Province: Scoping Report.

Wiltshire, N. 2018. Scoping and environmental impact assessment for the Proposed Development of the Kuruman Phase 1 Wind Energy Facility near Kuruman, Northern Cape Province: Scoping Report. Cedar Tower Services (Pty) Ltd, Cape Town.

Wink, I. & Johnson, A. 2018. Transportation Impact Assessment for the Proposed Development of the Kuruman Phase 1 Wind Energy Facility near Kuruman, Northern Cape Province: Scoping Report. JG AFRIKA (Pty) Ltd, Cape Town.