Scoping and Environmental Impact Assessment for the proposed Kap Vley Wind Energy Facility near Kleinzee in the Northern Cape

UPDATED DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

VOLUME 1

DEIAR, App A - F & EMPr

June 2018

DEA Reference number:
14/12/16/3/3/2/1046

CSIR Report number:
CSIR/IU/021MH/IR/2018/0002/B

Prepared for:
Kap Vley Wind Farm (Pty) Ltd - a subsidiary of juwi Renewable Energies (Pty) Ltd

Prepared by:
Council for Scientific and Industrial Research (CSIR)
PO Box 320
Stellenbosch
7599

our future through science

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UPDATED DRAFT EIA REPORT

June 2018

Prepared for:
Kap Vley Wind Farm (Pty) Ltd – a subsidiary of juwi Renewable Energies (Pty) Ltd

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REPORT DETAILS

Title:	**Scoping and Environmental Impact Assessment for the proposed development of the Kap Vley Wind Energy Facility near Kleinzee, Northern Cape: UPDATED DRAFT EIA REPORT**
Purpose of report :	This Updated Draft Environmental Impact Assessment Report forms part of a series of reports and information sources that are being provided during the EIA Process for the proposed Kap Vley Wind Energy Facility (WEF) project. In accordance with the 2014 NEMA EIA Regulations (as amended on 7 April 2017), the purpose of the EIA Report is to: • Present the details of and need for the proposed project; • Describe the affected environment, including the planning context, at a sufficient level of detail to facilitate informed decision making; • Provide an overview of the EIA Process being followed, including public consultation; • Assess the predicted positive and negative impacts of the project on the environment; • Provide recommendations to avoid or mitigate negative impacts and to enhance the positive benefits of the project; and • Provide an Environmental Management Programme (EMPr) for the design, construction and operational phases of the project. This Updated Draft EIA Report is currently released for a 30-day commenting period. All comments on the Updated Draft EIA Report (submitted within the 30-day review period) will be included in the Final EIA Report that will be submitted to the National Department of Environmental Affairs (DEA), in terms of Regulation 23 (1) of the 2014 NEMA EIA Regulations (as amended, 2017), for decision-making.
Prepared for:	Kap Vley Wind Farm (Pty) Ltd – a subsidiary of juwi Renewable Energies (Pty) Ltd
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CSIR Project Number: **CSIR Report Number:**	EMS0142 CSIR/IU/021MH/IR/2018/0002/B
Date:	June 2018
To be cited as:	CSIR, 2018. Scoping and Environmental Impact Assessment for the proposed development of the Kap Vley Wind Energy Facility near Kleinzee in the Northern Cape: Updated Draft EIA Report.

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EXECUTIVE SUMMARY

PROJECT STATUS AND PURPOSE

Please note that this report comprises the UPDATED DRAFT EIA REPORT that is being released for a 30-day commenting period. An initial Draft EIA Report was prepared and was released for a 30-day commenting period which extended to 17 May 2018.

Following the release of the initial Draft EIA Report, comments were received from the Department: Environment and Nature Conservation (DENC) which required substantial amendments to the DEIAR, in particular the Ecological Offset study (see letter from DENC dated 25 May 2018 included in Appendix E9 of this Updated Draft EIA Report). The CSIR subsequently submitted a notification to DEA dated 28 May 2018 in terms of Regulation 23 (1)(b) of the NEMA EIA Regulations, as amended to note that significant new information has come to light that was not contained in the DEIAR and EMPr that were consulted on during the initial public participation process contemplated in subregulation (1)(a) (see Appendix E7). The DEA was therefore notified that based on the new information the Final EIA Report will be submitted within 157 days from the date of the Acceptance of the Scoping Report (letter dated 12 February 2018 included in Appendix E5). This allows for an extension of 50 days to submit the Final EIA Report to DEA for decision-making. DEA acknowledged the notification for extension and granted extension in their letter dated 1 June 2018 (see Appendix E8). Following the 30-day commenting period, the comments received on the Updated Draft EIA Report and EMPr will be included in the Final submitted to DEA for decision-making.

The changes that were made in the Updated Draft EIA Report following the comments from DENC include *inter alia*:

1. The Terrestrial Ecological study was updated to address the comments from DENC and SANParks and is included in Appendix G of this report; and
2. The Ecological Offset Report was revised and was submitted for peer review and sign-off by an accredited and recognized biodiversity offset specialist, Mark Botha. The revised Ecological Offset Report is included in Appendix Q and the review from Mark Botha is included in Annexure 1 of Appendix Q.

In addition to the changes mentioned above the Updated Draft EIA Report also includes the following:

1. Comments from SANPARKS on the DEIAR (letter dated 11 June 2018 included in Appendix D4), in particular on the Ecological Offset study;
2. An updated EMPr which includes a Heritage Maintenance Plan (HMP) as requested by SAHRA in their letter 24 May 2018 (Appendix D4); and
3. The Agenda and notes from a meeting (Appendix E10 and E11 respectively) that was held with representatives from DENC, WWF, DEA (Biodiversity Unit), Simon Todd Consulting, juwi and CSIR to discuss the comments from DENC and to present the revised Ecological Offset report to DENC and DEA. Comments were invited to inform and determine the suitability and the way forward on the proposed offset approach.

PROJECT OVERVIEW

Juwi Renewable Energies (Pty) Ltd (hereinafter referred to as "juwi"), through its project company Kap Vley Wind Farm (Pty) Ltd, proposes to construct and operate a Wind Energy Facility (WEF) and associated transmission infrastructure [subject to a separate Basic Assessment (BA) Process] 30 km south east of Kleinzee in the Northern Cape. The proposed Kap Vley WEF will be connected to the Gromis Substation, or the new Eskom substation for which the location still needs to be finalised, via a 132 kV powerline.

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

- Remainder (RE) Kamaggas Farm 200 Portion 5;
- RE Kap Vley Farm 315;
- Portion 1 of Kap Vley Farm 315;
- Portion 2 of Kap Vley Farm 315,
- Portion 3 of Kap Vley Farm 315;
- Portion 3 of Platvley Farm 314;
- RE Kourootjie Farm 316; and
- RE Gra'water Farm 331.

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 Kap Vley WEF.

juwi 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 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, 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, 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. juwi intends to bid this project in the next bidding process to be potentially selected as an IPP.

The proposed Kap Vley WEF project site is located within the Renewable Energy Development Zone (REDZ) 8, which supports the development of large scale wind and solar energy developments. The proposed project is therefore in line with the national planning vision for wind development in South Africa.

Should the proposed site and development identified by juwi be acceptable, it is considered viable that long term benefits for the community and society in the Kleinzee/Komaggas 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 323 employment opportunities will be created during the construction phase (including 140 employees from the local area) and 35 during the operational period (including 17 employees from the local area) of the proposed Kap Vley WEF. The Kap Vley WEF is also partly situated on the Kommagas Community land, meaning that the local community would also derive an income as a project landowner.

PROJECT DESCRIPTION

A summary of the key components of the proposed Kap Vley WEF is described below.

- ***Wind turbines:***

  - Number of 20-45 turbines;
  - Hub height of 80 - 150 m and rotor diameter of 100 - 160 m;
  - Reinforced concrete foundation: 25 m x 25 m;
  - Crane platform: 1 ha at each turbine; and
  - Turbine capacity: To be confirmed.

- ***Collector substation:***

  - 22/33 kV to 132 kV collector substation of approximately 2.3 ha to receive, convert and step up electricity from the WEF to the 132 kV grid suitable supply. 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, guest accommodation 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):***

  - Site offices, construction camp area, and lay down areas: 13 ha, consisting of several areas along internal roads and centrally located; and
  - On-site concrete batching plant: 0.25 ha.

- ***Access road:***

  - The proposed development site may be accessed via the R355 from Springbok, the Komaggas gravel road off the R355 or a combination of gravel roads from Garies via Hondeklip Bay and Koingnaas.

- ***Service roads:***

  - 37 km of internal road linking turbine locations. The road will be 5 m in width and 15 m in some sections to allow for passing, curvature and the physical footprint due to cut and fill requirements. Turning areas are also included.

- ***Other infrastructure:***

  - Fencing of 5 m high around the O&M building and the on-site substation;
  - Cabling between turbines to be laid underground where practical, which will connect to an on-site substation; and
  - Stormwater channels and culverts.

The proposed Kap Vley WEF will connect to the Gromis Substation located on the remainder of the Farm Dikgat 195 or closer to the new Eskom substation, for which the location still needs to be determined, via a 132 kV overhead transmission line. Depending on the location of the substation on-site, a maximum of 40 km will be accommodated for the length of the proposed overhead line, connecting the on-site substation to the Gromis Substation or the new Eskom substation for which the location still needs to be determined. Note that this transmission infrastructure is assessed under a separate BA process.

NEED FOR AN ENVIRONMENTAL IMPACT ASSESSMENT

As noted above, in terms of the EIA Regulations promulgated under Chapter 5 of the NEMA published in GN R327, R326, R325 and R324 in Government Gazette 40772, dated 7 April 2017, a full Scoping and EIA Process is required for the proposed project. 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 facilities or infrastructure is for photovoltaic installations and occurs- (a) within an urban area; or (b) on existing infrastructure".*

Given that energy related projects have been elevated to national strategic importance in terms of the EA Process, the proposed project requires authorisation from the National DEA, acting in consultation with other spheres of government.

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 proponent, juwi, what the consequences of their choices will be in terms of impacts on the biophysical and socio-economic environment and how such impacts can be, as far as possible, enhanced or mitigated and managed as the case may be.

APPROACH TO THE EIA PROCESS

The Application for EA for the Scoping and EIA Project was submitted to the DEA via courier in October 2017, together with the Draft Scoping Report for comment. Appendix D of this EIA Report includes the proof of submission (i.e. courier waybills) of the Application for EA and the Draft Scoping Report to the DEA. The DEA acknowledged receipt of the Draft Scoping Report and Application for EA on 2/11/2017. The DEA EIA Reference Number: 14/12/16/3/3/2/1046 was assigned to the project.

The Scoping Report was made available to Interested and Affected Parties (I&APs) and stakeholders for a 30-day comment period. The comments received from stakeholders during the 30-day review of the Draft Scoping Report were incorporated into the Final Scoping Report (where required), and the Final Scoping Report was submitted to the DEA in December 2017, in accordance with Regulation 21 (1) of the 2014 NEMA EIA Regulations, for decision-making in terms of Regulation 22 of the 2014 NEMA EIA Regulations, as amended. The DEA accepted the finalised Scoping Report and Plan of Study for EIA on 12 February 2018, which enabled the commencement of the impact assessment phase.

The Draft EIA Report was released to stakeholders for a 30-day review period, which extended to 17 May 2018. Following the release of the Draft EIA Report, comments were received from DENC which required substantial amendments to the report, in particular the Ecological Offset study (see letter from DENC dated 25 May 2018 included in Appendix E9 of this Updated Draft EIA Report). The CSIR subsequently submitted a notification to DEA dated 28 May 2018 in terms of Regulation 23 (1)(b) of the NEMA EIA Regulations, as amended to note that significant new information has come to light that was not contained in the DEIAR and EMPr that were consulted on during the initial public participation process contemplated in subregulation (1)(a) (see Appendix E7). The DEA was therefore notified that based on the new information the Final EIA Report will be submitted within 157 days from the date of the Acceptance of the Scoping Report (letter dated 12 February 2018 included in Appendix E5). This allows for an extension of 50 days to submit the Final EIA Report to DEA for decision-making. DEA acknowledged the notification for extension and granted extension in their letter dated 1 June 2018 (see

Appendix E8). Following the 30-day commenting period, the comments received on the Updated Draft EIA Report and EMPr will be included in the Final EIA Report which will be submitted to DEA for decision-making.

IMPACT ASSESSMENT AND MANAGEMENT ACTIONS

The specialist studies and statements conducted to inform this impact assessment are listed below. All impacts identified and assessed, as well as the proposed mitigation measures and management actions can be found in Chapter 6 and 7. In addition, all the mitigation and management measures proposed by the specialists, including those additional impacts and management measures identified by the EAP have been included in the EMPr (Part B of this Updated Draft EIA Report).

EIA Project Team

The EIA team is listed in Table 1 below.

Table 1: 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.)*
Specialists		
Simon Todd	Simon Todd Consulting	Ecology Impact Assessment (Terrestrial Ecology including fauna and flora); Ecological Offset study
Mark Botha	Conservation Strategy Tactics and Insight	Review of the Ecological Offset Study
Bernard Oberholzer and Quinton Lawson	Bernard Oberholzer Landscape Architect and BOLA	Visual Impact Assessment
Luanita Snyman van der Walt *External Reviewer:* Dr Liz Day	CSIR *External Reviewer:* Freshwater Consulting	Dry and Ephemeral Watercourses Impact Assessment
Dr. Jayson Orton	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
John Pether	Private, sub-contracted by ASHA Consulting (Pty) Ltd	Desktop Palaeontological Impact Assessment
Andrew Pearson and Anja Albertyn	ARCUS	Bird Impact Assessment
Jonathan Aronson		Bat Impact Assessment
Johann Lanz	Private	Soils and Agricultural Potential Assessment
Surina Laurie *External Reviewer:* Elena Broughton	CSIR *External Reviewer:* Urban-Econ Development Economists	Socio-Economic Impact Assessment
Morné de Jager	Enviro-Acoustic Research	Noise Impact Assessment
Christo Bredenhann	WSP Group Africa (Pty) Ltd	Transportation Impact Assessment

In addition to the specialist studies included above, juwi has also commissioned the following two studies which are not specialist studies as per Appendix 6 of the NEMA EIA Regulations, as amended. These studies are therefore not included in the impact assessment tables below.

In addition to the specialist studies undertaken, an Ecology Offset Study (included in Appendix Q) was commissioned by the Project Applicant to determine an appropriate offset to reduce the impact of the proposed Kap Vley WEF on the plants and habitats of conservation concern. This report was prepared in accordance with the Draft National Biodiversity Offset Policy and not a standard specialist study in terms of Appendix 6 of the 2014 NEMA EIA Regulations. The Ecological Offset study was revised and externally reviewed by Mark Botha of Conservation Strategy Tactics and Insight, a recognised biodiversity offset expert, in response to a comment received from DENC on the Draft EIA Report. The review from Mark Botha is included in Annexure 1 of Appendix Q. Comments received from Mark Botha have been included in the revised Ecological Offset study. The basic recommendations of the study were supported by the reviewer and found to be soundly derived.

A Wake Effect statement was also commissioned by the Project Applicant to determine the impact of the proposed Kap Vley WEF on the adjacent Eskom Brazil WEF. This report is not a standard specialist study in terms of Appendix 6 of the 2014 NEMA EIA Regulations and takes the form of a technical statement confirming no potential impacts as required in the Scoping Acceptance by the DEA. The full Wake Effect statement can be found in Appendix R.

All the mitigation and management measures proposed by the specialists, including those additional impacts and management measures identified by the EAP, have been included in the EMPr (Part B of this Updated Draft EIA Report).

IMPACT ASSESSMENT

Table 2 below summarises the overall significance of the potential impacts identified from the development of the proposed Kap Vley WEF following the implementation of the recommended mitigation and management measures. **From this table it can be seen that no negative impacts of high significance are anticipated to occur as a result of this project provided the stipulated management actions are implemented effectively.** The positive impacts generated by the project (as seen in the table below) are associated with the economic benefits from employment opportunities, and the additional source of income from the rental of the land for the construction and operation of the WEF.

Table 2: Comparative Assessment of Positive and Negative Direct and Indirect Impacts

Specialist Study	Overall Impact Significance Before Mitigation or Enhancement	Overall Impact Significance After Mitigation or Enhancement
Terrestrial Ecological Impact Assessment	Negative: Moderate	Negative: Low
Bird Impact Assessment	Negative: Low	Negative: Low
Bat Impact Assessment	Negative: Low	Negative: Very Low
Dry and Ephemeral Watercourses Impact Assessment	Negative: Moderate	Negative: Low
Visual Impact Assessment	Negative: Moderate	Negative: Moderate-Low
Heritage Impact Assessment: Archaeology/ Palaeontology /Cultural Landscape	Negative: Very Low	Negative: Very Low
Soils and Agricultural Potential Impact Assessment	Negative: Very Low	Negative: Very Low
Social-Economic Impact Assessment	Negative: Moderate	Negative: Moderate
	Positive: Moderate	Positive: High
Noise Impact Assessment	Negative: Very Low	Negative: Very Low
Transportation Impact Assessment	Negative: Low	Negative: Low

CONCLUSIONS AND RECOMMENDATIONS FROM THE REVISED ECOLOGICAL OFFSET REPORT

Following the release of the Draft EIA Report comments were received from DENC on the Ecological Offset study and the Ecology specialist study (comments dated 25 May 2018 included in Appendix E9). Comments were also received from SANParks (included in Appendix D4). Based on the comments received from DENC and SANParks, the Ecological Offset study was revised and was externally reviewed by a recognised biodiversity offset expert, Mark Botha of Conservation Strategy Tactics & Insight (see review included in Annexure 1 of Appendix Q). The comments received from Mark Botha have been included in the revised Ecological Offset Study which is attached as Appendix Q to this Updated Draft EIA Report. The basic recommendations of the revised Ecological Offset study were supported by Mark Botha and found to be soundly derived.

A meeting was held with DENC, WWF, DEA (Biodiversity unit), Simon Todd Consulting, juwi and CSIR to discuss the comments received from DENC and to present the revised Ecological Offset study and review from Mark Botha to DENC and DEA. SANParks was also invited to the meeting, but could unfortunately not attend, due to prior commitments. Comments were invited to inform and determine the suitability and way forward on the proposed offset approach. The agenda and meeting notes are included in Appendiix E10 and E11 respectively.

The final revised Ecological Offset study was informed by comments received from DENC in their commenting letter, dated 25 May 2018, comments from SANParks in their letter dated 11 June 2018 as well as comments from Ms Elsabe Swart from DENC at the meeting held on 12 June 2018. The said study was also informed by the recommendations from the review conducted by Mark Botha. DENC and DEA will also have the opportunity to comment on revised Ecological Offset Study which is included in this Updated Draft EIA Report that is hereby released for comment.

The section below contains the conclusions and recommendations from the revised Ecological Offset study (Appendix Q of this report):

The Kap Vley site falls within a CBA and NCPAES Focus Area. In addition, a number of plant species of conservation concern are confirmed present at the site. As a result of these features, potential impacts at the site are a concern, particularly residual impacts on CBAs and plant species of conservation concern. As offsets should not be used to compensate for significant impact on species or habitats of conservation concern, it is important to firstly assess whether or not the mitigation to be implemented at the site can reduce on-site impacts to an acceptable level. The final preferred layout that has been assessed in the EIA has been iteratively developed in response to the results of extensive fieldwork at the site to identify and map sensitive habitats and populations of species of conservation concern. As a result of this avoidance, on-site impacts have been reduced as far as possible and no local populations of plant species of conservation concern would be compromised or elevated to a higher threat level as a result of the development. As the entire site falls within a CBA, impacts on CBAs cannot be avoided and moderate residual impact on habitat loss and broad-scale ecological processes within the CBA is expected to occur. The residual impact on the CBA and plant species of conservation concern provide the motivation for the offset.

Given the nature of the residual impact of the development, an offset is considered to be an appropriate off-site mitigation measure. The calculation of the required offset was based on a 1:30 offset ratio for the high sensitivity parts of the site and a 1:20 ratio for the remainder of the site. The resulting calculation provides for a minimum offset target area of 2 580 ha. The existence and availability of suitable offset areas is an important criterion that must be demonstrated before an offset can be implemented. The presence of Sand Fynbos and in particular the dune and restio dominated habitats with the presence of the identified plant species of conservation concern are taken as key indicators of potentially suitable target offset areas. Such areas are present to the south of the site in the broad area between Koingnaas and Hondeklip Bay and south of the Spoeg River. Previous experience in the area indicates that the species of conservation concern present at Kap Vley are also well represented in this area and as such these are valid offset target areas based on the “like for like” criterion. An analysis of the availability of these habitats in the local area indicates that the offset target habitats are sufficiently available in the area and that the targets can be achieved.

In terms of the implementation of the offset, the developer has engaged WWF-SA which has an active land purchase programme in Namaqualand and which works in collaboration with SANParks and NC-DENC. As such, any land purchase facilitated by WWF-SA would likely occur within identified priority and target areas that have the support of the national and provincial conservation bodies. Meetings to investigate the implementation of the offset have already been held with the developer, NC-DENC, WWF and SANParks. In the meetings, SANParks have indicated that a land management budget would be required for them to be able to take responsibility for the offset. In response to this need, the developer has committed to providing the appropriate funds to manage the offset area for the 20 year duration of the wind farm. This would ensure that the offset is protected in perpetuity and has long-term sustainability and an identified management authority. However, as no formal agreement with SANParks has been signed, alternative options for the management of the offset much remain on the table until such time as the offset target areas have been secured and a legally binding agreement with SANParks to take on the management of these areas has been signed.

This offset study is an assessment of the validity of an offset as a mitigation measure to account for residual impact at Kap Vley. It provides an analysis of the biodiversity attributes of the site and makes a recommendation with regards to the offset ratio and resultant extent of the required offset. It further identifies broad potential offset target areas that are known to contain the plant species of concern that have been identified at the Kap Vley site. In order to take the offset process forward, specific properties will have to be identified and evaluated in terms of their suitability as well as availability for purchase or other conservation commitment. While it is clear that suitable areas exist, their availability in terms of

land tenure, land reform status, presence of valid prospecting or mining rights, or with other infrastructure or affected party interests will need to be investigated and may exclude many properties from contention.

The Kap Vley project has not yet been authorised and while this offset study forms part of the EIA process, exactly how the timing of the offset process should work in relation to the EIA process is not well clarified at this point due to the recent advent of offsets as an accepted mitigation alternative. Given the uncertainly of the REIPPP process, the development is not certain to go ahead with the result that the offset process cannot proceed to an implementation phase until such time as the project receives preferred bidder status as defined within the REIPPPP. As the obligations of the developer would only come into effect at the commencement of construction, this is several years away at best. There is thus a danger that the offset study may become too prescriptive if specific property details or offset type are "locked into" the offset and significant changes in land use occur in the intervening years within identified offset target areas.

The institutional and legal arrangements regarding the offset are in early stages of development and additional attention to this aspect will be required to ensure that a binding agreement between the developer, WWF, NC-DENC, SANParks and any other required parties can be drawn up prior to construction. This document is not seen as the appropriate place to further elucidate these requirements and it is suggested that an Offset Implementation Agreement which reduces the specifics of the offset requirements, roles and responsibilities, costs, timelines and penalties to writing is developed. This would come into effect once the project received preferred bidder status and the parties would then have to agree to which milestones would need to have been achieved before the commencement of construction. This will in effect dictate the required timelines and associated milestones associated with the implementation of the offset.

However, as there is not an Offset Implementation Agreement currently in place, measures need to be taken to ensure that the developer is locked into the offset and that this is effectively achieved. This would be facilitated through the stipulation of conditions in the Environmental Authorisation issued by DEA. Thereafter, it would be the responsibility of the implementing partners to ensure that the requirements of the agreement are met once the implementation agreement has been signed. The following minimum conditions are made in this regard and have been developed with input from Mark Botha through the course of his review of this document:

1. A biodiversity offset is required mitigation for this activity (Kap Vley Wind Farm). The offset must secure in perpetuity at least 1 125 ha of Sand Fynbos and 510 ha Klipkoppe Shrubland vegetation types and not be less than 2 580 ha in aggregate extent. The Sand Fynbos vegetation types should include intact and representative areas of the Dune Fynbos and Restio Fynbos habitat types as defined by the terrestrial ecological specialist study.

2. Offset sites need to be at least in as good or better condition compared to the impacted areas, and contain viable populations of the majority of impacted species. Ideally, Offset sites should be declared as a protected area under the Protected Areas Act, be adjacent to an existing protected area, or at a minimum facilitate ecological connectivity in the region.

3. Before construction of any component of the activity begins, the requisite outcomes and necessary arrangements for the implementation of the offset must be captured in an Offset Implementation Agreement with credible implementing partners, which agreement must be concluded and submitted to DENC for approval, which approval shall not be unreasonably withheld.

4. The agreement must at least set out the specific areas which will be secured, how they will be rehabilitated and protected in the long term, what financial provision has been made for the

establishment and management of the offset for 30 years and what implications and penalties exist to ensure the performance of all parties in offset implementation.

OVERALL EVALUATION BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Based on the findings of the specialist studies the proposed project is considered to have an overall very low to low negative environmental impact and an overall high positive impact (with the implementation of respective mitigation and enhancement measures).

The Kap Vley site is considered to be a broadly sensitive environment due to the presence of numerous species and habitats of conservation concern. These have however been mapped in detail through detailed vegetation surveys undertaken in numerous site visits by the ecology specialist in spring, and effective avoidance accordingly implemented with regards to the layout of the proposed wind farm. As a result of this avoidance, on-site impacts on fauna and flora have been reduced to Low Significance after mitigation and are considered acceptable. However, impacts on CBAs and Protected Area Expansion Strategy Expansion focus areas cannot be effectively mitigated and impacts of Moderate significance after on-site-mitigation impacts on these features are expected. This fulfils the basic requirements for an offset and, with the implementation of an offset, residual impacts associated with the development can be reduced to an overall Low Significance. The Project Applicant has commissioned an Ecological Offset Study to determine an appropriate offset to reduce the potential negative impacts of the proposed Kap Vley WEF on the species and habitats of special concern. Following the release of the Draft EIA Report comments were received from DENC on the Offset study and the Ecology specialist study (comments dated 25 May 2018 included in Appendix E9). Comments were also received from SANParks (in their letter dated 11 June 2018 (included in Appendix D4). Based on the comments received from DENC and SANParks, the Offset study was revised and was externally reviewed by a recognised biodiversity offset expert, Mark Botha of Conservation Strategy Tactics & Insight (see review included in Annexure 1 of Appendix Q). The comments received from Mark Botha have been included in the revised Ecological Offset Study which is attached as Appendix Q to this Updated Draft EIA Report. The basic recommendations of the revised Ecological Offset study were supported by Mark Botha and found to be soundly derived.

As such, the development, with the implementation of an offset, is considered to have acceptable terrestrial ecological impacts and is therefore supported from a terrestrial ecological point of view.

The proposed Kap Vley WEF will not have significant impacts on Red Data bird and bat species. The site is not located in an IBA. It must be noted that no bird nests were found closer than 6.8 km from the nearest proposed turbines. A confirmed bat roost was located at a farmstead approximately 1,600 m to the nearest turbine. This roost has been buffered with a no go buffer of 1 km in which no turbines, or parts of a turbine, should be constructed. Other infrastructure, such as roads and powerlines, is permitted in this buffer. This buffer does not impact the current turbine layout and no adjustments to the proposed layout are required to accommodate the buffer. Therefore, the current recommended turbine exclusion buffers will have no impact on proposed layout of the Kap Vley WEF.

Drainage lines were identified on site, but the current layout avoids these features. The heritage resources identified on site are not of a high significance. The graves on site will be avoided as they are regarded as no-go areas. The layout of the Kap Vley WEF will avoid the sensitive ecological and heritage features identified by the respective specialists (where possible).

In accordance with the Guideline on Need and Desirability (GN 891 of 2014), this EIA considered the nature, scale and location of the development as well as the wise use of land (i.e. is this the right time and place for the development of this proposed project). When considering the timing of this project, the IRP2010 proposes to secure 17 800 MW of renewable energy capacity by 2030. As noted in the preceding chapters of this EIA Report, in August 2011, the DoE launched the REIPPPP and invited potential IPPs to submit proposals for the financing, construction, operation and maintenance of the first 3 725 MW of various renewable energy project (including solar and wind). In addition, the REDZs were recently gazetted and the proposed Kap Vley WEF falls within REDZ 8. The project is therefore aligned with Government's priority areas for the development of Renewable Energy Projects in SA.

On a provincial level, the Northern Cape Province is currently facing considerable constraints in the availability and stability of electricity supply. This is a consequence of South Africa's electricity generation and supply system being overstretched, and the reliance of the Northern Cape, as many other South African provinces, on the import of power to service its energy needs. The development of wind 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. On a municipal planning level, the proposed project does not go against any of the objectives set within the Development Plan (IDP) (2012/2017). The IDP's LED Strategy states that "Renewable energy has become a global priority and there is potential for both wind and solar power within the Nama Khoi Local Municipality." The proposed project will be in line with and will be supportive of the IDP's objective of creating more job opportunities. The proposed WEF will assist in local job creation during the construction and operation phases of the project. It should however be noted that employment during construction phase will be temporary. During the operational phase of the project (estimated to be more 20 years), long-term employment opportunities will be created. Employment opportunities in the Kleinzee area are limited following the closure of the De Beers mines. The creation of employment and local economic development in this area will therefore be a welcome injection to the area. The Kommagas local community will also derive benefit from the project as a landowner.

The locality of this project would not have a significant ("high") impact on any sensitive viewers (as determined in the Visual Impact Assessment included in Appendix K of this EIA Report). It will also have a very low significance negative impact on the current agricultural land use of the site.

Section 24 of the Constitutional Act states that "everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development". Based on this, this EIA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures and monitoring requirements. These measures will be undertaken to promote conservation by avoiding the sensitive environmental features present on site (as shown in Figure 7-1) and through appropriate monitoring and management plans included in the EMPr (Part B of the EIA Report).

The outcomes of this project therefore succeeds in meeting the environmental management objectives of protecting the ecologically sensitive areas and supporting sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development in the towns nearest to the project site. The findings of this EIA show that all natural resources will be used in a sustainable manner (i.e. this project is a renewable energy project and the majority of the negative site specific and cumulative environmental impacts are considered to be of low significance with mitigation measures implemented), while the benefits from the project will promote justifiable economic and social development.

In order to ensure the effective implementation of the mitigation and management actions, an updated EMPr has been compiled and is included in Part B of this Updated Draft EIA Report. The mitigation measures necessary to ensure that the project is planned, constructed, operated and decommissioned in an environmentally responsible manner are listed in this EMPr. The EMPr is a dynamic document that should be updated regularly and provide clear and implementable measures for the establishment and operation of the proposed Kap Vley WEF.

Taking into consideration the findings of the EIA process and given the national and provincial strategic requirements for renewable energy development and the location of the proposed Kap Vley WEF within a gazetted REDZ (REDZ 8), it is the opinion of the EAP that the project benefits outweigh the costs and that the project will make a positive contribution to steering South Africa on a pathway towards sustainable renewable energy development. Provided that the specified mitigation measures are applied effectively, it is recommended that the project receive EA in terms of the 2014 EIA Regulations (as amended on 7 April 2017) promulgated under the NEMA.

GLOSSARY

AC	Alternating Current
AGIS	Agricultural Geo-Referenced Information System
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
CSP	Concentrated Solar Power
DAFF	National Department of Agriculture, Forestry and Fisheries
DC	Direct Current
DEA	National Department of Environmental Affairs
DEA&DP	Western Cape Department of Environmental Affairs and Development Planning
DENC	Northern Cape Department of Environment and Nature Conservation
DM	Namakwa District Municipality
DMR	National Department of Minerals Resources
DNI	Direct Normal Irradiance
DOE	Department Of Energy
DOT	National Department of Transport
DSR	Draft Scoping Report
DWS	National Department of Water and Sanitation
EA	Environmental Authorization
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
ELP	Electrical Light Pollution
EMPr	Environmental Management Programme
FSR	Final Scoping Report
GA	General Authorization
GDP	Gross Domestic Product
GG	Government Gazette
GHI	Global Horizontal Irradiation
GIS	Geographical Information Systems
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IAIR	Avifaunal Impact Assessment Report
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IFC	International Financial Corporation

IPP	Independent Power Producer
IRP	Integrated Resource Plan
LED	Local Economic Development
LM	Nama Khoi Local Municipality
MW	Megawatts
NCPAES	Northern Cape Protected Area Expansion Strategy
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act
NEMPA	National Environmental Management: Protected Areas Act
NHRA	National Heritage Resources Act (Act 25 of 1999)
NP	National Park
NSD	Noise Sensitive Development
NWA	National Water Act (Act No. 36 of 1998)
O&M	Operation and Maintenance
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
PV	Photovoltaic
REDZs	Renewable Energy Development Zones
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RfP	Request for Proposal
S&EIR	Scoping and Environmental Impact Reporting
SABAP2	South African Bird Atlas Project
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
SIP	Strategic Infrastructure Plan
SEA	Strategic Environmental Assessment
SKA	Square Kilometre Array
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
WASA	Wind Atlas of South Africa
WEF	Wind Energy Facility
WMA	Water Management Area
WULA	Water Use License Application

Scoping and Environmental Impact Assessment for the proposed Kap Vley Wind Energy Facility near Kleinzee in the Northern Cape

UPDATED DRAFT ENVIRONMENTAL IMPACT ASSESSMENT 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 – Namaqualand District Municipality
	Local Municipality - Nama Khoi Local Municipality
	Ward number - 8
Farm Kamaggas 200- SG 21 Digit Code (s)	C05300000000020000005
Farm Kap Vley 315 - SG 21 Digit Code (s)	C05300000000031500000
	C05300000000031500001
	C05300000000031500002
	C05300000000031500003
Farm Gra'water 331 - SG 21 Digit Code (s)	C05300000000033100000
Farm Platvley 314 - SG 21 Digit Code (s)	C05300000000031400003
Farm Kourootjie Farm 316- SG 21 Digit Code (s)	C05300000000031600000
Number of turbines	20 – 45 turbines
Turbine Capacity	To be confirmed
Hub Height[1]	80 - 150 m
Rotor Diameter[1]	100 - 160 m
Project Size[1]	50 - 300 MW
Area occupied by on-site substation	2.3 ha
Capacity of on-site substation	132 kV
Area occupied by construction lay down areas (including construction camp)	13 ha, consisting of several laydown areas placed strategically throughout the facility.
Permanent area occupied by the development footprint of the project	128 ha
Internal access roads	37 km of internal road linking a maximum of 45 turbine locations. The road will be 5 m in width and 15 m in sections to allow for passing, curvature and the physical footprint due to cut and fill requirements. Turning areas are also allowed for.
Concrete batching plant	0.25 ha (on-site batching)
O&M Building	1 ha with maximum height of 32 m including a communication tower.
Turbines	Reinforced concrete foundation – 25 m x 25 m Crane Platform –1 ha per turbine
Site Access	Access to the site is currently possible via existing farm access from the public roads to the north and south of the site.
Proximity to grid connection	Depending on the location of the substation on-site, a maximum of 40 km will be accommodated for the length of the proposed overhead line from Gromis Substation – or closer to new Eskom substation for which location still needs to be determined – this component is assessed under a separate Basic Assessment process.
Fencing	Permanent fencing will be required around the O&M building and on-site substation and will be a maximum of 5 m high.

[1] These ranges were proposed by the DEA during a pre-application meeting on 11 October 2017. Please refer to Appendix E1 for the meeting notes.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS REQUIREMENTS WITH REFERENCE TO RELEVANT SECTIONS OF THIS REPORT

IMPORTANT NOTE:

This report comprises an UPDATED DRAFT EIA REPORT which is hereby released for a 30-day commenting period. An initial Draft EIA Report was prepared and was released for a 30-day commenting period which extended to 17 May 2018.

Following the release of the initial Draft EIA Report, comments were received from the Department: Environment and Nature Conservation Northern Cape (DENC) which required substantial amendments to the DEIAR, in particular the Ecological Offset study (see letter from DENC dated 25 May 2018 included in Appendix E9 of this Updated Draft EIA Report). The CSIR subsequently submitted a notification to DEA dated 28 May 2018 in terms of Regulation 23 (1)(b) of the NEMA EIA Regulations, as amended to note that significant new information has come to light that was not contained in the DEIAR and EMPr that were consulted on during the initial public participation process contemplated in subregulation (1)(a) (see Appendix E7). The DEA was therefore notified that based on the new information the Final EIA Report will be submitted within 157 days from the date of the Acceptance of the Scoping Report (letter dated 12 February 2018 included in Appendix E5). This allows for an extension of 50 days to submit the Final EIA Report to DEA for decision-making. DEA acknowledged the notification for extension and granted extension in their letter dated 1 June 2018 (see Appendix E8). Following the 30-day commenting period, the comments received on the Updated Draft EIA Report and EMPr will be included in the Final EIA Report which will be submitted to DEA for decision-making.

The changes that were made in the Updated Draft EIA Report following the comments from DENC include *inter alia*:

1. The Terrestrial Ecological study was updated to address the comments from DENC and SANParks and is included in Appendix G of this report; and
2. The Ecological Offset Report was revised and was submitted for peer review and sign-off by an accredited and recognized biodiversity offset specialist, Mark Botha. The revised Ecological Offset Report is included in Appendix Q and the review from Mark Botha is included in Annexure 1 of Appendix Q.

In addition to the changes mentioned above the Updated Draft EIA Report also include the following:

1. Comments from SANPARKS on the Draft EIA Report (letter dated 11 June 2018 included in Appendix D4), in particular on the Ecological Offset study; and
2. An updated EMPr which includes a Heritage Maintenance Plan (HMP) as requested by SAHRA in their letter 24 May 2018 (Appendix D4).
3. The Agenda and notes from a meeting (Appendix E10 and E11 respectively) that was held with representatives from DENC, WWF, DEA (Biodiversity Unit), Simon Todd Consulting, juwi and CSIR to discuss the comments from DENC and to present the revised Ecological Offset report to DENC and DEA. Comments were invited to inform and determine the suitability and the way forward on the proposed offset approach.

The Environmental Impact Assessment (EIA) process undertaken to date has culminated in the preparation of this Environmental Impact Assessment Report (EIA Report). The EIA Report provides information relevant to the project and establishes the potential impacts that were assessed in detail from the Scoping Phase, as well as a description of appropriate mitigation measures. This report has been prepared in accordance with the 2014 EIA Regulations, as amended, published in Government Notice No. R 326 of 7 April 2017 and associated guidelines promulgated in terms of the National Environmental Management Act (NEMA) (Act 107 of 1998).

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

Table 1.1: Requirements of an EIA Report as defined in terms of Appendix 3 of GNR 326

Section of the EIA Regulations	Requirements for an EIA Report in terms of Appendix 3 of the 2014 NEMA EIA Regulations, as amended (GN R326)	Section	Page
Appendix 3 - (1)(a)	Details of - i. the EAP who prepared the report; and ii. the expertise of the EAP, including a curriculum vitae;	Chapter 1 Section 1.8 and Appendix A	Pages 1-31 to 32 and A9-14
Appendix 3 - (1)(b)	The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, 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;	Chapter 1 Table 1.1, Section 1.1; Chapter 2 Section 2 Figure 2.1 and Chapter 3 Section 3.4	Pages 1-3 Pages 1-8 to 1-9, 2-2 2-4 3-4 to 3-5
Appendix 3 - (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;	Chapter 1 Section 1.1 Figure 1.1 Chapter 3 Figure 3.27 and Figure 3.28	Pages 1-7, Pages 1-8-9 3-48 and 3-49
Appendix 3 - (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;	Chapter 4 Section 4.1 and Chapter 2 Section 2.1	Pages 4-2 to 4-5 2-2 to 2-10
Appendix 3 - (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;	Chapter 4 Section 4.1 and Section 4.2	Pages 4-2 to 4-5 and 4-6 to 4-14
Appendix 3 - (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;	Chapter 1 Section 1.5 and Section 1.6	Pages 1-12 to 1-13 1-13 to 1-29

Section of the EIA Regulations	Requirements for an EIA Report in terms of Appendix 3 of the 2014 NEMA EIA Regulations, as amended (GN R326)	Section	Page
Appendix 3 - (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 - 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 the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts – (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; vi. the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; vii. positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; viii. the possible mitigation measures that could be applied and level of residual risk; ix. the outcome of the site selection matrix; x. if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and xi. a concluding statement indicating the preferred alternatives, including preferred location of the activity;	(i) Chapter 5	Pages 5-4 to 5-18
		(ii) Chapter 4 Section 4.4 Appendix D to the main report	Pages 4-18 to 4-20 1 to 120
		(iii) Appendix F	Pages 1 to 120
		(iv) Chapter 3 Section 3.2 Section 3.3 and Section 3.5	Pages 3-6 to 3-14 3-14 to 3-52 3-54 to 3-57
		(v) Chapter 6 Section 6.1	Pages 6-8 to 6-95
		(vi) Chapter 4 Section 4.6	Pages 4-22 to 4-28
		(vii) Chapter 6 Section 6.1 Appendices G-P	Pages 6-8 to 6-94 Appendices G-P
		(viii) Chapter 6 Section 6.1 Appendices G-P	Pages 6-8 to 6-94 Appendices G-P
		(ix) Chapter 5 Section 5.1 and 5.2	Pages 5-4 to 5-18 5-19 to 5-20
		(x) Chapter 5 Section 5.1	5-4 to 5.18
		(xi)Chapter 5 Section 5.2	5-19 to 5-20
Appendix 3 - (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	Chapter 4 Section 4.6 and Section 4.7	Pages 4-20 to 4-25 4-27 to 4-36

Section of the EIA Regulations	Requirements for an EIA Report in terms of Appendix 3 of the 2014 NEMA EIA Regulations, as amended (GN R326)	Section	Page
	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; 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 3 - (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 A	Pages 18-19
Appendix 3 - (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 A	Pages 15-16
Appendix 3 - (1)(k)	Where applicable, any specific information required by the competent authority;	Appendix E Appendix E1 Appendix E2 Appendix E3 Appendix E9 Appendix F Table 1 Table 3 Table 4	Pages 4-9 25-27 27-31 55-61 5 20-36 37-41
Appendix 3 - (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

This chapter provides an introduction (project overview) of the proposed Kap Vley Wind Energy Facility, (WEF) proposed near Kleinzee in the Northern Cape. This chapter includes:

- An overview of the of the proposed WEF;
- The legal requirements for an EIA;
- Information on the Project Applicant and EIA team;
- An overview of the motivation or needs and desirability of the proposed WEF;
- The objectives of the EIA Report; and the
- Requirements for an EIA in terms of Appendix 3 of the 2014 NEMA EIA Regulations, as amended (GN R326).

1.1. INTRODUCTION TO THE PROPOSED DEVELOPMENT OF A WIND ENERGY FACILITY

Juwi Renewable Energies (Pty) Ltd (hereinafter referred to as "juwi"), through its project company Kap Vley Wind Farm (Pty) Ltd, proposes to construct and operate a WEF and associated transmission infrastructure [subject to a separate Basic Assessment (BA) Process] 30 km south east of Kleinzee in the Northern Cape (see Figure 1.1). The proposed Kap Vley WEF will be connected to the Gromis Substation, or the new Eskom substation for which the location still needs to be finalised, via a 132 kV powerline.

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

- Remainder (RE) Kamaggas Farm 200 Portion 5;
- RE Kap Vley Farm 315;
- Portion 1 of Kap Vley Farm 315;
- Portion 2 of Kap Vley Farm 315,
- Portion 3 of Kap Vley Farm 315;
- Portion 3 of Platvley Farm 314;
- RE Kourootjie Farm 316; and
- RE Gra'water Farm 331.

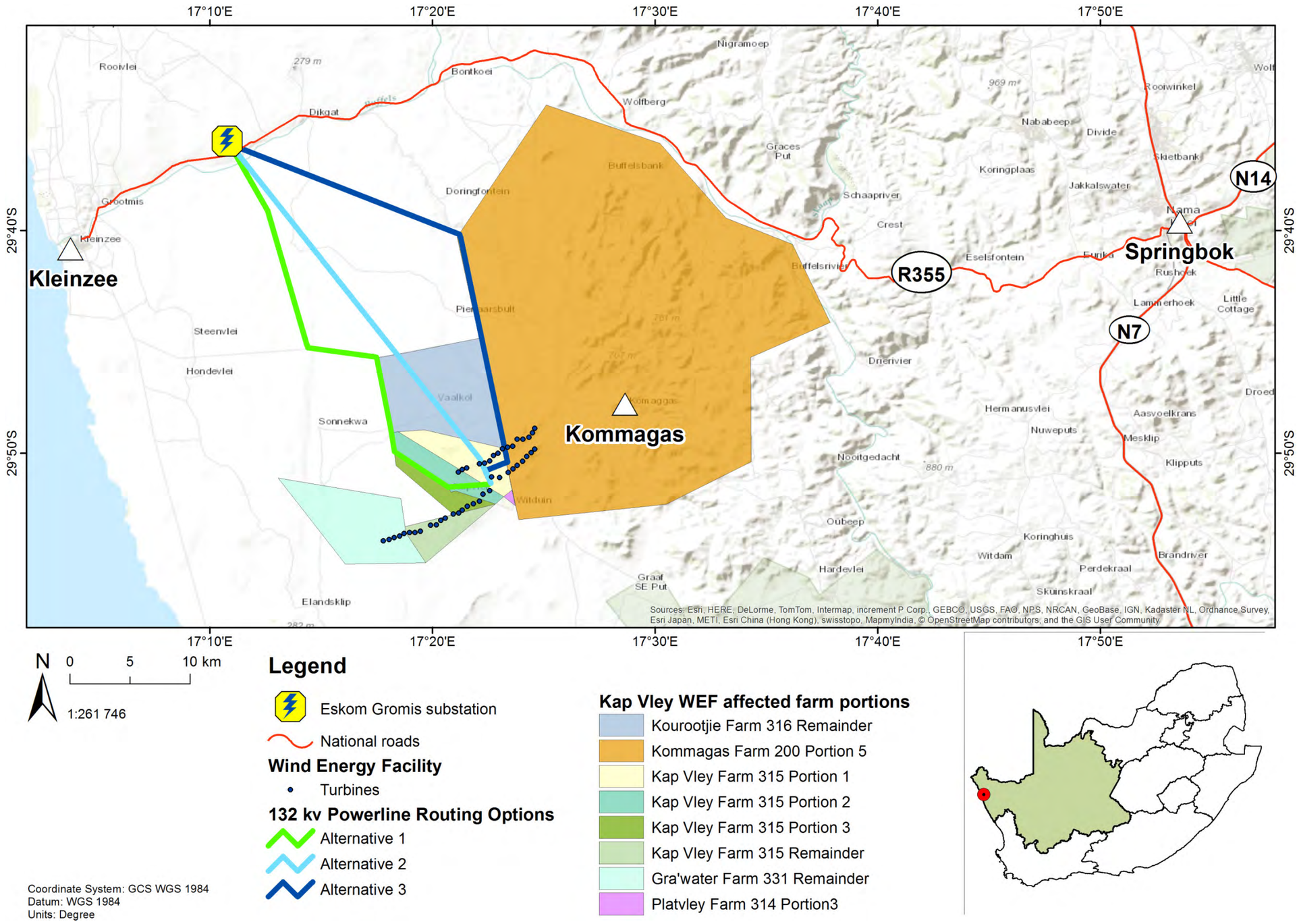

Figure 1.1: Locality map for the proposed Kap Vley WEF near Kleinzee in the Northern Cape.

1.2. AN OVERVIEW OF THE PROPOSED KAP VLEY WIND ENERGY FACILITY

The proposed Kap Vley WEF will comprise of a maximum of 45 turbines with a hub height and rotor diameter of 80 - 150 and 100 - 160 m, respectively. The development footprint of the proposed WEF will be approximately 128 ha. The key components of the Kap Vley WEF are discussed in more detail in Chapter 2 of this EIA Report. Figure 1.2 illustrates the current plan for the location of the turbines and roads for the proposed Kap Vley WEF.

1.3. 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 Kap Vley 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".

juwi 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 EIA 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.

The project is currently at the stage where an Updated Draft EIA Report has been prepared and is hereby being released for a 30-day commenting period. Following the commenting period, the comments received on the Updated DEIAR will be included in the Final EIAR which will then be submitted to DEA for decision-making.

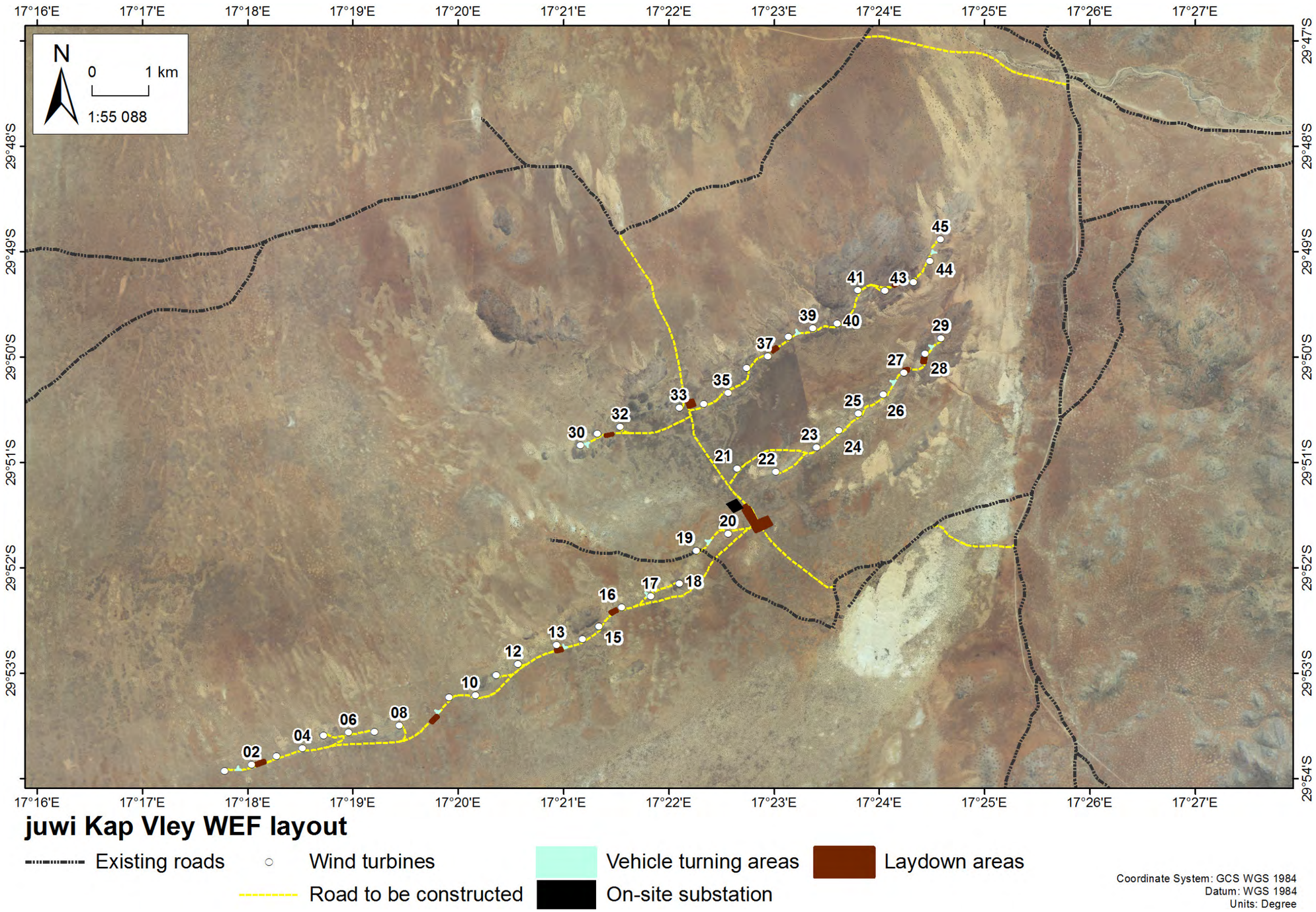

Figure 1.2: Layout map for the proposed Kap Vley WEF-showing the proposed wind turbine as well as internal roads

1.4. PROJECT APPLICANT

juwi Renewable Energies (Pty) Ltd (juwi) is part of the international juwi Group, one of the world's leading companies in the area of renewable energy. juwi focuses on Solar Energy and Wind Energy and works with landowners, project developers, technology providers, regulators and investors to source and develop renewable energy projects. juwi 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 Procurement Programme (REIPPPP) and reaching financial closure.

The applicant for this project is the juwi owned project company, Kap Vley Wind Farm (Pty) Ltd.

1.5. 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, 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, 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. juwi 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.

The National DEA, in discussion with the DoE, was mandated by MinMec to undertake a Strategic Environmental Assessment (SEA) to identify the areas in South Africa that are of strategic importance for Wind and Solar PV development. The Wind and Solar PV SEA was thus undertaken in support of the Strategic Infrastructure Plan (SIP) 8, which focuses on the promotion of green energy in South Africa. The SEA aimed to identify strategic geographical areas best suited for the roll-out of large scale wind and solar PV energy projects, referred to as Renewable Energy Development Zones (REDZs). Through the identification of the REDZs, the key objective of the SEA was to enable strategic planning for the development of large scale wind and solar PV energy facilities in a manner that avoids or minimises significant negative impact on the environment while being commercially attractive and yielding the highest possible social and economic benefit to the country – for example through strategic investment to lower the cost and reduce timeframes of grid access.

Following the completion of the SEA, the proposed REDZs (shown in Figure 5.3 of Chapter 5), were submitted for Cabinet approval. The REDZs were signed off by the Minister of Environmental Affairs and gazetted on 16 February 2018 in Government Gazette No. 41445. This was a big milestone for the renewable energy sector as South Africa now has REDZs to guide responsible investment and future planning. In these zones/corridors, there has been a pre-assessment of environmental sensitivities and a more efficient and coordinated environmental assessment process can thus now be followed in these areas.

The proposed Kap Vley WEF project site is located within REDZ 8, which supports the development of large scale wind and solar energy developments. The proposed project is therefore in line with the national planning vision for wind development in South Africa.

Should the proposed site and development identified by juwi be acceptable, it is considered viable that long term benefits for the community and society in the Kleinzee/Komaggas 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 323 employment opportunities will be created during the construction phase (including 140 employees from the local area) and 35 during the operational period (including 17 employees from the local area) of the proposed Kap Vley WEF. The Kap Vley WEF is also partly situated on the Kommagas Community land, meaning that the local community would also derive an income as a project landowner.

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.

1.6. 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.

Table 1.2: 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 1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	**The environmental sensitivities present on site were assessed within the Terrestrial Ecological Impact Assessment included in the EIA Report (Appendix G).** **The specialist identified 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.** **It is noted that the site is of high biodiversity significance and falls within a CBA 1 and 2. An Ecological Offset study has been undertaken by Simon Todd Consulting and is included in Appendix Q. This study has been updated following inputs from the Scoping and EIA phase (undertaken to date) and following discussions and agreements between the different parties involved. The Ecological Offset study has been revised extensively following comments received from DENC and SANParks during the review of the initial Draft EIA Report. The letter from DENC is included in Appendix E9. The letter from SANParks is included in Appendix D4. A meeting was held with representatives from DENC, DEA (Biodiversity Unit), WWF, juwi and CSIR on 12 June 2018 at the SANParks offices in Kimberly. The purpose of the meeting was to discuss the comments from DENC and to present the updated Ecological Offset study to them and to DEA. The agenda and meeting notes are included in Appendix E10 and E11 respectively.** **The updated Ecological Offset Study has been peer**

NEED	
Question	**Response**
	reviewed by Mr Mark Botha of *Conservation Strategy Tactics and Insight* who is an accredited and recognized Offset specialist. The review is included in Annexure 1 of Appendix Q. The outcome of the Ecological Offset study is that the overall residual ecological impact after mitigation is of moderate significance, but due to the CBA status of the site an ecological offset is still proposed. juwi is in discussions with WWF in the area and SANPARKs to expand the Namaqua NP as an offset. In commenting on the Draft EIA Report WWF confirmed in a letter dated 16 May 2018 (see Appendix D4) that they have no objection to the contents of the EIA Report, in particular the Ecological Offset study (Appendix Q) and the approach proposed in the Offset study. **SANParks provided comments on the Draft EIA Report in their letter dated 11 June 2018 (see Appendix D4). SANParks noted that the proposed development falls within the Buffer Zone of Namaqua National Park (NNP) which includes critical priority natural areas, as wells as the view shed protected zone. In addition, the proposed development also impinges upon the planned park expansion footprint. In particular, SANParks notes that the proposed development falls within a CBA and NCPAES Areas. SANParks is concerned about potential negative impacts on the integrity of NNP and surrounding area. Although this wind farm is far from their boundary the turbines will be visible form certain places in the park and will impact on the remote and open sense of place. Each turbine will have a red light on the top for aircraft and this will also be visible from a distance at night, potentially spoiling the view from the park now and into the future should we develop tourism products closer to Kommagas.** **The sensitivity map is included in Chapter 3 of this EIA Report and was informed by assessments done by the specialists on the project team.**
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 CBAs present on site were identified by the Ecology specialist and are included in the Terrestrial Ecological Impact Assessment in Appendix G. The specialist confirmed that the site falls within a CBA 1 & 2. juwi is in the process of determining an offset to compensate for the likely impact of the development. Meetings and**

NEED	
Question	**Response**
	discussions have been held with SANParks WWF, DEA and DENC to discuss offset requirements. **The specialist has identified all ecological sensitive areas on site that have to be avoided by the proposed development and proposed mitigation measures to avoid or minimise impacts to ensure that the ecological integrity of the areas is maintained.** **The environmental sensitivity map is included in Chapter 3 of this EIA Report.** **Measures to avoid, remedy, mitigate and manage impacts are included in the Environmental Management Programme (EMPr) that was compiled during the EIA Phase and is included in Section B of 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 are included in the EMPr (Section B of 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 were included within the EMPr. 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) was undertaken to assess potential archaeological, palaeontological and cultural impacts resulting from the proposed development during the EIA Phase (Appendix L). The affected environment in terms of heritage is also described in Chapter 3. Measures to avoid or to minimise these impacts to the landscape and the cultural heritage are included in the HIA in Appendix L as well as the EMPr included in Section B. SAHRA indicated in their letter dated 24 May 2018 that they have no objections to the proposed Kap Vley Wind Farm (see Appendix D4).**

NEED	
Question	**Response**
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?	**An Ecological Assessment has been undertaken with regards to the proposed project; the assessment includes a detailed profile of the natural environment and anticipated impacts. Measures to avoid, remedy, mitigate and manage impacts are included in the EMPr (Part B of this 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 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?	**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 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.**

NEED	
Question	**Response**
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 generating capacity and turbine technology 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. Mitigation measures to manage these impacts have been identified.**
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 was undertaken and is included as Appendix N of this Updated EIA Report. A socio-economic profile is included in Chapter 3.** **An EMPr (Part B) has been compiled for the proposed project to ensure that all potential 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 WEF in a rural landscape. The visual impact has been assessed as part of the Visual Impact Assessment (Appendix K of this Updated Draft EIA 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 were considered in the Socio-Economic Impact Assessment undertaken (Appendix N of this Updated Draft 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 were considered as part of the Terrestrial Ecology Impact Assessment as well as the Ecological Offset study undertaken for this project (Appendices G and Q) respectively.** **The proposed activity does not compromise any of the objectives set within the Nama Khoi Local Municipality's Integrated Development Plan (IDP) (2012/2017) and the Namakwa District Municipality's IDP (2017 – 2022). The proposed project will also be supportive of the IDP's objective**

NEED	
Question	**Response**
	of creating more job opportunities. The proposed WEF will assist in local job creation during the construction and operation phases of the project (if an EA is granted by the DEA). However, as noted above, employment opportunities will be temporary during the construction phase and long-term during the operational phase as the plant is expected to be operational for 20 years.
1.12. Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	**Please refer to Chapter 5 of this Updated Draft EIA 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 the Updated Draft EIA Report where the potential cumulative impacts are discussed for this project.**
2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?:	
2.1.1. The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,	**The Nama Khoi Municipality's IDP (2017-2022) states that an opportunity exists to utilise wind energy more widely and lessen the dependence on wood and gas as energy sources for cooking in households. This opportunity has been identified because of the increasing backlog in electricity provisioning in the municipal area. Even though this WEF will not supply electricity directly to the municipality, the energy produced by the facility will feed into the national grid.** **The IDP has also identified embarking on renewable energy and upgrading electricity supply to water pump stations and incorporation of Eskom electricity network to address the electricity needs in the Komaggas area; this depicts a need for an alternative source of energy.** **Furthermore, the DEA commissioned a SEA to identify the areas in South Africa that are of strategic importance for Wind and Solar PV development. The SEA aims to identify strategic geographical areas best suited for the roll-out of large scale wind and solar PV energy projects, referred to as REDZs. The proposed Kap Vley WEF falls within REDZ 8 and is therefore aligned with**

NEED	
Question	**Response**
	national priority areas for the development of renewable energy projects. The REDZs were recently gazetted and renewable projects will operate within these areas. Eskom may therefore be able to unlock funding to proactively construct grid infrastructure to facilitate generation capacity from these areas. This will mean that the municipality will also benefit from these upgrades and potentially alleviate the electrification backlogs present in the area. **One of the economic priority issues identified within the Nama Khoi Local Municipality IDP (2017–2022) is the high levels of unemployment. The IDP further states that the majority of the adult population within the Nama Khoi Local Municipality have low skills levels and need employment. The proposed project will create job opportunities and economic spin offs during the construction and operational phases (if an EA is granted by the DEA). It is estimated that approximately 323 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 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 activity does not compromise any of the objectives set within the Nama Khoi Local Municipality IDP (2017 – 2022). The proposed project will also be supportive of the IDP's objective of facilitating job creation to address the high unemployment rate.**
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.**
2.1.3. Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.)	**The impact on sensitive natural areas would be limited. 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. This footprint**

NEED	
Question	**Response**
	has since been significantly reduced through detailed technical planning to avoid environmentally sensitive areas as much as possible, while still retaining a technically and financially viable layout. **The impact of the proposed project on cultural/heritage areas (archaeology and palaeontology) have been assessed in the form of a HIA attached as Appendix L. The visual intrusion into cultural landscape & disruption of traditional activities was assessed to be of low significance before and after mitigation.** **The site layout avoids sensitive heritage features. Please see Chapter 3 for a site layout map including the avoided sensitive features.** **The preferred project site is currently being used for agricultural purposes, predominantly grazing. Should the proposed project proceed, approximately 128 ha 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 Impact Assessment (Appendix M) was compiled to reflect the impact of the proposed project in terms of the land use and agricultural potential.** **As noted, an EMPr was compiled for the proposed project to ensure that all potential negative impacts identified are suitably managed and mitigated, and potential positive impacts are enhanced. The visual impact and considerations have been assessed in the Visual Impact Assessment which is attached as Appendix K. An environmental sensitivity map is included in Chapter 3, based on the input obtained from the various specialist studies. Where possible, sensitive features have been avoided by layout revisions.**

NEED	
Question	**Response**
2.1.4. Municipal Economic Development Strategy ("LED Strategy").	**The Nama Khoi Local Municipality's Integrated Development Plan (IDP) (2012/2017) LED Strategy (2016) lists renewable energy as an opportunity for the municipality. It states that "Renewable energy has become a global priority and there is potential for both wind and solar power within the Nama Khoi Local Municipality."** **The proposed Kap Vley WEF is therefore aligned with the LED Strategy of the Nama Khoi Local Municipality.**
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 is addressed and included in the Socio-Economic Impact Assessment (Appendix N).**
2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	**This is addressed and included in the Socio-Economic Impact Assessment (Appendix N).**
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 is addressed and included in the Socio-Economic Impact Assessment (Appendix N).**
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 323 (140 local) and 35 (17 local) 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 and as an ecological corridor.**
2.5.3. result in access to public transport or enable non-motorised and pedestrian	**N/A -the proposed project is located within a rural area and the site is zoned for agricultural use and as**

NEED		
Question		**Response**
	transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	**an ecological corridor. 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, predominantly grazing. Should the proposed project proceed, approximately 128 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 was undertaken and is included as Appendix M 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 and as an ecological corridor.**
2.5.7.	optimise the use of existing resources and infrastructure,	**The proposed Kap Vley WEF will connect to the Gromis Substation located on the remainder of Farm Dikgat 195, or closer to the new Eskom substation for which the location still needs to be determined 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 settlement),	**This project is in a REDZs and therefore in a priority renewable energy development area.**
2.5.9.	discourage "urban sprawl" and contribute to compaction/densification,	**Not applicable as the project is not proposed in an urban area where social impacts are expected to manifest.**
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.** **Based on the findings of this EIA, the proposed project would not have a significant ("high") negative impact on the receiving environment, with the implementation of suitable mitigation**

NEED	
Question	**Response**
	measures. As noted in Appendix M of this Updated Draft EIA Report (Soils and Agricultural Potential Impact Statement), due to the climate and soil limitations, the site is not suitable for any agricultural land use other than low intensity grazing. Currently, the site is used for grazing, which could continue in the surrounding regions, together with the generation of additional income via the leasing of the land to the Applicant.
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),	**This was addressed within the Socio-Economic Impact Assessment (Appendix N).**
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 was assessed in the HIA and VIA which are included as Appendices K and L respectively.**
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 are proposed and environmentally approved in the area, which lends itself potentially to a renewable energy development area.** **The proposed wind facility falls within the gazetted REDZ 8. The REDZs were recently gazetted. Therefore, should the renewable energy projects operate within these areas, Eskom may be able to unlock funding to proactively construct grid infrastructure to facilitate generation capacity from these areas. This will mean that the municipality will also benefit from these upgrades and potentially alleviate the electrification backlogs present in the 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)?	**This was addressed within the Socio-Economic Impact Assessment (Appendix N).**
2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods,	

NEED	
Question	**Response**
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?	
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?	**This was addressed within the Socio-Economic Impact Assessment (Appendix N).**
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	

NEED	
Question	**Response**
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 to date as part of the Scoping and the EIA process is included in Chapter 4 of the Updated Draft EIA Report. Various methods were employed to notify potential I&APs of the proposed project, namely, through notices in the local newspaper, site notices on site and in Komaggas & Kleinzee, emails as well as notification letters.**
2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	
2.13.3. ensure participation by vulnerable and disadvantaged persons,	
2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	**The EIA process has taken 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 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 to date as part of the Scoping and the EIA process is included in Chapter 4 of the Updated Draft EIA Report. Various methods were employed to notify potential I&APs of the proposed project, namely, through notices in the local newspaper, sites notices on site and in Komaggas and Kleinzee, 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 has taken 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 has been promoted and opportunities for engagement will be provided throughout 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)?	**The proposed project presents viable long term benefits for the community and society in the Kleinzee/Komaggas area. Recommendations made within the Socio-Economic Impact Assessment (included in Appendix N of this Updated Draft EIA Report) and those included in the EMPr section of this Report (Part B) have the potential to facilitate more options to local community members in terms of socio-economic benefits.**
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	**An EMPr was developed to address health and safety concerns. An Environmental Control Officer (ECO) will be appointed to monitor compliance.**

NEED	
Question	**Response**
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?	
2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1. the number of temporary versus permanent jobs that will be created,	**This was addressed within the Socio-Economic Impact Assessment (Appendix N).**
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 were given the opportunity to comment on the Draft Scoping Report and the Draft EIA Report during the 30 day public participation period. Legislation, policies and guidelines, which could apply to impacts of the proposed project on the environment, have been considered. The scope and content of this Updated Draft EIA Report has been informed by applicable integrated environmental management legislation and policies. Chapter 4 of this Updated EIA Report and the specialist studies included in this Report also provide a description of the relevant applicable legislation that the proposed development complies with. The Updated Draft EIA Report will be circulated again to all the relevant stakeholders for a 30-day commenting period.**
2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	**Public Participation has been undertaken as part of the Scoping Phase for this EIA process, and to this date the CSIR has not received information on potential conflicts of interest.**
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	**The proposed WEF will adhere to the principles of environmental management. Public participation forms an integral part of the Environmental Assessment Process and assists in identifying issues**

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Question	**Response**
environment will be protected as the people's common heritage?	**and possible alternatives to be considered during the EIA Process.**
2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	**The proposed mitigation measures included in the EMPr (Part B) of this Report have been informed by the Specialist studies undertaken and this includes a detailed assessment of the environment as well as the impacts associated with the proposed development. 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. Based on material and socio-economic terms, and measured to the value of the best alternative that is not chosen, the proposed project will result in positive opportunity costs.**
2.20. What measures were taken to ensure that he costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	**The EMPr (Part B) of this proposed project must form part of the contractual agreement and be adhered to by both the contractors/workers and the applicant.**
2.21. Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	**Due to both the climate and soil limitations, the site is not suitable for any agricultural land use other than low intensity grazing. The site is within one of South Africa's eight proposed Renewable Energy Development Zones (REDZ 8), and has therefore been identified as one of the most suitable areas in the country for renewable energy development, in terms of a number of environmental impact, economic and infrastructural factors. These factors include an assessment of the significance of the loss of agricultural land. Renewable energy development is therefore a suitable land use option for the site. The proposed WEF would however 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?	**In assessing the cumulative impacts of the proposed development, all the projects that fall within a 50 km radius of the proposed Kap Vley WEF were considered. The incidence and severity of the in-migration of job seekers and increases in social deviance are likely to increase with the development of more renewable energy projects in**

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Question	**Response**
	the area. The cumulative socio-economic benefit offered by industrial scale development in the area outweighs the negative impacts associated with economic growth. The cumulative impact of the proposed development is therefore considered to be of moderate significance (after mitigation) for the influx of people. The cumulative impact regarding project expenditure and long-term diversification of the economy is considered to be of high significance (positive impact) after mitigation.

1.7. EIA TEAM

As previously noted, the CSIR has been appointed by juwi to undertake the EIA with associated PPP 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. Details on the PPP are included in Chapter 4 of this Updated Draft EIA Report.

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 1.3: 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.)*
Specialists		
Simon Todd *External Reviewer of the Ecological Offset study*: Mark Botha	Simon Todd Consulting *External Reviewer:* Conservation Strategy Tactics & Insight	Ecology Impact Assessment (Terrestrial Ecology including fauna and flora); Ecological Offset study
Bernard Oberholzer and Quinton Lawson	Bernard Oberholzer Landscape Architect and BOLA	Visual Impact Assessment
Luanita Snyman van der Walt *External Reviewer:* Dr Liz Day	CSIR *External Reviewer:* Freshwater Consulting	Dry and Ephemeral Watercourses Impact Assessment
Dr. Jayson Orton	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
John Pether	Private, sub-contracted by ASHA Consulting (Pty) Ltd	Desktop Palaeontological Impact Assessment
Andrew Pearson and Anja Albertyn	ARCUS	Bird Impact Assessment
Jonathan Aronson		Bat Impact Assessment
Johann Lanz	Private	Soils and Agricultural Potential Assessment
Surina Laurie *External Reviewer:* Elena Broughton	CSIR *External Reviewer:* Urban-Econ Development Economists	Socio-Economic Impact Assessment
Morné de Jager	Enviro-Acoustic Research	Noise Impact Assessment
Christo Bredenhann	WSP Group Africa (Pty) Ltd	Transportation Impact Assessment

Please note that the Dry and Ephemeral Watercourses Impact Assessment was initially referred to as the Aquatic Impact Assessment. The "Dry and Ephemeral Watercourses" study included in this Updated Draft EIA Report fulfills the requirements and Terms of References set out in the Plan of Study for the Aquatic Ecology Impact Assessment. As the study progressed and upon site investigation it became clear that "Aquatic Ecology" was not the appropriate terminology to describe the on-site conditions, which were verified to be characterised by dry and ephemeral watercourses (including drainage lines) that play an important role within this particular arid landscape, but is not strictly aquatic.

In addition to the specialist studies included above, juwi has also commissioned the following two studies which are not specialist studies as per Appendix 6 of the NEMA EIA Regulations, as amended. These studies are therefore not included in the impact assessment tables below.

Ecological Offset study:
This study was conducted by Simon Todd of Simon Todd Consulting. The Ecological Offset study was undertaken in addition to the Terrestrial Ecology study to inform the biodiversity offset required as the

site falls within a CBA1 and CBA2. The site also falls within the Northern Cape Protected Expansion Strategy (NCPAES) Focus Area (2017), which further highlights the significance of the area for conservation purposes. Apart from highlighting the significance of the study area for conservation, the NCPAES also highlights areas where an offset would be seen as being most beneficial and desirable. The Ecology Offset study has been updated following comments received from DENC in their letter dated 25 May 2018 (see Appendix E9). It was also updated following comments received from SANParks in their letter dated 11 June 2018 (see Appendix D4). The Updated Ecological Offset study is attached as Appendix Q in the Updated Draft EIA Report. The revised Ecology Offset Study was peer reviewed by an accredited and recognized Offset specialist, Mark Botha, in response to the comments received from DENC in their letter dated 25 May 2018. The review report is included in Annexure 1 of Appendix Q of this report.

Analysis of potential Wake Loss Effect on Eskom WEF

A Wake Effect Analysis was commissioned by juwi in response to a request by DEA to assess the potential impact on performance of the Eskom WEF due to wake losses from the proposed Kap Vley WEF (see DEA letter dated 29/11/2017 included in Appendix E). The proposed development is located approximately 15 km from the Eskom Kleinzee WEF which has already received EA. This potential impact was assessed and included as Appendix R in the Updated Draft EIA Report. The full Wake Effect study and the implications of this proposed project for this is attached as **Appendix R.**

1.8. 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 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 Wind Energy Project (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, i.e. the REDZs. He has also recently led EIAs for Solar PV projects in the Free State and Northern Cape for Mainstream Renewable Energy, Solaire Direct and Mulilo Renewable Project Developments. He 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 EAP in the EMS group of the CSIR and has a Master's degree in Botany from the Stellenbosch University. She has 15 years of experience in Environmental Management (which includes nine 12 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 Wind Energy Facility near Jeffrey's Bay (Environmental

Authorisation granted in June 2012), as well as the 50 MW Banna Ba Pifhu Wind Energy Facility proposed by WKN Wind current near Humansdorp in the Eastern Cape (Environmental Authorisation granted in July 2014). She was the project manager of ten BAs for wind monitoring masts in South Africa as part of the National Wind Atlas Project of the Department of Energy. Environmental Authorisation from the national Department of Environmental Affairs for all the ten masts was obtained in 2010. She was also the Project Leader for seven Solar Photovoltaic facilities near Kenhardt in the Northern Cape in 2016 for Mulilo Renewable Project Developments. 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 (i.e. financial constraints).

1.9. OBJECTIVES FOR THIS EIA REPORT

This Updated Draft EIA Report was preceded by a comprehensive Scoping Process. During the Scoping Phase, the Scoping Report was made available to Interested and Affected Parties (I&APs) and stakeholders for a 30-day comment period extending from 30 October 2017 to 30 November 2017. The comments received from stakeholders during the 30-day review of the Scoping Report were incorporated into the Scoping Report (where required), and the finalised Scoping Report was submitted to the DEA on the 11th of December 2017, in accordance with Regulation 21 (1) of the 2014 NEMA EIA Regulations, as amended, for decision-making in terms of Regulation 22 of the 2014 NEMA EIA Regulations. It is important to note that (for the purpose of completeness and continuity), the comments received from I&APs during the Scoping Phase have been included in Appendix D4 of this Updated Draft EIA Report. The DEA accepted the finalised Scoping Report and Plan of Study for EIA on 12 February 2018, which marked the end of the Scoping Phase (Appendix E5 this Updated Draft EIA Report), after which the EIA Process moved into the impact assessment and reporting phase. For background on the Scoping Process, the reader is referred to the Scoping Report (CSIR, 2017).

Following the release of the initial Draft EIA Report, comments were received from DENC which required substantial amendments to the DEIAR, in particular the Ecological Offset study (see letter from DENC dated 25 May 2018 included in Appendix E9 of this Updated Draft EIA Report). The CSIR subsequently submitted a notification to DEA dated 28 May 2018 in terms of Regulation 23 (1)(b) of the NEMA EIA Regulations, as amended to note that significant new information has come to light that was not contained in the DEIAR and EMPr that were consulted on during the initial public participation process contemplated in subregulation (1)(a) (see Appendix E7). The DEA was therefore notified that based on the new information, the Final EIA Report will be submitted within 157 days from the date of the Acceptance of the Scoping Report (letter dated 12 February 2018 included in Appendix E5). This allows for an extension of 50 days to submit the Final EIA Report to DEA for decision-making. DEA acknowledged the notification for extension and granted extension in their letter dated 1 June 2018 (see Appendix E8).

This Updated Draft EIA Report is currently being released to stakeholders for a 30-day review period. All comments received will be included in the finalised EIA Report, which will be submitted to DEA for decision-making. Following the 30-day commenting period, the comments received on the Updated Draft EIA Report and EMPr will be included in the Final EIA Report which will be submitted to DEA for decision-making.

The primary objective of this EIA Report is to present stakeholders, I&APs and the CA, the DEA, with an overview of the predicted impacts and associated management actions required to avoid or mitigate the negative impacts; or to enhance the benefits of the proposed project.

In broad terms, the amended 2014 NEMA EIA Regulations (GN R326) stipulates that the EIA Process must be undertaken in line with the approved Plan of Study for the EIA, and that it must include a description of the potential environmental impacts, mitigation and closure outcomes, as well as the residual risks of the proposed activity.

Based on the 2014 NEMA EIA Regulations, the objectives of the EIA Process are to:

- determine the policy and legislative context within which the activity is located and note how the proposed activity complies with and responds to the policy and legislative context;
- describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- determine the nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and the degree to which these impacts (a) can be reversed; (b) may cause irreplaceable loss of resources, and (c) can be avoided, managed or mitigated;
- identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- identify suitable measures to avoid, manage or mitigate identified impacts; and
- identify residual risks that need to be managed and monitored.

In terms of legal requirements, a crucial objective of the EIA Report is to satisfy the requirements of Appendix 3 of the amended 2014 NEMA EIA Regulations (as noted in Regulation 23 (3) of the GN R326). This section regulates and prescribes the content of the EIA Report and specifies the type of supporting information that must accompany the submission of the EIA Report to the CA. An overview of where the requirements of Appendix 3 of the 2014 NEMA EIA Regulations are addressed in this Updated Draft EIA Report is presented in Table 1.2.

As noted in Regulation 23 (4) of the GN R326, the EMPr that is required as part of the EIA Process is provided in Part B of this Updated Draft EIA Report and has been structured to comply with the requirements outlined in Appendix 4 of the 2014 NEMA EIA Regulations, as amended, as well as the requirements of DEA's acceptance of the Scoping Report and Plan of Study for EIA (as shown in Appendix F of this Updated Draft EIA Report). An overview of this compliance is shown in Part B of this Updated Draft EIA Report. In addition, the specialist studies that have been conducted as part of the EIA Phase need to comply with Appendix 6 of the amended 2014 NEMA EIA Regulations. Each specialist study (Appendix G to Appendix P) provides an overview table showing compliance with the regulations.

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

Scoping and Environmental Impact Assessment for the proposed Kap Vley Wind Energy Facility near Kleinzee in the Northern Cape

UPDATED DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 2:

Project Description

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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 Kap Vley WEF, as provided by juwi.

The purpose of this chapter is to present sufficient project information on the proposed Kap Vley 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 EIA Report, juwi through its project company Kap Vley Wind Farm (Pty) Ltd is proposing to develop the Kap Vley WEF and associated infrastructure including a 132 kV distribution line and on-site substation near Kleinzee in the Northern Cape. While the exact type and generation capacity of the turbines are yet to be finalised, the turbines are expected to have a combined maximum generation capacity of 300 MW. The proposed Kap Vley WEF will consist of a maximum of 45 individual turbines which will be positioned at strategic locations that have been informed by the scoping and impact assessment inputs provided by the specialists on the project team. The proposed location of the Kap Vley 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
Kap Vley WEF	North	-29.826978	17.337172
	North East	-29.810322	17.413315
	East	-29.845538	17.404749
	South- West	-29.898838	17.295770

2.1 KEY COMPONENTS OF THE PROPOSED KAP VLEY 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. 45 turbines. The hub height and rotor diameter ranges are also provided i.e. 80 - 150 m and 100 - 160 m respectively and were considered by the specialists.

The total physical footprint of the proposed project (i.e. maximum 45 turbines and supporting infrastructure) is estimated to be approximately 128 ha.

As mentioned in Chapter 1 of this EIA Report 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, which includes the Kommagas community, for the life span of the project. 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. This footprint has since been significantly reduced through detailed technical planning to avoid environmentally sensitive areas as much as possible, while still retaining a technically and financially viable layout. As the proposed Kap Vley WEF requires approximately 128 ha of land, there is spatial scope to avoid major environmental constraints through optimisation of the final design. Figure 2.1 indicates the project layout, including the associated infrastructure.

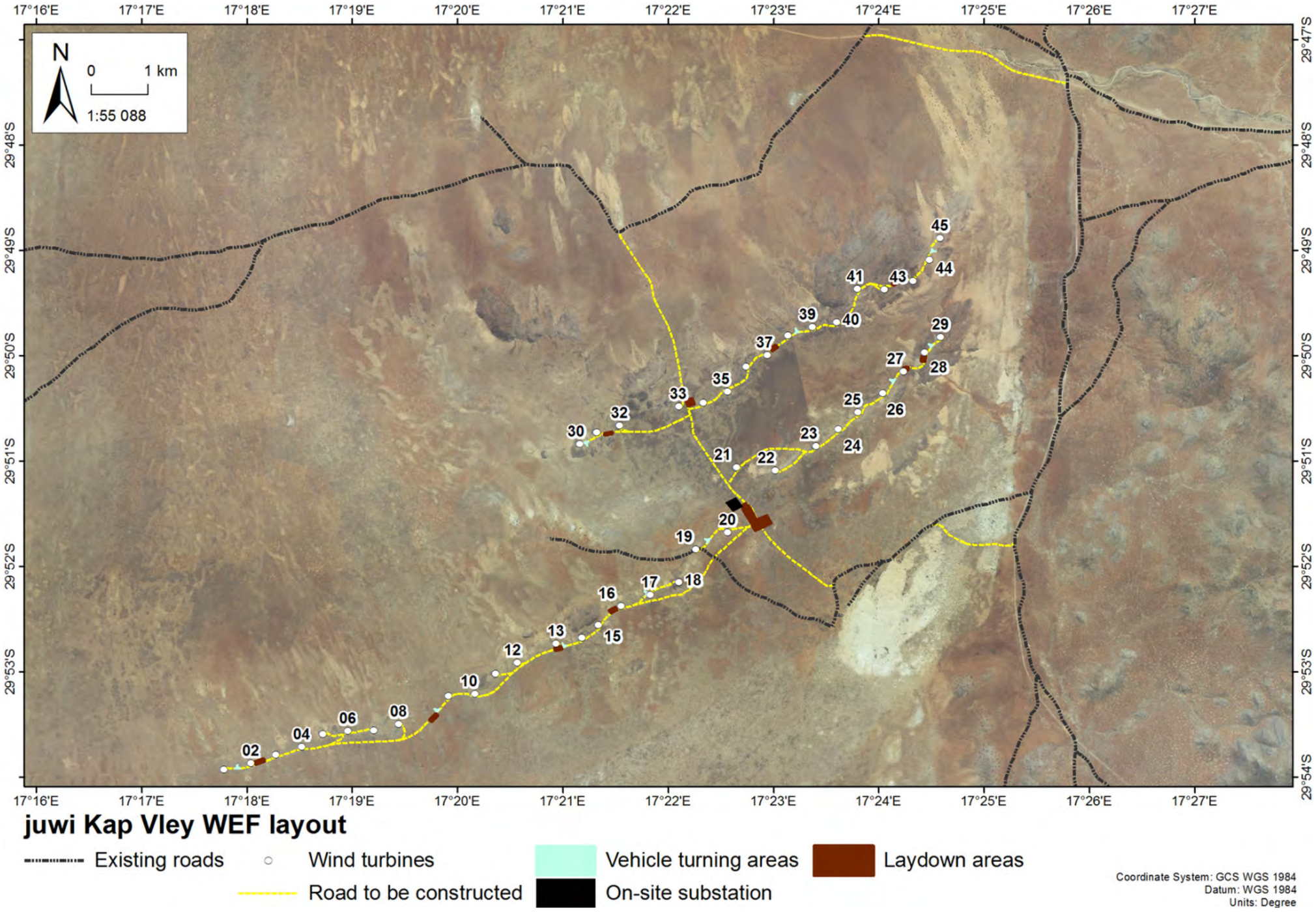


Figure 2.1: Proposed layout of the Kap Vley WEF

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, an environmental sensitivity map has been produced (and included in Chapter 3 and 7 of this EIA Report). 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 Kap Vley 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 20-45 turbines;
  - Hub height of 80 - 150 m and rotor diameter of 100 - 160 m;
  - Reinforced concrete foundation: 25 m x 25 m;
  - Crane platform: 1 ha at each turbine; and
  - Turbine capacity: To be confirmed

- ***Collector substation:***

  - 22/33 kV to 132 kV collector substation of approximately 2.3 ha to receive, convert and step up electricity from the WEF to the 132 kV grid suitable supply. 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, guest accommodation 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):***

  - Site offices, construction camp area, and lay down areas: 13 ha, consisting of several areas along internal roads and centrally located; and
  - On-site concrete batching plant: 0.25 ha.

- ***Access road:***

  - The proposed development site may be accessed via the R355 from Springbok, the Komaggas gravel road off the R355 or a combination of gravel roads from Garies via Hondeklip Bay and Koingnaas.

- ***Service roads:***

  - 37 km of internal road linking turbine locations. The road will be 5 m in width and 15 m in some sections to allow for passing, curvature and the physical footprint due to cut and fill requirements. Turning areas are also included.

- ***Other infrastructure:***

  - Fencing of 5 m high around the O&M building and the on-site substation;
  - Cabling between turbines to be laid underground where practical, which will connect to an on-site substation; and
  - Stormwater channels and culverts.

The proposed Kap Vley WEF will connect to the Gromis Substation located on the remainder of the Farm Dikgat 195 or closer to the new Eskom substation, for which the location still needs to be determined, via a 132 kV overhead transmission line. Depending on the location of the substation on-site, a maximum of 40 km will be accommodated for the length of the proposed overhead line, connecting the on-site substation to the Gromis Substation or the new Eskom substation for which the location still needs to be determined. Note that this transmission infrastructure is assessed under a separate BA process.

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 2.2 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 and rotor blades will have a height of 80 - 150 m and a rotor diameter of 100 - 160 m.

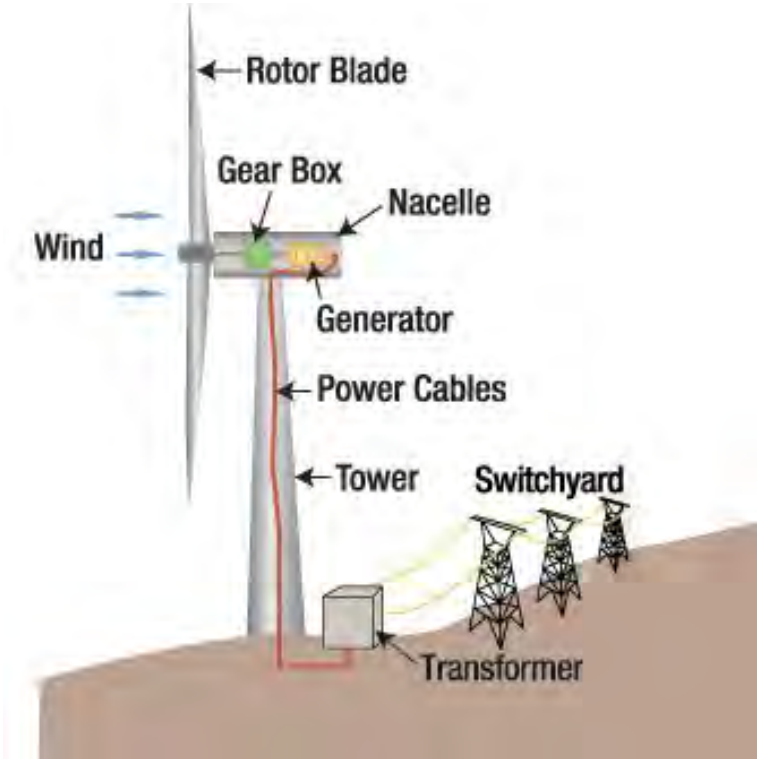


Figure 2.2: Generic design for a wind turbine (*Source*: Tennessee Valley Authority, Wikimedia).

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 625 m^2. The comparatively small base of the turbine allows other activities to continue uninterrupted in the space underneath and around the turbine. Conventional large scale development footprints often lead to habitat fragmentation and interference with fauna. As such the micro-siting of the wind turbines will be in an optimum position that minimises the possibility of habitat fragmentation and interference with movement of fauna.

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

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

2.1.2 Associated Infrastructure

Construction Laydown and Hardstand Areas

During construction, a laydown area with a maximum footprint of 13 ha (including a construction camp) and hardstand areas (including boom erection, storage and assembly area) will be established. These hard stand areas will be utilised by cranes during the construction phase (and also possibly when maintenance is done in the operational phase). The crane platform covering a footprint of approximately 1 ha will be established at each wind turbine. The crane platform will support turbine assembly, off-loading and storage during the construction phase. A schematic illustration of a typical hard stand area and crane platform is provided in Figure 2.3 below.

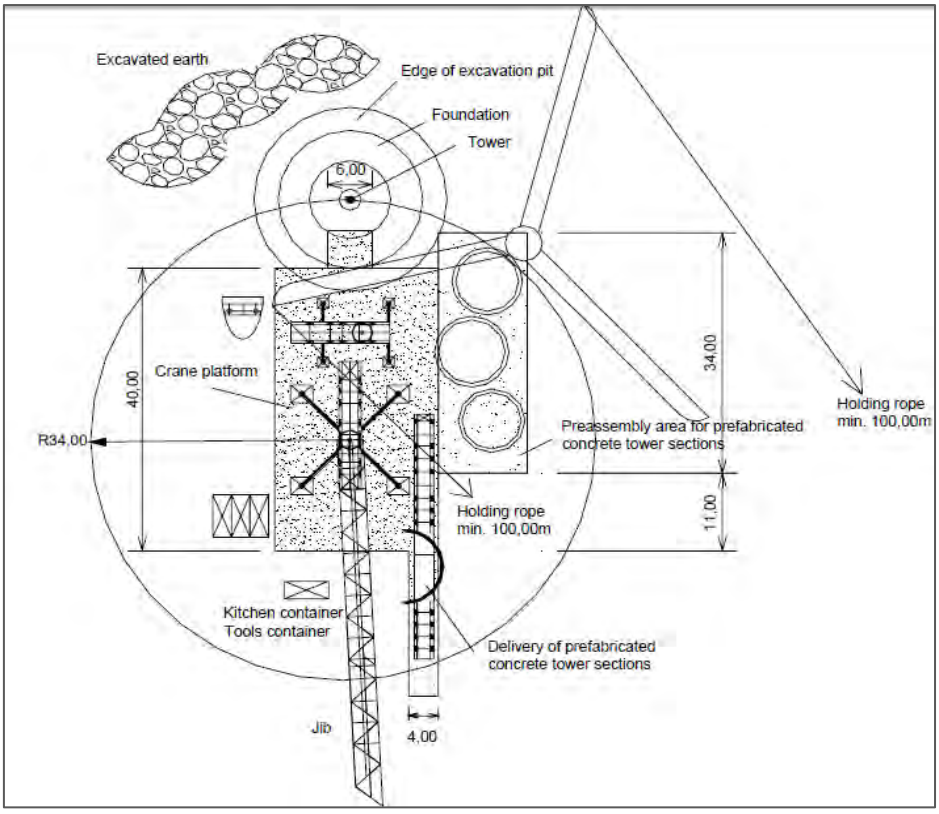


Figure 2.3: Example of a hard standing area and crane platform.

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.

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.

Batching plant

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

Operations and Maintenance Area

The on-site operation and maintenance area is required to support the functioning of the proposed Kap Vley 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 Kap Vley 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 currently being undertaken for the project.

Electrical Infrastructure

The transmission line for the proposed Kap Vley WEF will be constructed and will extend between the proposed on-site substation and the Eskom Gromis Substation or closer to new Eskom substation for which the location still needs to be determined. In addition, the transmission line shall be constructed with **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. This footprint has since been significantly reduced through detailed technical planning to avoid environmentally sensitive areas as much as possible, while still retaining a technically and financially viable layout.**

A servitude of approximately 40 m wide will be established for the construction of a 132 kV high voltage powerlines to connect to Eskom's Electricity Distribution. Three different route alternatives (Alternatives 1, 2 and 3) are considered as part of the separate BA process and a corridor of 200 m wide was assessed along each route alternative. 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 kV or 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.

The on-site substation buildings and structures are expected to be approximately 5 m high, with a maximum footprint of 2.3 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

The proposed development site may be accessed either via R355 from Springbok, the Komaggas gravel road off the R355, or from a combination of gravel roads from Garies via Hondeklip Bay and Koingnaas. Internal roads will be constructed for the construction and operational phases. The roads will be approximately 5 m wide and 15 m in some sections.

juwi appointed WSP to undertake a Transportation Impact Assessment (TIA) for the proposed Kap Vley WEF. juwi have also commissioned a technical access study by Aurecon that assessed the technical suitability of access routes all the way from Saldanha Port to site. The TIA assessed 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, and to propose mitigating measures to address these impacts, where required.

There are two proposed access roads to the site. These roads links to the town of Komaggas to the east, and from there a single carriageway surfaced road links to the R355. The R355 is a Provincial Road which

follows an east-west alignment between Kleinzee on the west coast and Springbok to the east. It is a surfaced single-carriageway 2-way road with no shoulders between the Komaggas access road and Springbok. It is unsurfaced between the Komaggas access road and Kleinzee. The TIA further states that the transport routes for the construction materials, components of the turbines as well as any oversized/weight components may be National, Provincial or Local roads; and approval will have to be obtained from each authority for the transportation of any oversized or abnormally heavy component. In addition, vertical or horizontal alignment upgrades of the local access roads depending on the length and width of abnormal vehicles may be required. These alignment grades cannot be determined at this stage, as the abnormal vehicle dimensions are unknown. Figures 2.4 to 2.9 below provide examples of transportation of some of the turbine components.

In terms of the transportation of wind turbines, approximately eight truck-loads will be required per turbine (i.e. three for the turbine tower; three for the blade and two for the nacelle). Therefore, a maximum of 360 truck-loads will be required to deliver the wind turbine components for the maximum 45 wind turbines proposed for the site. In addition, the transportation of transformers, cables, and construction material for the infrastructure proposed, will require heavy vehicle deliveries. 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.

Figure 2.4: Tower section being transported.

Figure 2.5: Tower section being transported.

Figure 2.6: Rotor blade being transported.

Figure 2.7: Rotor blade being transported.

Figure 2.8: Nacelle being transported.

Figure 2.9: Nacelle being transported.

Note: Photos from ERM EIA Report for the Victoria West REF (2011)

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 was finalised in the EIA phase. The project layout was informed by the findings of the specialist studies, which included the identification of sensitive biophysical areas that need to be avoided. The specialists were requested to comment on the final layout. The 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 Kap Vley WEF project is expected to extend approximately 18-24 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 625 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 1,5 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 compiled EMPr which is included in Part B of this EIA Report. An independent 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 323 jobs are expected to be created during the construction phase.

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 Kap Vley 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 unscheduled maintenance.

The projected operations are expected to provide several services and added economic spin offs (as highlighted in Chapter 1 of this EIA Report). Approximately 35 employment opportunities (skilled and unskilled) will be created during the operational phase of the project.

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 Kap Vley 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.

Scoping and Environmental Impact Assessment for the proposed Kap Vley Wind Energy Facility near Kleinzee in the Northern Cape

UPDATED DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 3:

Description of the Affected Environment

CONTENTS

TABLES

FIGURES

3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter provides an overview of the affected environment for the proposed Kap Vley 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:

- Inputs in the specialist studies that were provided by 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
- Nama Khoi Local Municipality and Namaqualand District Municipality IDPs 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 descriptions of the proposed Kap Vley WEF site, with focus on significant environmental aspects of this project, are provided in the relevant specialist studies (which are included in Appendix G to Q of this EIA Report).

3.1 BACKGROUND

As noted in Chapters 1 and 2, the development of the proposed Kap Vley WEF and associated electrical infrastructure (subject to a separate Basic Assessment Process) will be on the following farm portions: Remainder (RE) Kamaggas Farm 200 Portion 5, RE Kap Vley Farm 315, Portion 1 of Kap Vley Farm 315, Portion 2 of Kap Vley Farm 315, Portion 3 of Kap Vley Farm 315, Portion 3 of Platvley Farm 314, RE Kourootjie Farm 316 and RE Gra'water Farm 331 near Kleinzee in the Northern Cape. Figure 3.1 below represents the regional setting of the proposed Kap Vley WEF project.

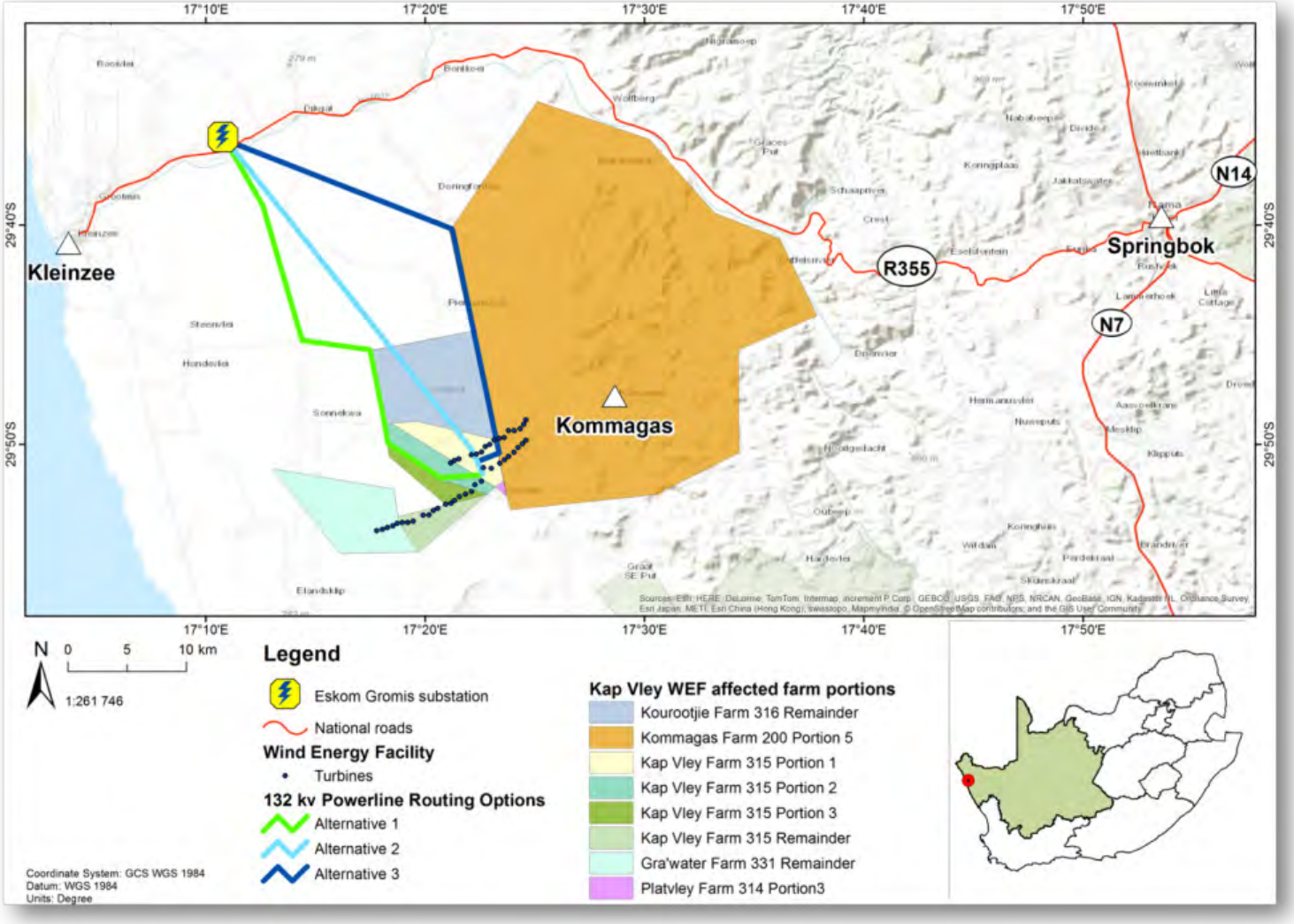


Figure 3.1: Locality Map for the proposed Kap Vley WEF project within a regional setting

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.

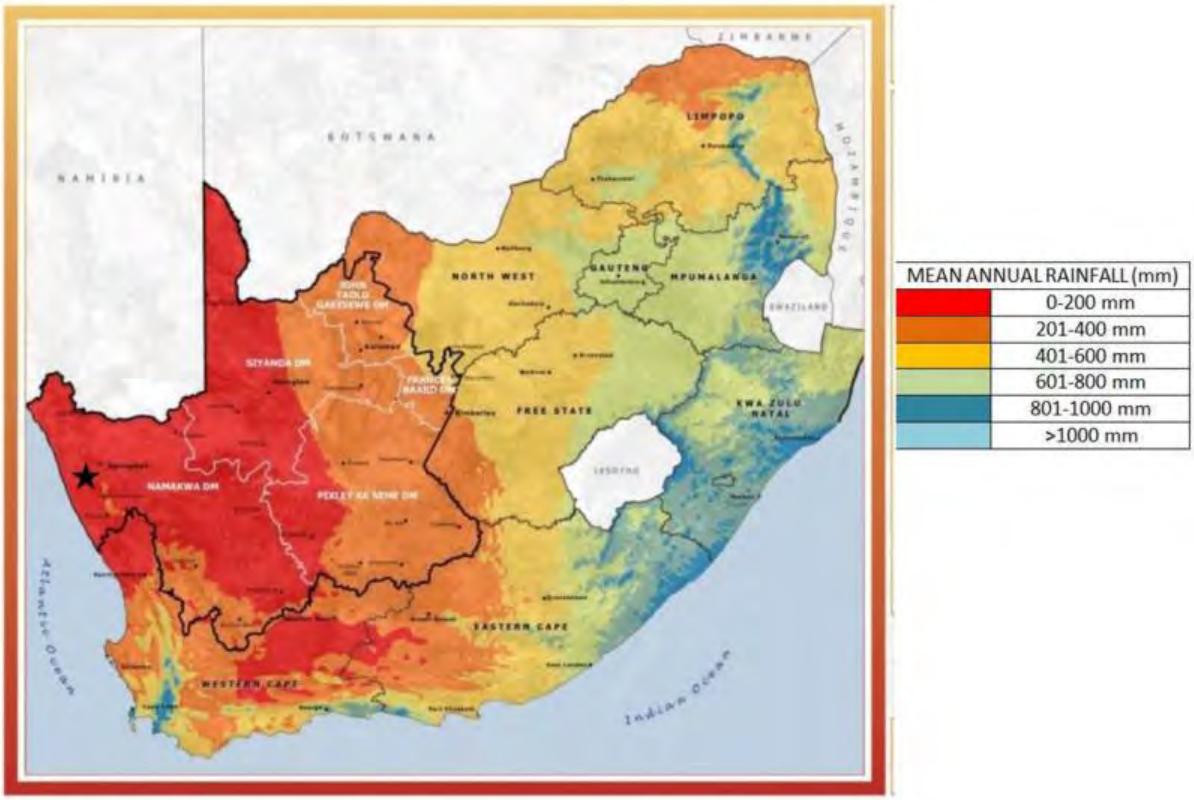


Figure 3.2: Mean Annual Rainfall Levels of South Africa (*Source*: Northern Cape PSDF, 2012)

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 rainfall for the site is very low, at 98 mm per annum. The average monthly distribution of rainfall is shown in Figure 3.3 below.

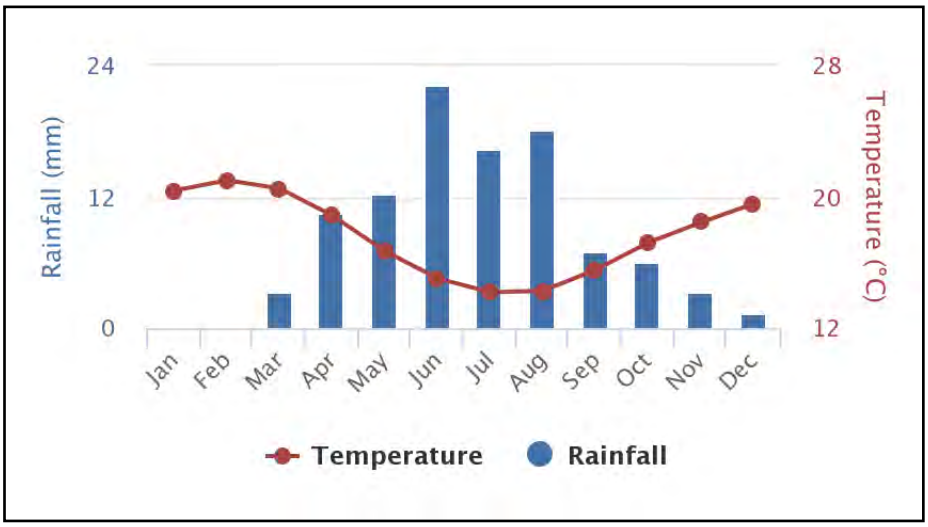


Figure 3.3: The average monthly distribution of rainfall within the area including, Kap Vley WEF (*Source*: Lanz, 2018; taken from "*The World Bank Climate Change Knowledge Portal, 2015*")

The level of agricultural production (including grazing) possible in a given environment is largely controlled by moisture availability. It is classified into 6 categories across the country (see Table 3.1). This site falls into Class 6, which is labelled as having a very severe limitation to agriculture (Lanz, 2017) (the lowest ranking).

Table 3.1: The classification of moisture availability climate classes for summer rainfall areas across South Africa (Agricultural Research Council, 2007)

Class	Moisture availability		Description of agricultural limitation
	Summer rainfall areas (Rainfall/0.25 PET)	Winter rainfall areas (Rainfall/0.40 PET)	
C1	>34	>34	None to slight
C2	27-34	25-34	Slight
C3	19-26	15-24	Moderate
C4	12-18	10-14	Moderate to severe
C5	6-12	6-9	Severe
C6	<6	<6	Very severe

3.2.2 Topography and Landscape

The topography of the site consists of a series of low ridges running across a generally flat terrain. The proposed development is located on a low mountain range, separated from the Komaggas Mountains further inland, with a series of ridges on the coastal plains. The coastal plains are at an altitude of about 250 m and the ridges range from an altitude of 300 m to a maximum altitude of just above 500 m. Slopes within the area vary with maximum slopes of 35% down the sides of the ridges where they are highest and steepest, with that said, the highest portion of this low range, the 'Brandberg', is 512 m above mean sea level. The other highpoints are known as 'Byneskop' and 'Graafwater se Kop'. The range is surrounded by a vast, flat to gently undulating coastal peneplain which, being visually exposed, tends to make the mountain ridge visible over long distances. Steep slopes are indicated in Figure 3.4. The proposed turbine locations are along the ridge lines with maximum slopes impacted by any footprint of the development much less and are not likely to exceed 10%.

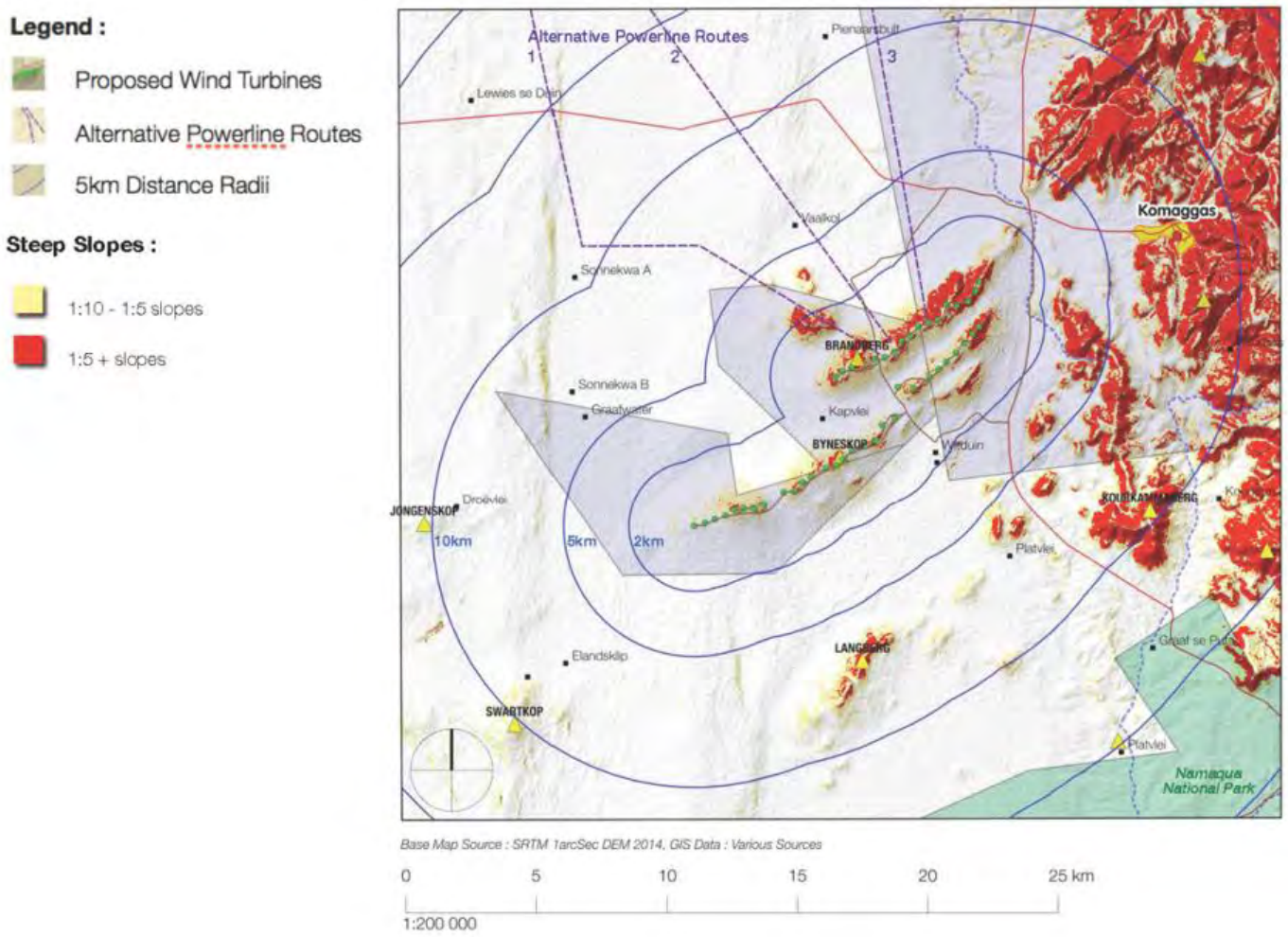


Figure 3.4: Steep Slopes and Peaks (Source: BOLA and MLB Architects, 2018)

3.2.3 Regional Geology

The underlying geology of the ridges is migmatite and gneiss of the Namaqualand Metamorphic Complex (Figure 3.5). The geology of the coastal plains is aeolian material overlying Tertiary and Quaternary marine sediments. The low mountain range is composed of quartzite and schist of the Khurisberg Formation (Okiep Group of rocks), the resistant quartzite being responsible for the parallel ridges trending in a South West and North East direction. The surrounding coastal peneplain is mostly sand, calcrete, and alluvium along the dry riverbeds. (Geological Survey, 1984, 1:1 000 000 Map).

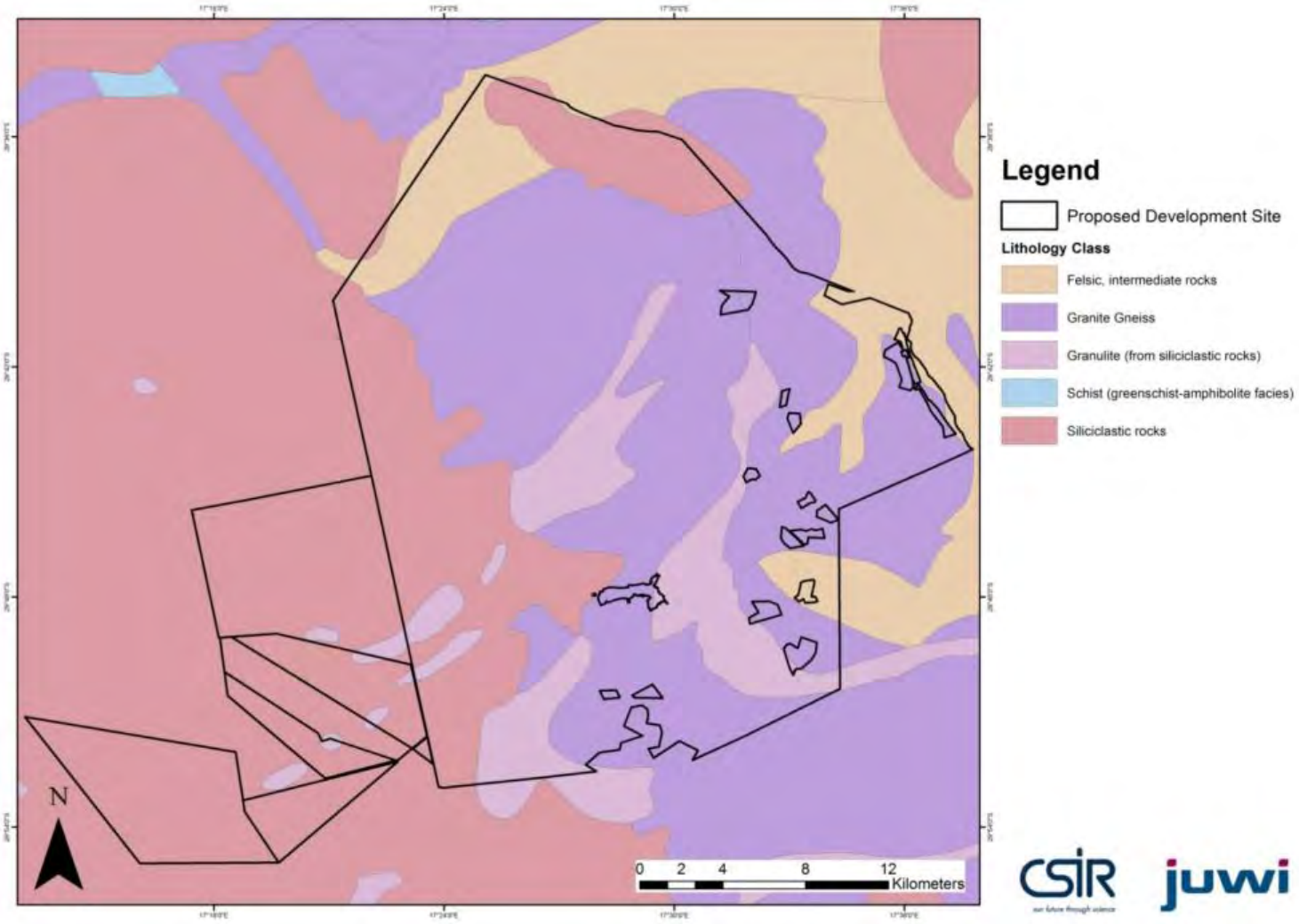


Figure 3.5: Geological setting of the proposed Kap Vley WEF and the surrounding environment

3.2.4 Soil Types and Soil Potential

Information taken from the Agricultural and Soil Potential Study (Lanz 2018) (Appendix M of this report)

The land type classification is a nationwide survey that groups areas of similar soil, terrain and climatic conditions into different land types. There are two land types across the site. The coastal plains are entirely land type Ah38. Soils of this land type are predominantly deep to moderately deep very sandy soils on underlying hardpan carbonate. Predominant soil forms are Hutton, Clovelly and Vilafontes. These soils would fall into the Oxidic and Calcic (underlying hardpan carbonate) soil groups according to the classification of Fey (2010). The higher lying ridges comprise a different land type, Ib123, that is dominated by rock outcrop and shallow, sandy soils on underlying rock of the Hutton and Mispah soil forms. These soils would fall into the Oxidic and Lithic soil groups according to the classification of Fey (2010). A summary detailing soil data for the land types is provided in Table 3.2. The field investigation confirmed that the dominant soil types are as described in the land type data.

Due to the sandy soil texture the sandy soils are susceptible to wind erosion. Although the soils are not classified as highly susceptible to water erosion, the aridity of the environment with consequent low plant cover means that erosion risk is nevertheless high (see Figure 3.6).

Table 3.2: Land Types Soil data for the site

Land type	Land capability class	Soil series (forms)	Depth (mm)	Clay % A horizon	Clay % B horizon	Depth limiting layer	% of land type
Ib123	8	Rock outcrop	0			R	61
		Hutton	50 - 150	5 - 10	5 - 20	R	14
		Mispah	50 - 100	6 - 20		R	12
		Swartland	100 - 200	10 - 20	35 - 45	so	8
		Glenrosa	50 - 100	6 - 20	15 - 25	R	6
		Valsrivier	300 - 500	15 - 25	35 - 45	vr,vp	0
		Dundee	200 - 600	10 - 20	10 - 25	R	0
		Oakleaf	300 - 500	15 - 25	15 - 35	R	0
Ah38	7	Hutton	400 - 1200	0 - 2	2 - 4	ca,ka,db	47
		Clovelley	> 1200	0 - 2	2 - 4		20
		Vilafontes	600 - 800	1 - 3	4 - 8		19
		Pinedene	700 - 800	1 - 3	3 - 8	gc	10
		Fernwood	> 1200	1 - 2	1 - 2		3
		Dundee	> 1200	1 - 3	1 - 3		1

Land capability classes: 7 = non-arable, low potential grazing land; 8 = non-utilisable wilderness land.
Depth limiting layers: R = hard rock; so = partially weathered bedrock; ca = soft carbonate; ka = hardpan carbonate; db = dorbank hardpan; vp = dense, structured clay layer; vr = dense, red, structured clay layer; gc = dense clay horizon that is frequently saturated.

Figure 3.6: Photograph showing susceptibility to erosion that has occurred as a result of past disturbance (Photo taken from Lanz 2018).

3.2.5 Agricultural Capability and Sensitivity

Land capability is the combination of soil suitability and climate factors. As noted above, the site is within Class 7 and Class 8 land types. The flatter plains have been classified as Class 7 non-arable low potential grazing land according to the land capability classification category scale. Furthermore, the ridges are classified as Class 8, non-utilisable wilderness land. The limitations to agriculture within the flatter plains are predominantly the aridity and lack of access to water. In addition, the shallow soil depths and rock outcrops on the ridges where the turbines are located are a further limitation to agriculture. Agricultural potential and conditions are very uniform across the site and there are no agriculturally sensitive areas occurring within the study area. The grazing capacity of the area is classified as low, with more than 31 hectares required per large stock unit. The choice of placement of the wind turbines, including access roads, therefore, has minimal influence on the significance of agricultural impacts. Therefore from an agricultural point of view, no areas need to be avoided by the development and there are no buffers required (Lanz, 2018).

3.3 ECOLOGY: WATERCOURSES AND TERRESTRIAL ENVIRONMENT

The ecological evaluation was informed by the preliminary desktop and scoping exercise of the site and general area, and the site visits that were undertaken during the Scoping phase as well as the detailed impact assessment undertaken during the EIA phase. The SANBI BGIS database 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.

The terrestrial ecology specialist, Mr Simon Todd of Simon Todd Consulting, visited the site numerous times between August 2017 and October 2017. As impacts on species and habitats of conservation concern are a primary concern associated with the development, specific and extensive measures were taken to identify and map the distribution of such features across the site. The entire proposed layout was walked in the field and all individuals and populations of plant SCC within or near the development footprint were mapped and recorded. Where rare or sensitive habitats such as quartz patches or mobile dune fields were present, these were recorded and mapped in the field. The vegetation of the site was characterised by sampling the vegetation across the site within the development footprint and including at all proposed turbine locations.

3.3.1 Dry and ephemeral watercourses

Information taken from the Dry and Ephemeral Watercourses Impact Assessment (CSIR (Snyman-van der Walt), 2018) (Appendix J of this report)

The specialist conducted a site visit on 14 – 15 August 2017 to identify potential watercourses/aquatic features that may be present on site. However, due to the limited rainfall the arid area receives, the site visit was mainly aimed towards verifying the absence of permanent watercourses/aquatic features.

3.3.1.1 Quaternary catchments

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 project area spans several quaternary catchments: F30D, F30F, F30G, F40A, F40B, F40D as can be seen in Figure 3.7.

The proposed layout entails that physical infrastructure would only be constructed in quaternary catchments F30G, F40A, F40B, F40D (Snyman-van der Walt, 2018).

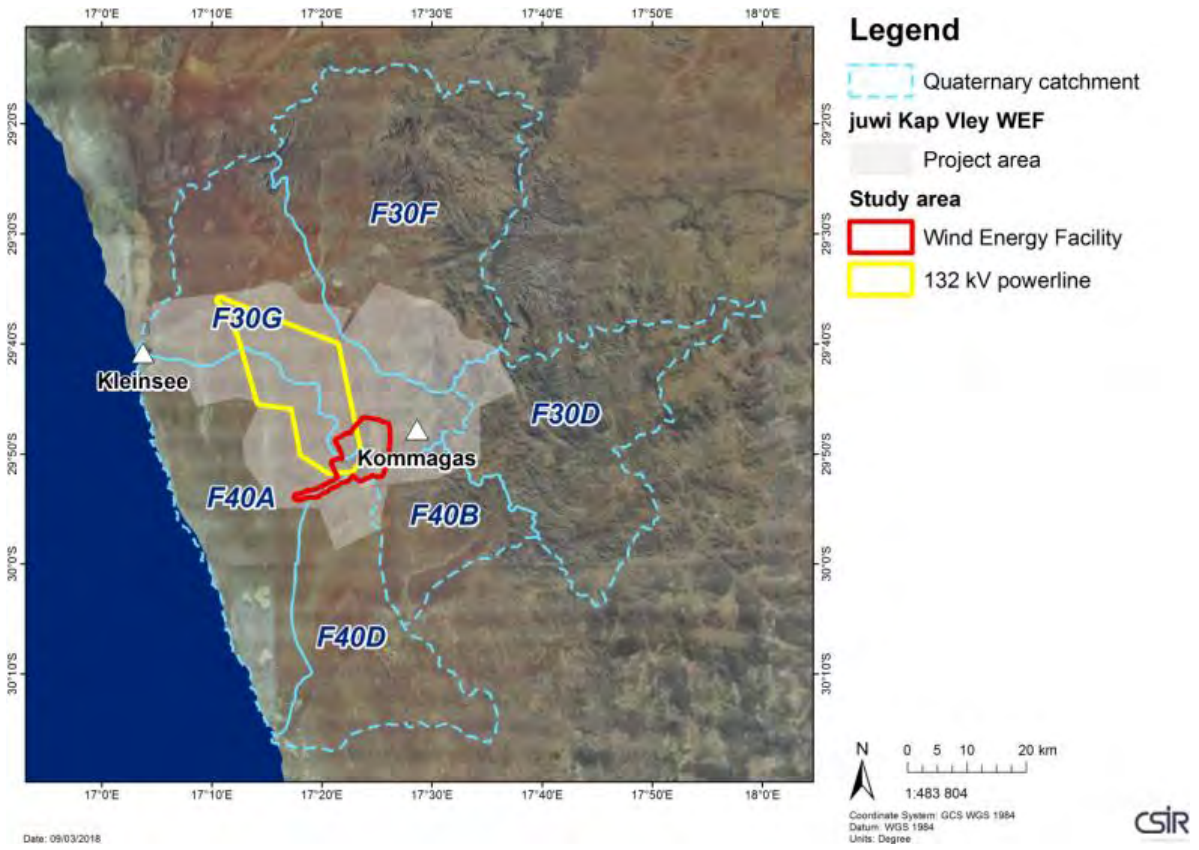


Figure 3.7: Geological catchments in the proposed juwi Kap Vley WEF project area (*Source*: Snyman-van der Walt, 2018).

3.3.1.2 Dry and ephemeral watercourses

Based on existing spatial data, watercourses in the project area consist of ephemeral rivers, wetlands and salt pans (Figure 3.8).

During the site visit, carried out in August 2017 no pans, drainage lines or other watercourses were observed to be wet or inundated. The dry conditions at the site are shown in Figure 3.9.

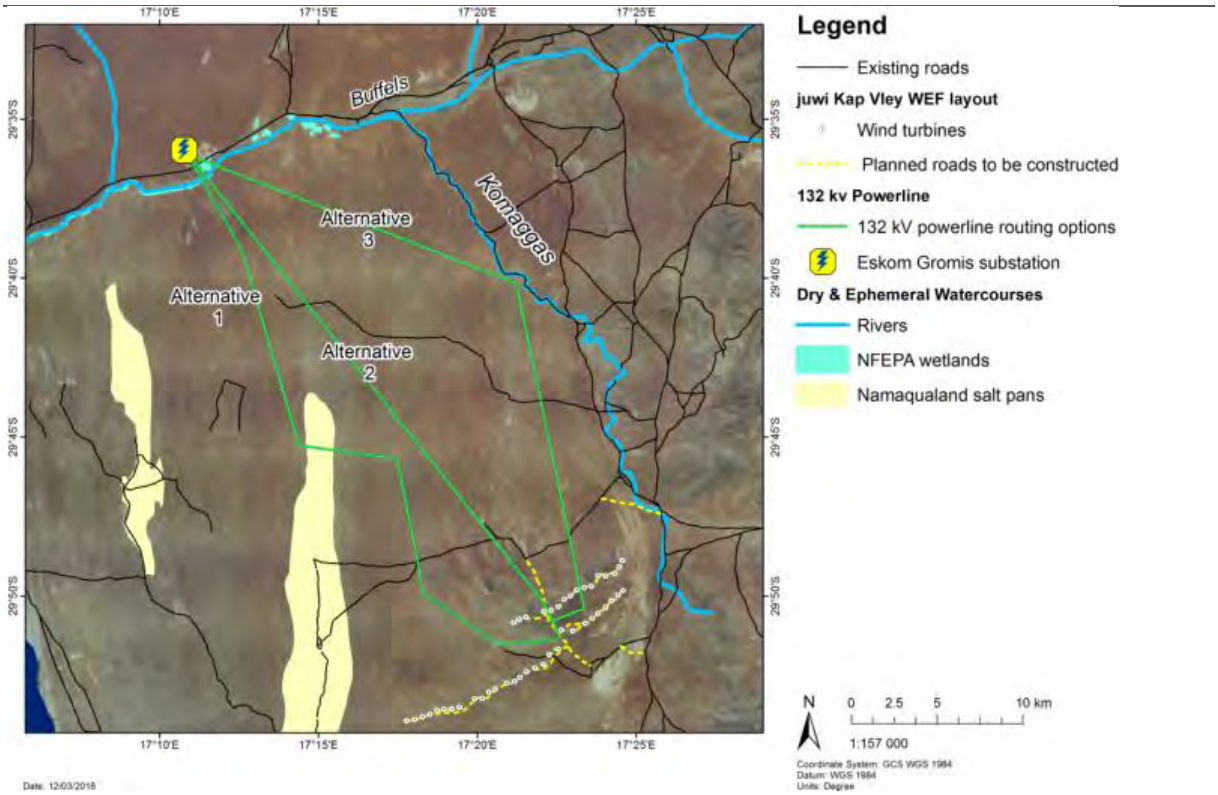


Figure 3.8: Anticipated dry and ephemeral watercourses in the project area consist of ephemeral rivers, wetlands (incl. Namaqualand salt pans) (based on existing spatial data). Importantly, the Namaqualand Salt Pans were verified in-field to not be hydrological features. *(Source*: Snyman-van der Walt, 2018).

Figure 3.9: Photograph illustrating the arid environmental conditions of the area in which the Kap Vley WEF is proposed (taken during site visit, 14 August 2017) (*Source*: Snyman-van der Walt, 2018).

- **Non-perennial rivers**

Two ephemeral rivers are within the project area, namely the Buffels River (non-perennial, primary river) and the Kommagas River (non-perennial, secondary river) (Table 3.3, Figure 3.10). Both these rivers were modelled by Kleynhans (2000) as being in a Category C, or Moderately Modified, Present Ecological State (PES).

Table 3.3: Present Ecological State, Ecological Importance & Ecological Sensitivity of the Buffels and Kommagas Rivers.

	Buffels	Kommagas
Present Ecological State (Kleinhans, 2000)	C Moderately Modified	C Moderately Modified
Ecological Importance (DWS, 2014)	Moderate	Moderate
Ecological Sensitivity (DWS, 2014)	Low	Low

Rivers in semi-arid to arid regions generally show decreased volume downstream mainly due to evaporation and infiltration into the alluvium and channel boundaries (Tooth, 2000). In the Buffels River most of the water flows along the base of the alluvial aquifer and is stored in the channel banks during drier months (Adams et al., 2004).

- **Wetlands**

Natural wetlands associated with the Buffels River as delineated by the National Freshwater Ecosystem Priority Area (NFEPA) project (Nel *et al*., 2011) are presented in Figure 3.10. All three proposed alternative routings for the 132 kV powerline (which is assessed under a separate BA process) must cross the Buffels River to reach the Eskom Gromis substation. The wetlands at the proposed Buffels River crossing are channelled valley-bottom and flat wetlands. Most of the wetlands here are of Natural or Good condition (equivalent to PES A), whilst the flat wetland closest to the existing road is Moderately Modified (equivalent to PES C) (Net *et al*., 2011).

However, from the satellite imagery (Figure 3.10) it is clear that the wetlands recorded in the NFEPA database are mainly associated with the riverbed of the Buffels River or have been incorrectly derived for the NFEPA database. This was also confirmed by the Ecology Specialist on the project team.

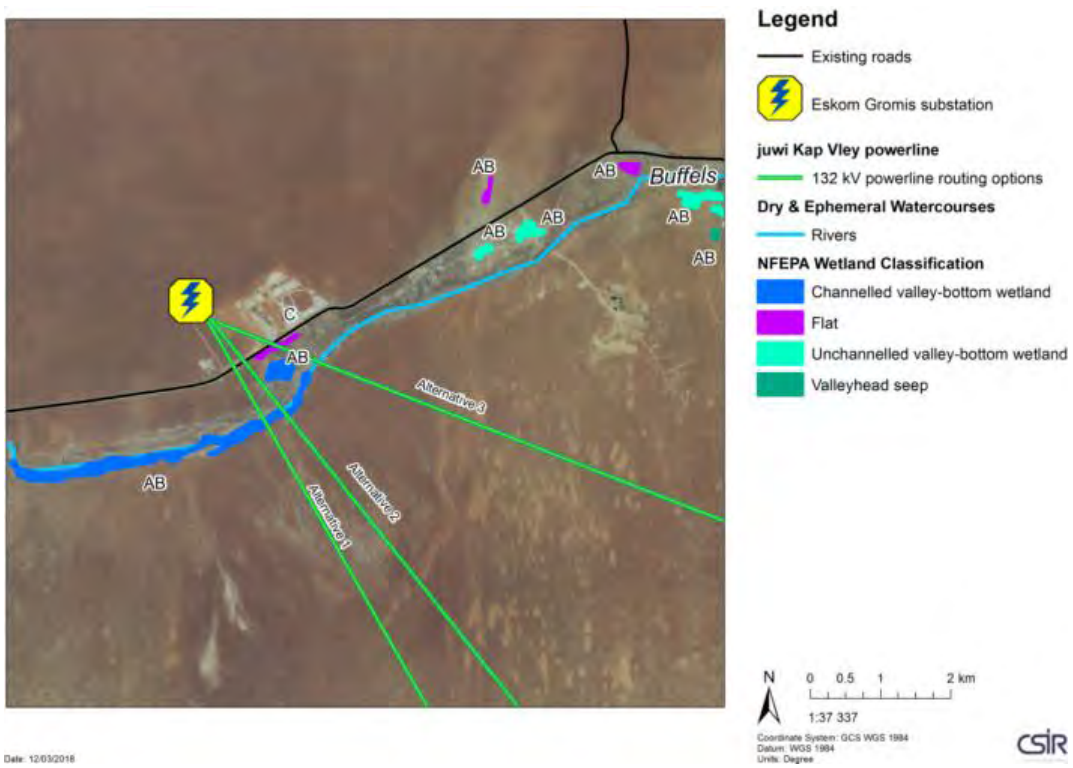


Figure 3.10: Classification and Present Ecological State of wetlands associated with the non-perennial Buffels River (Nel *et al*., 2011).

- **Salt pans**

According to the South African Vegetation map Namaqualand salt pans are present in the project area (Mucina et al., 2006; SANBI, 2012). Namaqualand salt pans are nearly permanently dry. Occasionally the lowest depressions of these pans may contain pools of standing water. In the Kleinzee area these pans are often covered under wind-borne sand (Mucina et al., 2006) (Figure 3.11).

However, within the study area, the classification of these areas as this vegetation type is debatable as these areas do not appear to be salt pans in their origin and do not correspond with the general description of these areas as provided. Furthermore, their description as a pan is considered a misnomer as these areas are dry and do not fill with water even in exceptional circumstances. These appear to rather be areas where the wind has removed the sand overburden, exposing the older underlying calcrete basement which lead to their 'white' appearance and assumption that these are salt pans.

Figure 3.11: Photo of the area indicated as Salt Pans by the Vegetation Map of South Africa (Mucina & Rutherford 2006; SANBI, 2012). The sandy overburden has been removed by the wind. The area is generally fairly well vegetated with shorter succulent and woody shrubs. These are not hydrological features and occur on marine sediments (Photo credit: Simon Todd).

3.3.1.3 Drainage lines

Drainage lines were delineated using existing spatial data, namely imagery from Google Earth Pro (Google Inc. 2014), the South African 50 cm imagery (CD:NGI, 2012), and 20 m contours (CS:SM, 2006). Drainage lines were digitised using ArcMap 10.4 software (ESRI Inc., 2014). The drainage lines are situated on the slopes of a ridgeline on which the WEF is proposed and is probably the most likely route of overland flow to lower lying areas during rainfall events. The drainage lines channel run-off to the lower lying plains, and not into a specific watercourse (Figure 3.12). Figure 3.13 shows an example of a drainage line on site taken during site visit, 14 August 2017.

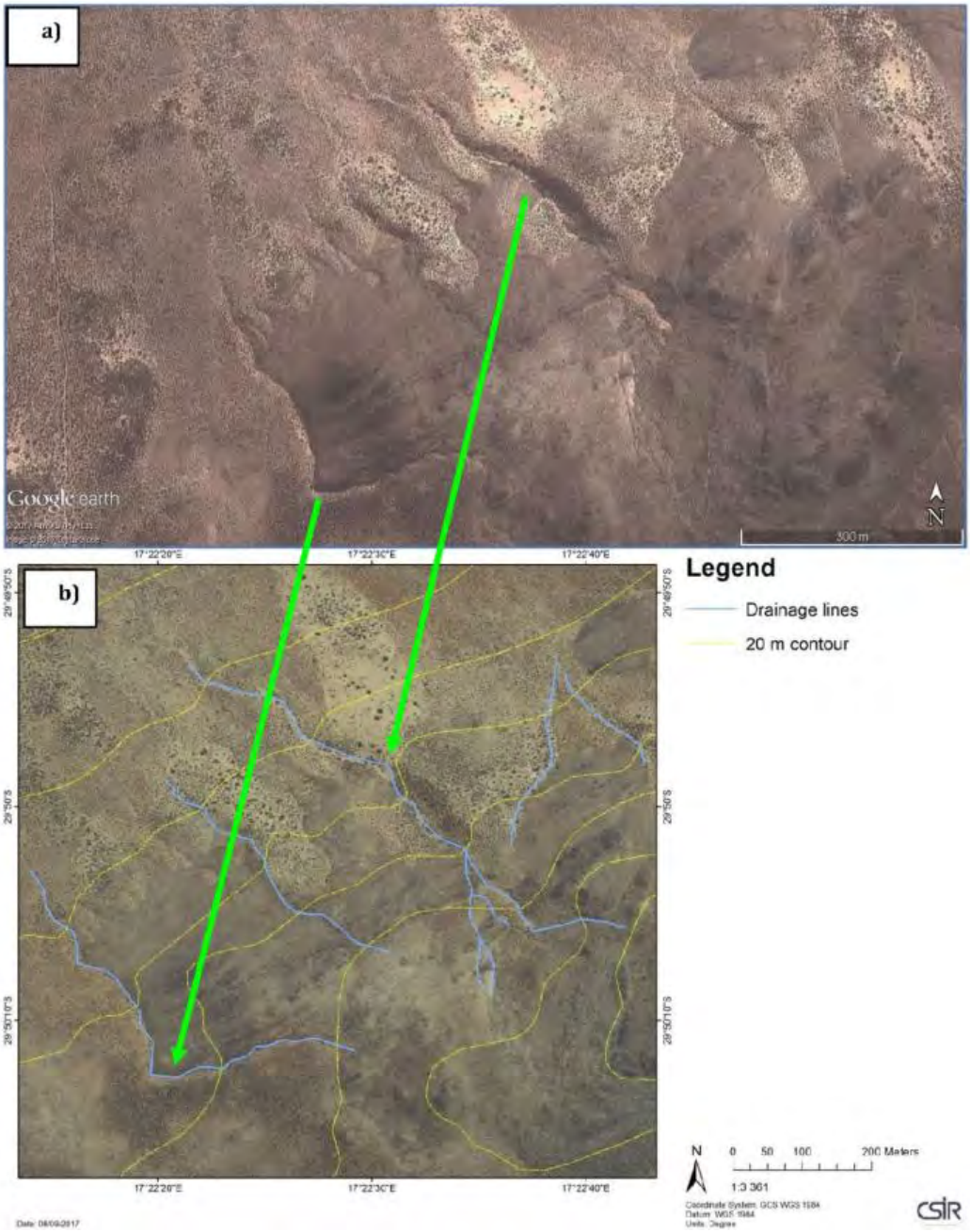


Figure 3.12: Imagery on Google Earth, as well as b) South African 50 cm imagery and 20 m contours were used to identify and delineate potential drainage lines.

Figure 3.13: Photograph illustrating an example of the drainage lines on site (taken during site visit, 14 August 2017). The blue arrow indicates the most likely direction of overland flow during a rainfall event (Photo credit: Luanita Snyman-van der Walt).

3.3.2 Terrestrial Ecology (Flora and Fauna)

Information taken from the Terrestrial Ecological Impact Assessment (Todd, 2018) (Appendix G of this report)

3.3.2.1 Vegetation (Flora)

3.3.2.1.1 General Vegetation Description

The proposed development site is located in the Namaqualand Sand Fynbos within three main vegetation types i.e. Namaqualand Klipkoppe Shrubland, Namaqualand Strandveld and Namaqualand Sand Fynbos (Mucina & Rutherford 2006/2012) (Figure 3.14). The dominant vegetation type around the proposed turbine ridges is Namaqualand Klipkoppe Shrubland. The lower lying areas consist of Namaqualand Strandveld and Namaqualand Sand Fynbos. The Namaqualand Klipkoppe Shrubland occupies 10 936 km^2 of central Namaqualand from Steinkopf to Nuwerus in the south. This vegetation type is associated with the rocky hills, granite and gneiss domes of the mountains of central Namaqualand. Due to its' steep and rocky nature, Namaqualand Klipkoppe Shrubland has not been impacted by intensive agriculture. This vegetation type is largely intact and has been classified as Least Threatened. Only 6% of this vegetation type is currently conserved mainly within the Goegap and the Namaqua National park. The majority of the lower-lying parts of the site are classified as Namaqualand Strandveld and about 10% of this vegetation type has been lost mainly to coastal mining for heavy metals and it is not currently listed. Furthermore, there is a narrow strip of Namaqualand Sand Fynbos mapped along the eastern boundary of the study area.

The national vegetation map does not provide a very satisfactory reflection of the vegetation of the site. This relates firstly to the extensive tracts of Namaqualand Klipkoppe Shrubland which has been mapped at the site compared to the limited extent of this unit actually present. Although there are some rocky hills and outcrops present at the site which can be considered representative of this unit, the lower slopes of the hills on-site are generally covered in aeolian sand and consist of Namaqualand Sand Fynbos, which has been significantly under-mapped at the site. A notable feature of the Sand Fynbos of relevance to the current study, is that the site occurs at the northern extreme distribution point of Namaqualand Sand Fynbos and there do not appear to be any areas of this unit to the north of the current site. In addition, this unit has not been well investigated in the past and there are at least 30 endemic or red-listed species of conservation concern known from this vegetation unit. As such, the information contained in the VegMap is not considered reliable in this regard and alternative sources are relied upon to assess the significance and sensitivity of this vegetation at the site. The actual vegetation of the site as it occurs on the ground and which would be affected by the development is detailed below and is considered the primary source on which the assessment is based.

A fine scale habitat map for the study area has been produced, based on high resolution aerial photography of the study area and information collected on-site)during the detailed ground-truthing and walk-through of the development footprint areas (Figure 3.15). The map illustrates the high diversity of habitats present at the site, as well as the high local variation in the number of habitats present. This map forms the basis for the sensitivity mapping at the site and each unit is ascribed a sensitivity rating according to the presence and abundance of species and features of conservation concern. The different major habitat types and plant communities present are described in detail below along with their typical and characteristic associated species.

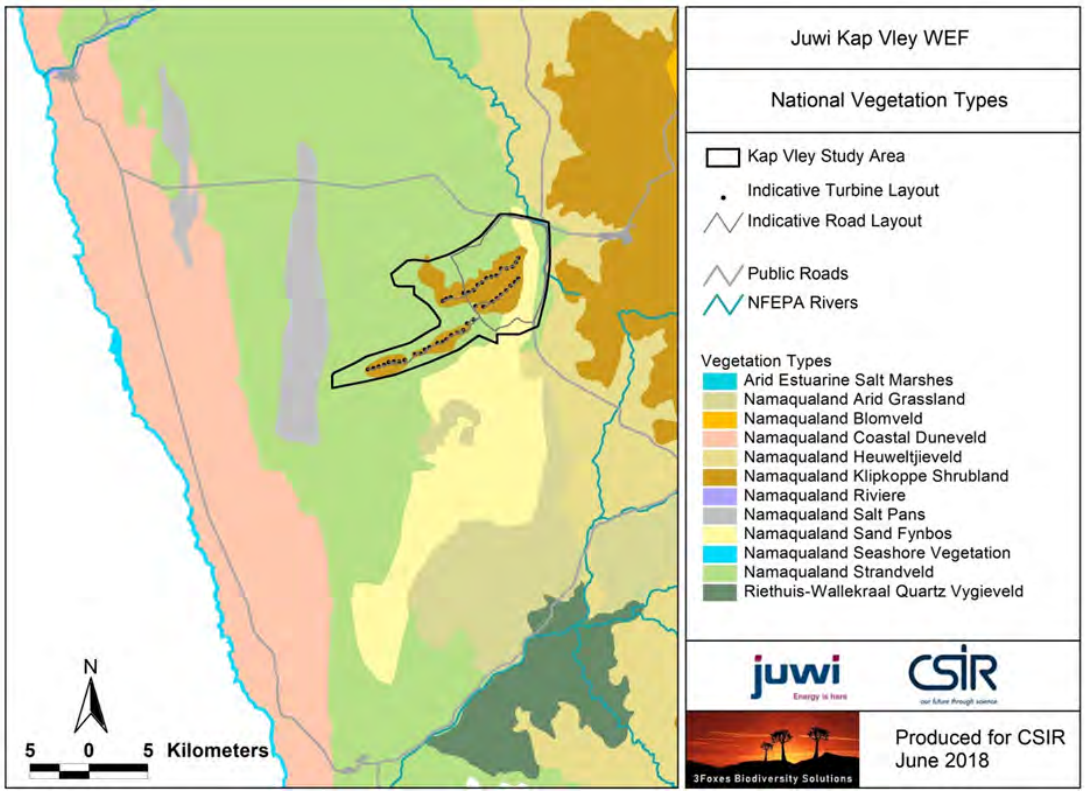


Figure 3.14: Vegetation Map in relation to the proposed Kap Vley study area and surrounding area (Mucina and Rutherford 2006 and Powrie Update (2012)). (Source: Todd, 2018)

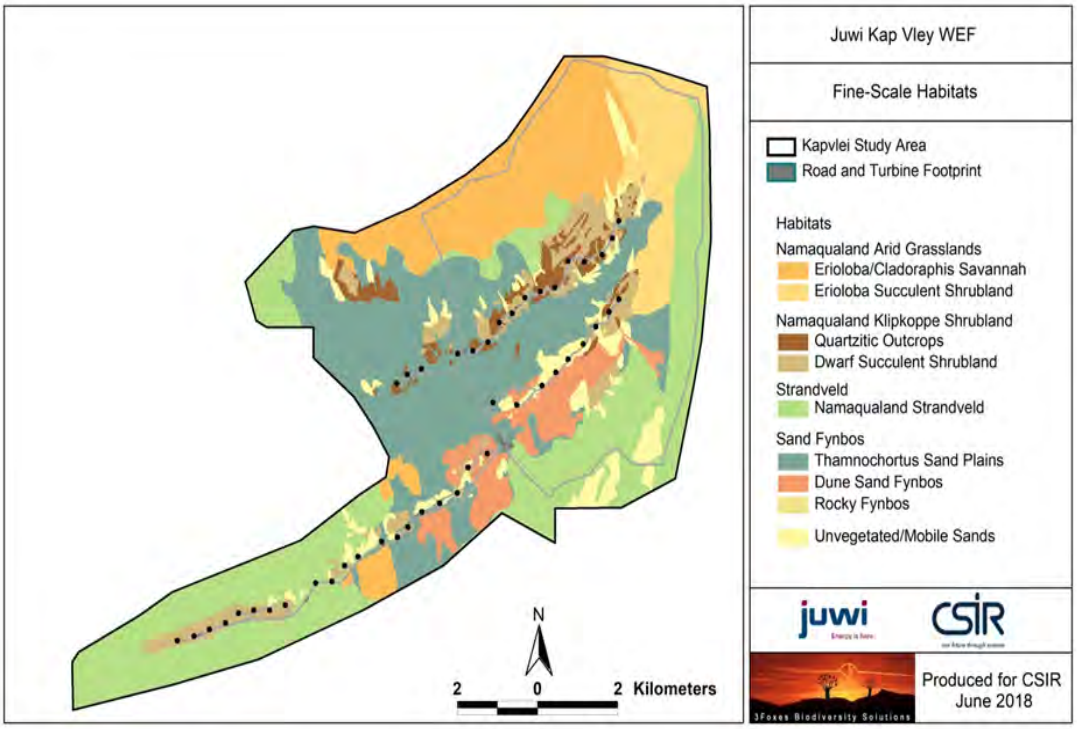


Figure 3.15: Fine-Scale habitat map for the Kap Vley study area, based on high resolution aerial photography and field-based GPS mapping and field verification. (*Source*: Todd, 2018)

Based on the sensitivity screening undertaken for the site, the Kap Vley WEF site is located within an area that is recognised as an area of biodiversity significance. This is reflected in the inclusion of the area as a Tier 1 and Tier 2 Critical Biodiversity Area (CBA) (Figure 3.16). Extensive fieldwork was conducted by the specialist across the proposed Kap Vley WEF site for the current study and confirms the presence of numerous plant species and habitats of conservation concern at the site. A number of avoidance and mitigation measures have however been implemented by the developer in the layout and planning phases of the development to reduce impacts on these features as far as possible. This includes detailed vegetation surveys and a full walk-through of the entire development footprint to identify and map populations of species of conservation concern (SCC) as well as map sensitive features and no-go areas. These areas are delineated with the specific purpose of avoiding high residual impacts at the site and maintaining the ecological functioning of the area. Following several iterations to the proposed the layout, all turbines have been excluded from No-Go and areas of High Sensitivity areas..

The site also falls within a Northern Cape Protected Area Expansion Strategy (NCPAES) Focus Area (2017), which further highlights the significance of the area for conservation purposes (Figure 3.17). Development of the site would certainly place some limitations on the future expansion of traditional formalised conservation into the affected area. However, in principle, there would not be any hindrance on other forms of conservation expansion into this area, such as through stewardship. In addition, provided that the development can reduce impacts to an acceptable level, the site would retain significant biodiversity value and the development would not be likely to compromise the vast majority of biodiversity features and components. Currently, the major impact on biodiversity at the site is the current land use and especially overgrazing from livestock. Significant differences in vegetation composition and condition between land owners are visible in the area, with significant negative impact on some species and habitats. The Namaqualand National Park is about 14 km to the south of the proposed WEF. The wind farm would contribute to habitat loss in the area to some degree, but whether this significantly impacts on the conservation value of the area is debateable. While turbines certainly generate a visual impact for people in the close environment, most fauna appear to quickly become habituated to wind turbines and on existing wind farms it is not uncommon to see wildlife resting in the shade of the turbines. Furthermore, a significant proportion of the wind farm is on communal land. It is not likely that these areas can be incorporated into traditional protectionist-style conservation areas and must be conserved as “working landscapes” with the people who rely on these areas for livelihoods still active in the landscape. It would be hard to argue that the wind farm is not compatible with the concept of a working landscape and as such, the development of the Kap Vley Wind Farm would not impact on future conservation options in the area to a large degree as many of these options would in fact remain open into the future and are not precluded by the presence of the wind farm.

Development within a CBA and the NCPAES has negative impacts on biodiversity pattern and process and is generally considered undesirable. Although the total footprint (128 ha) of the development is small, it must be considered in context of the currently intact and relatively undisturbed receiving environment and the implications that the development may have for future land use options in the area. As development within CBAs is not desirable, the developer has taken a pro-active approach in this regard and measures to reduce the impacts of the development include detailed mapping of habitats and SCC on the site to inform the final development layout and ensure that avoidance of these features can be maximised, as well as the initiation of an offset study to examine the utility and feasibility of developing an offset to mitigate the residual impacts of the development on CBAs. A stand-alone Ecological Offset Study has been commissioned and forms part of the EIA documentation which accompanies this study (included in Appendix Q). The study was revised by an external biodiversity offset exper, marl Botha (the review is included in Annexure 1 of Appendix Q). A summary of the Ecological Offset Study is included in Section 6.2 of Chapter 6. The footprint of the development will be largely within the areas of Sand Fynbos and the offset requirement would therefore also need to focus largely on this habitat and especially the presence of identified key SCC.

As a primary purpose of CBAs is to try and secure the broad-scale ecological functioning and resilience of landscapes, it is pertinent to consider the impact that the development may have on ecological processes and not just the species resident within the site. In terms of connectivity in a north-south direction, the development is not likely to have a significant impact as there are extensive tracts of intact Strandveld vegetation to the west of the site as well as an intact corridor between Sandberg and the inland mountains of the escarpment towards Komaggas. Furthermore, in terms of the rocky hills and sand fynbos areas, these are isolated islands of habitat, with larger intact areas to the east in the former and to the south in the latter case. As such, there is likely little movement of fauna and flora closely associated these habitats in other directions. There is likely to be a fair amount of movement of fauna along the ridges of the site in an east-west direction and linking up to the main body of rocky habitats to the east of the site. This is likely most important for reptiles and while no studies have yet examined the impacts of wind farms on reptiles in general, some studies in other countries have found no impact of turbines on tortoises (Ennen et al. 2012, Lovich et al. 2011), suggesting that these impacts are likely to be low, especially since the development infrastructure is not likely to represent a significant impediment to movement in its own right. The primary value of the site and the Sandberg area is that it is likely to represent an upland-lowland gradient that can be used by fauna and flora on a local level. Fauna can move onto the adjacent plains habitats or northern slopes of the hills in the cooler winter months when these areas are warmer and then retreat to higher lying areas and south-facing slopes in the hotter summer months. This provides for resilience of local populations in the face of climate change as well as the generally unpredictable arid environment. This role of the site was recognised and provides one of the motivating factors for demarcating a significant proportion of the high-lying ground at the site as a no-go area. In addition, the total footprint of the development is relatively low and as this is generally restricted to the ridge-top environment, habitat connectivity along the slopes of the site and between many of the plains and slopes will generally not be disrupted. The layout of the development is very efficient in that it does not have an excess of roads that are not required and the turbines are restricted to a few aligned ridges. As such, there is significant space within the development area that is not impacted and most fauna should not have a problem moving through this area. Consequently, the overall impact of the development on broader scale ecological processes is considered to be relatively low and no major impacts to dispersal ability or faunal movement patterns are likely to be generated by the development.

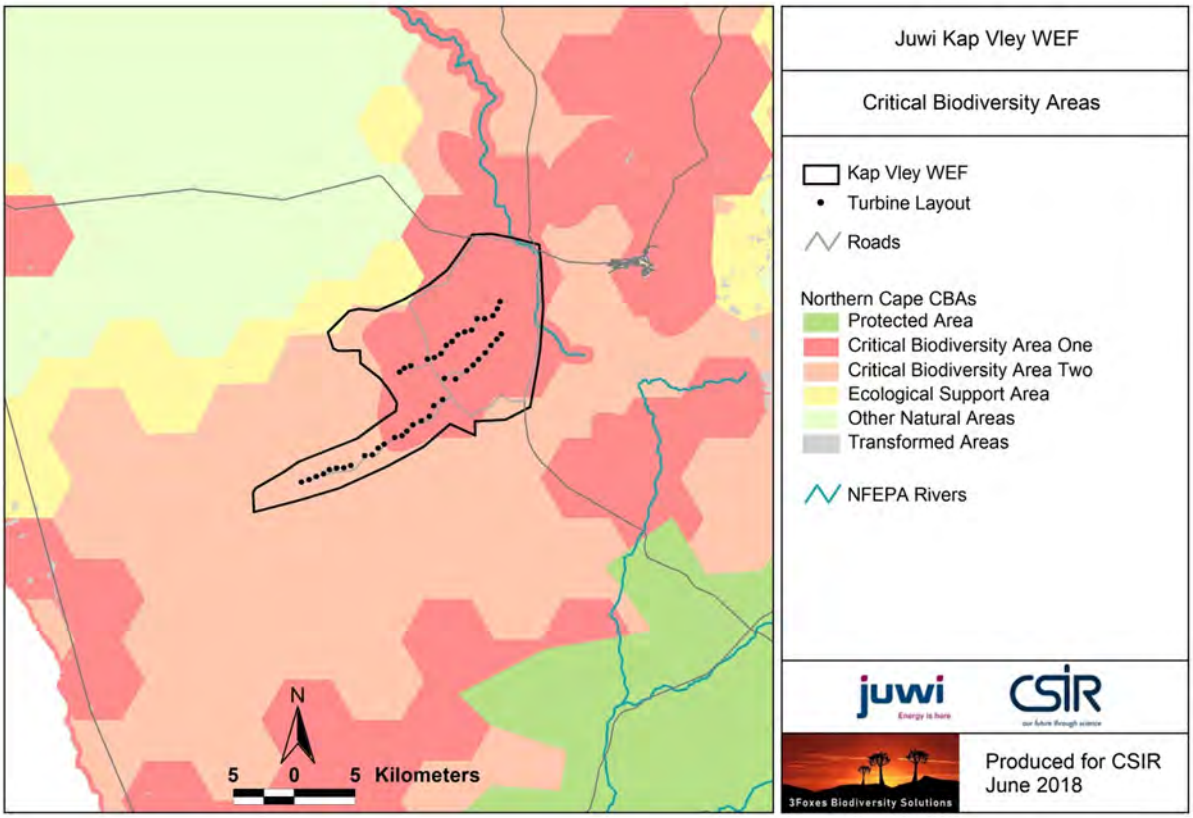


Figure 3.16: Critical Biodiversity Areas map for the study area, showing that the site lies within a Tier 1 and Tier 2 CBA. (*Source*: Todd, 2018)

In order to ensure that the offset is located within appropriate offset receiving areas, the developer has engaged WWF-SA to facilitate the land acquisition. As WWF-SA has an active land purchase programme in Namaqualand which works in collaboration with SANParks and DENC, which will ensure that the offset is located within identified target areas. Juwi is investigating the possibility of the land to be secured by WWF-SA on behalf of the client and management to be transferred to SANParks who will have the long term capacity to manage the site. As there are offset target areas adjacent to the Namaqua National Park with the appropriate features, the offset would have a long-term future as part of the greater Namaqua National Park. This option as well as other alternatives are currently being investigated by juwi.

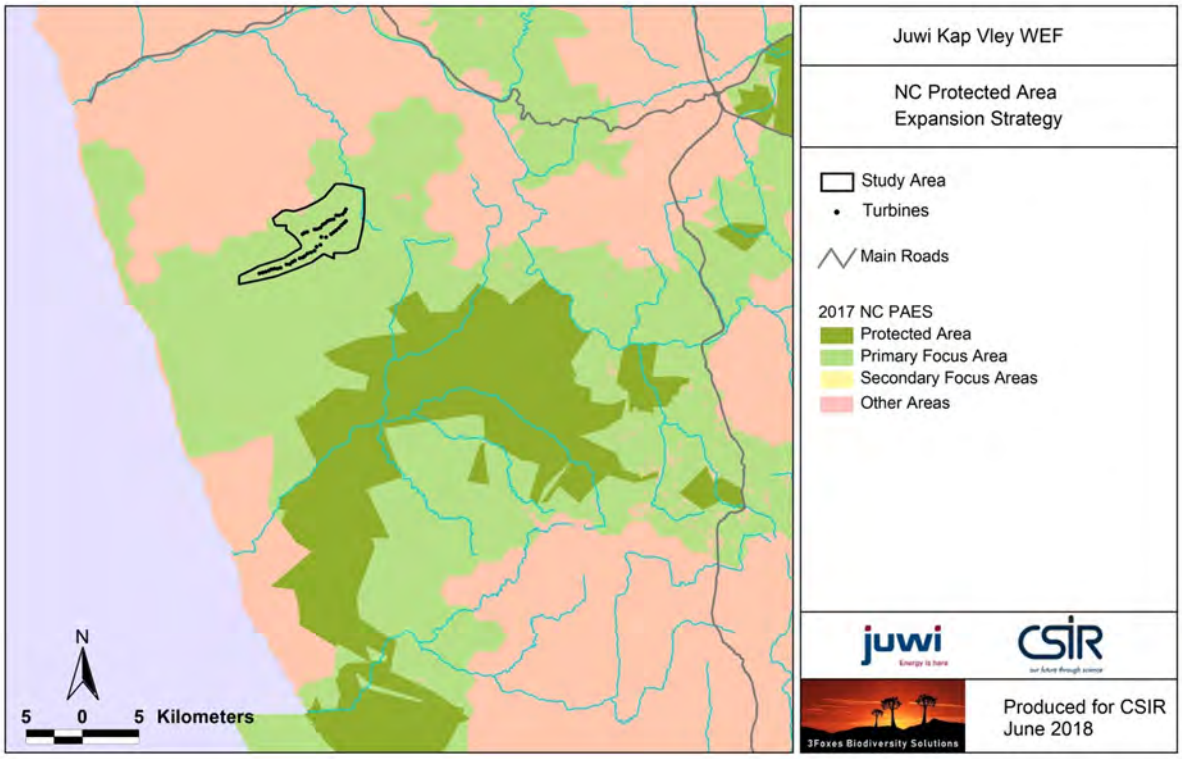


Figure 3.17: Northern Cape Protected Area Expansion Strategy (NCPAES) Map for the broader area, showing the Kap Vley site falling within a Primary Focus Area. (*Source*: Todd, 2018)

3.3.2.1.2 Vegetation on site

Based on the fieldwork that has been conducted by Mr Simon Todd (the Ecologist on the project team) at the Kap Vley project area there are a number of endemic and plant SCC present on site. These species are *Aspalathus albens, Metalasia adunca, Muraltia obovate, Agathosma elata, Argyrolobium velutinum, Caesia sabulos, Lampranthus procumbens, Phyllobolus tenuiflorus and Leucospermum praemorsum.* These are summarised in Table 3.4 below, showing their distribution according to the SANBI Red List, as well as the potential significance of impacts on each species. As all populations of these species within or near the development footprint have been mapped, the extent of the impact on these species is well characterised. Significant avoidance of important populations of these species has been implemented and no more than 2% of the on-site population of any of these species would be impacted by the development and in some cases no impact on species of higher conservation concern such as *Agathosma elata* would occur due to total avoidance. No local or regional populations of these species would be compromised by the development or elevated to a higher level of conservation concern as a result of the development (Todd, 2018).

Although a full walk-through of the development footprint has been conducted, it is possible that additional species of concern are present in the area but were missed or were not active at the time of sampling. However, as the entire development footprint has been checked in the field, any additional species of concern that may be present, would occur at very low abundance. The list below however represents those species which are confirmed present at the site and which would potentially bear the brunt of the development impact. An second full walk-through of the development footprint would be required prior to construction and would be used to further reduce the impact of the development on species of concern through translocation or seed banking of affected species and individuals.

Table 3.4: Species of Conservation Concern (SCC) confirmed to be present at the Kap Vley site, with maps of their distribution taken from the Red List of South African Plants (see http://redlist.sanbi.org/redcat.php) and a short consideration of their likely significance for the development of the site (Todd, 2018).

Species & Image	IUCN Status & Abundance on-site	Significance for Kap Vley development
Aspalathus albens 	Recently downgraded from Vulnerable to Least Concern 	Populations are localised and total impact on this species at the site would be very low. Overall significance at site is low.
Metalasia adunca 	Near Threatened Widespread on dunes and sandy slopes. 	Common in many areas of the dune habitat and mobile sands. As it occurs as many scattered individuals, some impact on this species is unavoidable. However, the proportion of individuals affected is low and as this is fairly widespread species, the residual impact is not considered highly significant.
Muraltia obovata 	Vulnerable Common and widespread across most habitats with sandy soils 	Very common at the site and avoidance will not be possible, but impact on local population not likely to be highly significant as it is common within favourable habitat. Implications for the development are low.

Species & Image	IUCN Status & Abundance on-site	Significance for Kap Vley development
Agathosma elata 	Endangered Locally abundant on sandy slopes 	Scattered but healthy populations which have been avoided. Impact on this species would have high significance but avoidance has been effective at minimising impact.
Argyrolobium velutinum 	Endangered Occasional on sandy slopes 	Occasional scattered plants that can't be easily avoided. Overall significance of the impact on this species is considered to be low.
Caesia sabulosa 	VulnerableUncommon 	Not common at the site and significant impact is not likely. Implications for the development is low.

Species & Image	IUCN Status & Abundance on-site	Significance for Kap Vley development
Lampranthus procumbens 	Vulnerable Common on sandy slopes 	Locally common at the site. Impact on this species would have high significance but the important populations have been avoided although some residual impact is likely. Translocation of affected plants may be able to partly mitigate any residual impact.
Phyllobolus tenuiflorus 	Vulnerable Uncommon on rocky soils 	Not common at the site and it is not likely that a significant impact would be generated. Low significance for the development.
Leucospermum praemorsum 	Vulnerable Localised but common along parts of the affected ridges 	Common on sand dunes and while significant avoidance for this species has been implemented, this is a dominant species across large areas and some local residual impact on this species will occur. Moderate significance for the development as this is likely the northern most population of this species.

3.3.2.2 Fauna

- **Mammals**

A list of Mammals known from the broad area around the Kap Vley site, based on the MammalMap Database (http://vmus.adu.org.za) is provided in Appendix 1 of the Terrestrial Ecology Report.

There are 45 different mammals that are known to occur in the broad area around the site. Species observed at the site to date include Golden moles, Steenbok, Common Duiker, South African Ground Squirrel, Suricate, Yellow Mongoose, Namaqualand Rock Mouse, Rock Hyrax, South African Mole rat, Black-backed Jackal, Caracal, Baboon, Aardvark and Smith's Red Rock Rabbit. Other mammals captured by the camera traps include African Wildcat, Bat-eared Fox, Cape Fox, Cape Grey Mongoose, Cape Hare, Honey Badger, Steenbok, Striped Polecat and Porcupine (Todd, 2018). Although all parts of the site were well-used by fauna, Caracal tended to be restricted to the rocky hills as were Smith's Rock Rabbit.

Apart from the species which were observed and can be confirmed present at the site, four red-listed species of conservation concern are known from the area. This includes the Leopard, *Panthera pardus* (Vulnerable), Littledale's Whistling Rat *Parotomys littledalei* (Near Threatened), African Clawless Otter *Aonyx capensis* (Near Threatened) and Grants' Golden Mole *Eremitalpa granti granti* (Vulnerable). It is not likely that either the Leopard or Otter are present at the site on account of human disturbance or lack of suitable habitat. Golden Moles are confirmed present at the site, but it is not clear if these are the more common Cape Golden Mole or Grants' Golden Mole.

It is unlikely that the local or regional populations of any species would be compromised by the development and long-term impacts on mammals are likely to be low to moderate after mitigation.

- **Reptiles**

A list of Reptiles known from the vicinity of the Kap Vley site, based on records from the ReptileMap database is provided in Appendix 2 of Terrestrial Ecology report. (Conservation status is from Bates et al. 2013).

The site has a relatively diverse reptile assemblage, with significantly higher diversity in the rocky hills than on the surrounding plains due to the greater habitat diversity and refuge availability of this habitat compared to the plains. Species observed at the site include Armadillo Girdled Lizard, Karoo Girdled Lizard, Giant Desert Lizard, Southern Rock Agama, Common Giant Ground Gecko, Namaqua Day Gecko, Knox's Desert Lizard, Common Sand Lizard, Pink Blind Legless Skink and Many-horned Adder. This is likely to represent only a proportion of the reptile fauna of the site and as many as 40 species are known to occur in the wider area. No SCC have however been recorded from the area although it is possible that the Speckled Padloper, *Chersobius signatus* (Vulnerable), is present at the site as it is widespread in Namaqualand and the rocky hills habitat at the site is suitable for this species. Namaqualand is however known as a centre of endemism and diversity for reptiles and the wider area has a high diversity and abundance of local endemics. This appears to be generated at least partly through the high habitat diversity of the area, which includes rocky hills, heuweltjie veld on fine-textured firm soils, loose sands and dunes, stable and vegetated dunes, well vegetated drainage lines etc.

The fieldwork supports the possibility that reptile diversity in the area is high and indicates that the site has a relatively diverse reptile assemblage, with significantly higher diversity in the rocky hills than on the surrounding plains due to the greater habitat diversity and refuge availability of this habitat compared to the plains. Species observed at the site include Armadillo Girdled Lizard, Karoo Girdled Lizard, Giant Desert Lizard, Southern Rock Agama, Common Giant Ground Gecko, Namaqua Day Gecko, Knox's Desert Lizard, Common Sand Lizard, Pink Blind Legless Skink and Many-horned Adder. he most important habitat for reptiles at the site are the rocky outcrops, which provide an array of microsites and suitable refuges for a variety of reptiles. Direct impact to this habitat would be relatively low as little of the footprint impinges on the outcrops themselves. The sandy substrates are home to local endemics such as the Pink Blind Legless Skink which may be vulnerable to habitat disruption due to the construction of roads which may fragment the continuity of the preferred sandy substrate.

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 at the site which may be compromised by the development. 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 at the site.

- **Amphibians**

A list of Amphibians known from the vicinity of the Kap Vley site, based on records from the FrogMap database is provided in Appendix 3 of the Terrestrial Ecology Report. (Conservation status is from Minter et al. 2004).

There is no natural permanent or even seasonal standing water at the site, which is due to the sandy substrate and consequent lack of drainage features where water can gather. As a result, the amphibian community at the site is restricted to species which are relatively independent of water and consequently of low diversity. The only species confirmed present at the site is the Namaqua Rain Frog which appears to be relatively widespread at the site as it was captured in several different areas including in sandy areas between rocky outcrops, indicating that it is not restricted to low-lying areas. Other species which are possibly present include the Cape Sand Frog, *Tomopterna delalandii*, and the Desert Rain Frog, *Breviceps macrops*, which is classified as Vulnerable. The Desert Rain Frog is however restricted to the coastline and is not known to occur so far inland and as a result is unlikely to occur at the site, although this cannot be discounted as the area has not been well investigated.

Given the paucity of important amphibian habitats at the site and the low diversity of amphibians, a significant impact on frogs is not likely.

3.3.3 Bats

Information taken from the Bat Impact Assessment (ARCUS, 2018) (Appendix I of this report)

A 12-month preconstruction bat monitoring programme was undertaken by ARCUS in line with South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction (Sowler *et al*. 2016). The baseline environment for bats was investigated by using acoustic monitoring to document bat activity on the WEF site. Bats emit ultrasonic echolocation calls for orientation, navigation and foraging. These calls can be recorded by bat detectors enabling bat species to be identified and their activity patterns quantified.

The survey approach focused on the use of passive acoustic monitoring to record bats at seven locations at the Kap Vley WEF site (Figure 3.18). Six bat detectors were installed on temporary aluminium masts with ultrasonic microphones mounted at 12 m. At the seventh bat detector, microphones were mounted at 12 m and 80 m above ground level on a lattice meteorological mast. The detectors were installed and commissioned on 1 and 2 March 2017 and sampled bat activity until 19 February 2018. The sampling period therefore spanned autumn (92 nights), winter (92 nights), spring (91 nights) and summer (81 nights) allowing for a characterisation of baseline bat activity appropriate to the aims of this impact assessment report.

Potential structures that bats could use as roosts were investigated during the day for the presence or evidence of roosting bats (e.g. guano and culled insect remains, etc.) whenever the ARCUS team was on site. These included buildings, rocky outcrops and trees.

Acoustic data from each bat detector were analysed using Kaleidoscope (Version 4.3.2, Wildlife Acoustics). Bat species were automatically identified from their echolocation calls using the embedded

echolocation call library in the software. The results were vetted by manually identifying and checking several recordings. Most files contained only a single bat pass and therefore the total number of files was used as a proxy for bat passes. This would underestimate bat activity if any files contained more than one bat pass. There are no major wetlands or rivers of any importance for bats on the site but there are non-perennial drainage systems and farm dams which will be attractive to bats. Micro-habitats available to bats for foraging include natural shrubland, natural thornveld/Duneveld, livestock water points, camel thorn woodland, stands of alien trees and farmsteads. Roosting micro-habitats include rocky outcrops, trees, and buildings. Grazing is the only current land use on the site and there are no other existing impacts to bats.

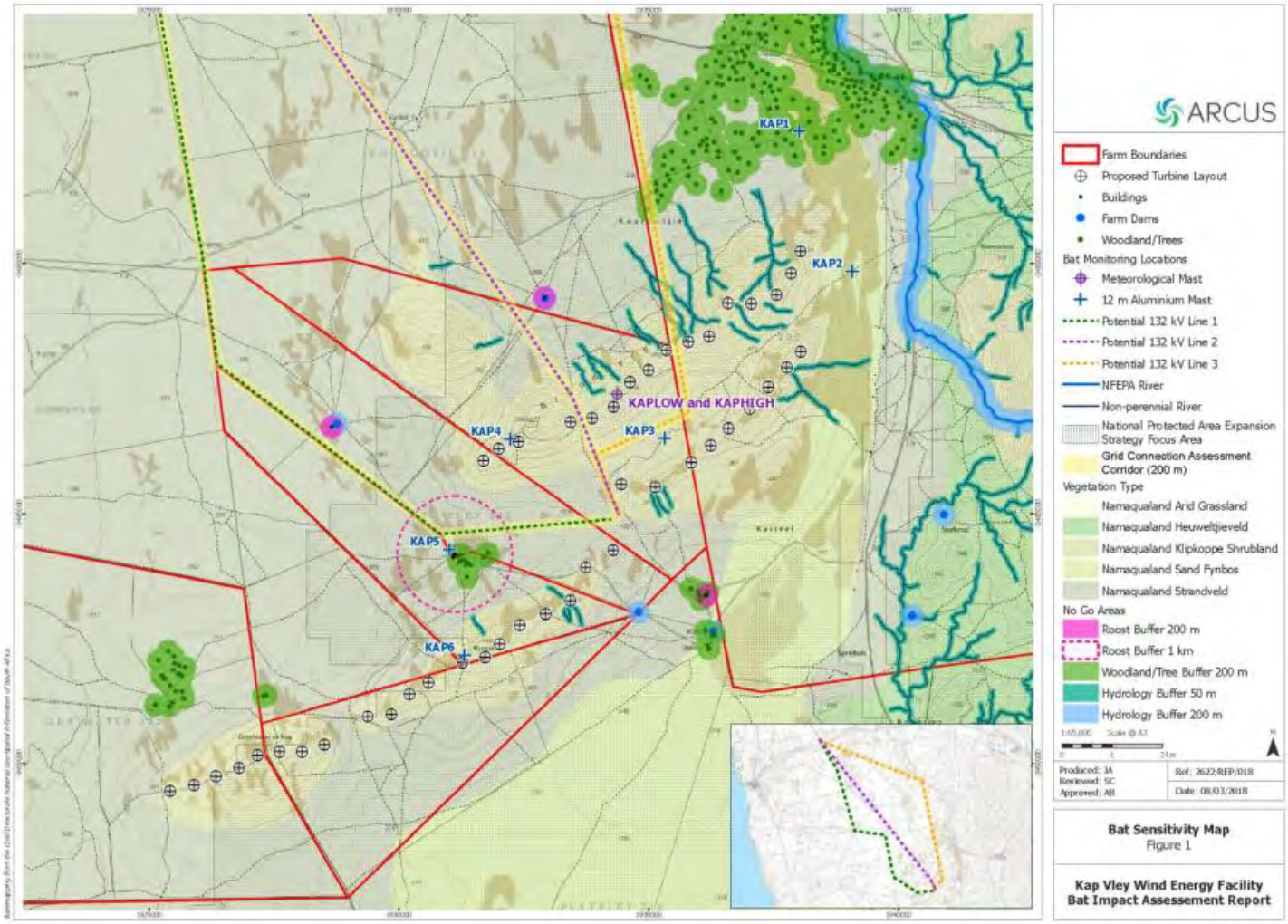


Figure 3.18: Bat sensitivity map, showing the locations of the bat monitoring detectors at the proposed Kap Vley WEF site (*Source*: ARCUS, 2018)

The project falls within the actual or predicted distribution range of approximately eleven species of bat (African Chiroptera Report 2013; Monadjem *et al*. 2010). However, the distributions of some bat species in South Africa, particularly rarer species, are poorly known so it is possible that more (or fewer) species may be present. Analysis of the acoustic monitoring data suggests that at least five species of bat are present (Table 3.5) (ARCUS, 2018). These five bat species have a Conservations Status of Least Concern.

Bats were most often recorded in the lower lying areas of the site and were recorded less on ridges, where all turbines are proposed. A total of 17,912 bat passes were recorded from 356 sample nights across the five species and across all bat detectors. Overall, the levels of bat activity were low to moderate compared to other sites within a similar biome.

The bat monitoring data presented suggest that the development of the proposed Kap Vley WEF and associated powerline 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 to bats. A confirmed bat roost was located at a farmstead approximately 1,600 m to the nearest turbine. This roost has been buffered with a no-go buffer of 1 km in which no turbines, or parts of a turbine, should enter. Other infrastructure, such as roads and powerlines, is permitted in this buffer. This buffer does not impact the current turbine layout and no adjustments to the proposed layout are required to accommodate the buffer.

Table 3.5: Bat Species recorded at the proposed Kap Vley WEF site and their sensitivity to WEFs

Species	Species Code	# of Bat Passes	Conservation Status[1]		Likelihood of Risk[2]
			National	International	
Egyptian free-tailed bat *Tadarida aegyptiaca*	EFB	7,290	Least Concern	Least Concern	**High**
Roberts's flat-headed bat *Sauromys petrophilus*	RFB	235	Least Concern	Least Concern	**High**
Natal long-fingered bat *Miniopterus natalensis*	NLB	3,737	Least Concern	Least Concern	**High**
Cape serotine *Neoromicia capensis*	CS	6,009	Least Concern	Least Concern	**Medium-High**
Long-tailed serotine *Eptesicus hottentotus*	LTS	641	Least Concern	Least Concern	**Medium**

Monitoring of bat activity and bat fatality during the operational phase of the WEF is needed to determine if any additional mitigation measures are needed.

A key finding of the bat monitoring is that the vast majority of the bat activity, approximately 90 %, was recorded in low lying areas of the site, away from proposed turbine positions. Further, at the meteorological mast bat activity was higher at the lower monitoring height. These findings suggest lower risk to bats in the potential rotor swept zone.

Bats were much more active in the lower altitude areas of the site. In particular, activity was highest at KAP5 which is situated at a farmstead where moderate numbers of bat passes were recorded each night.

[1] Child, M.F., Roxburgh, L., Do Linh San, E., Raimondo, D., Davies-Mostert, H.T. eds., 2016. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

[2] The likelihood of risk to impacts of wind energy was determined from the guidelines and is based on the foraging and flight ecology of bats and migratory behaviour.

This site was deliberately chosen for monitoring because the presence of trees, buildings and water are favourable for bats and monitoring here could give a good indication of bat activity in the area.

The Cape serotine was principally responsible for the high activity at KAP5. This species is known to roost in buildings and a survey at the farmstead on the evening of 5 December 2017 confirmed the presence of roosting bats. A total of 58 bats were counted emerging from three different entrances in the main building at the farmstead. Acoustic data confirmed that the bats emerging from the building were Cape serotine. This species is classified as being at medium-high risk of impacts of wind turbines and fatalities at operational wind energy facilities in South Africa have been reported across a wide geographic range (Aronson *et al*. 2013; Doty and Martin 2012). Based on Best Practise Guidelines for surveying bats at WEFs[3] this building will need to be buffered by 1 km to protect bats using the roost (Figure 3.18). The building is located approximately 1 600 m from the nearest turbine to the north so this should not impact the current proposed turbine layout.

Among the high risk species recorded were two free-tailed bats; the Egyptian free-tailed bat and Roberts's flat-headed bat, which is endemic to South Africa. Free-tailed bats are high-flying species whose morphology and echolocation enable fast flight in open areas and these bats are therefore at risk of encountering wind turbine blades across most of the rotor-swept zone. Monitoring of operational WEFs in South Africa has confirmed that Egyptian free-tailed bats have suffered mortality by wind turbines (Aronson *et al*. 2013; Doty and Martin 2012). However, based on the monitoring data from the met mast, these two species appear to be more active at lower altitudes. Both species had their highest activity at KAP2 which is situated in the Namaqualand sand vegetation type approximately 1 km to the nearest turbine. Both are known to roost in, among other types of roosts, rock crevices (Monadjem *et al*. 2010) and additionally Roberts's flat-headed bat appears to be adapted for roosting under slabs of exfoliated rock or narrow crevices and cracks (Jacobs and Fenton 2001). These geological features are present near KAP2. In addition, Egyptian free-tailed bats also roost under tree bark and the scattered trees and open woodland near KAP2 might be attracting these bats to this area of the site.

The third high risk species, the Natal long-fingered bat, was mainly recorded in lower risk areas of the proposed site and away from proposed turbine positions. This is a migratory species (Monadjem *et al*. 2010) and is protected under the Convention on the Conservation of Migratory Species of Wild Animals (1979). The majority of bat mortalities at WEFs in North America and Europe are migratory species (Baerwald and Barclay 2011; Cryan 2011; Kunz *et al*. 2007b) therefore it may be assumed that the Natal long-fingered bat is at risk from wind turbines in South Africa. This species migrates during autumn (April and May) and spring (September and October) between summer maternity roosts and winter hibernating sites generally located at higher latitudes, and is reported to migrate distances from approximately 150 km to 560 km (Miller-Butterworth *et al*. 2003; Monadjem *et al*. 2010). Although this species had higher activity during these periods, based on the magnitude of their activity it is unlikely that they are migrating through the site. It is more likely that there is a resident population of the Natal long-fingered bat at the project and surrounding region. While this may decrease the risk to this species, resident populations of bats are also impacted by WEFs (Rydell 2010).

3.3.4 Birds

Information taken from the Bird Impact Assessment (ARCUS, 2018) (Appendix H of this report)

A 12-month preconstruction bird monitoring programme was developed and undertaken by ARCUS in line with Best Practice Guidelines applicable at the time of the surveys (Jenkins *et al*. 2015). Furthermore,

[3] Sowler, S., Stoffberg, S., MacEwan, K., Aronson, J., Ramalho, R., Potgieter, K., Lötter, C. 2016. South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction: 4th Edition. South African Bat Assessment Association.

BirdLife South Africa (BLSA) recently released species specific Verreauxs' Eagle Guidelines (BLSA 2017b). These were considered in the design of the monitoring programme.

The baseline avifauna (bird) environment for the WEF site and Grid Connection site was defined utilising a desk-based study and informed by four seasons of pre-construction bird monitoring on the WEF site (and its surrounds) and a specialist nest survey. This information was examined to determine the potential location and abundance of avifauna which may be sensitive to development, and to understand their conservation status and sensitivity.

An arbitrary boundary was used to define the WEF site, within which all monitoring activities occurred, and species were recorded. To obtain data for accurate 'before-after' comparison, the monitoring programme included data collection in a control area, at least 3.5 km from the nearest proposed turbines, and where there are no future known plans for renewable energy development. An arbitrary boundary was also created to define the 'control site', around the locations of the control site monitoring methods. Five vantage points were surveyed on the WEF site, and one in the control site (Figure 3.19).

It is important to note that the proposed development site is not within an Important Bird Area (IBA). The WEF site is not overly diverse in terms of available bird habitats, with generally similar vegetation types found throughout. There are no wetlands or rivers of any importance for birds on the site.

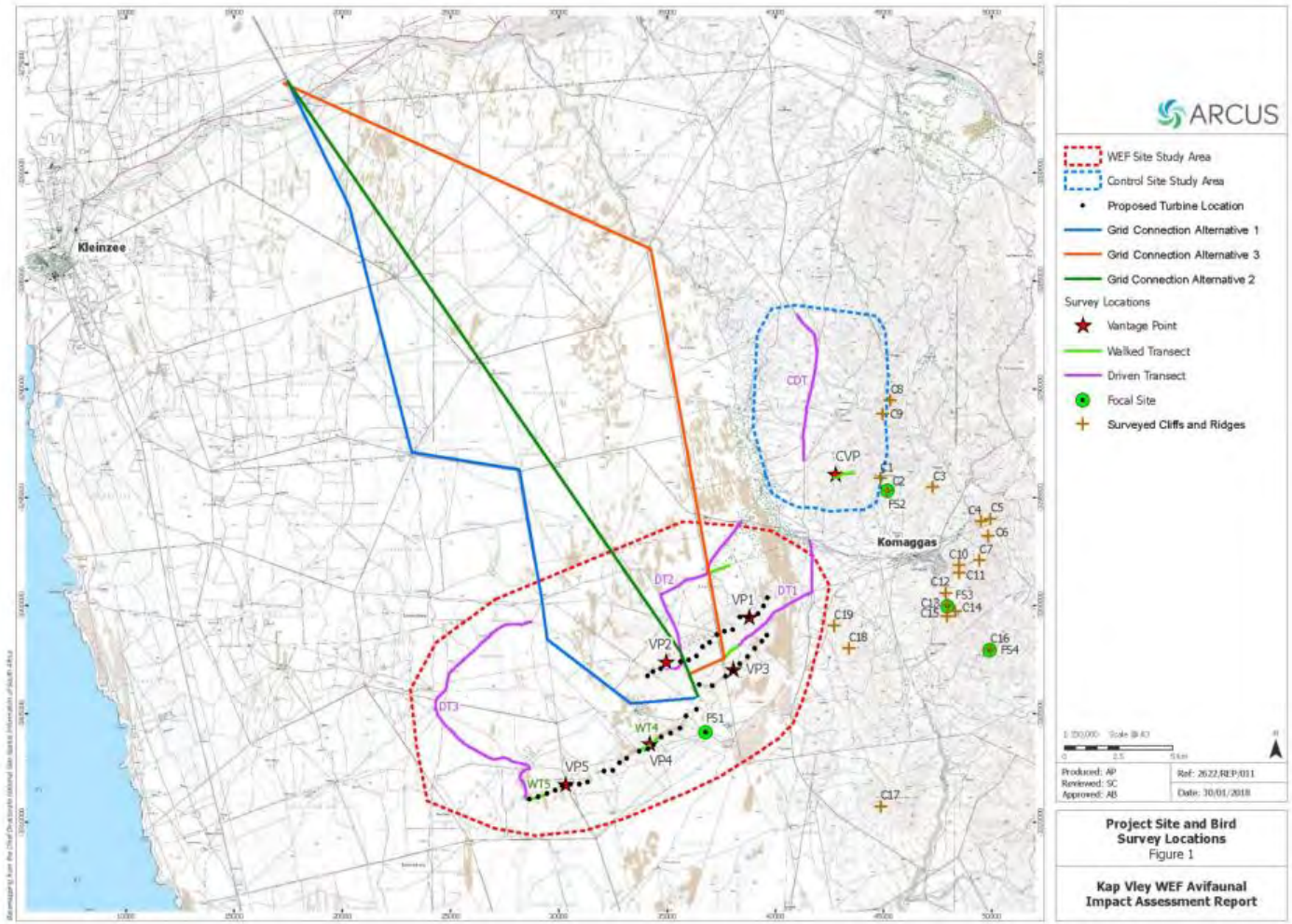


Figure 3.19: Project site and Controlled site study area showing the bird survey locations (*Source*: ARCUS, 2018)

A total of 82 positively identified species (including 15 priority species) have been recorded across both the Kap Vley WEF site and the control site after four seasonal surveys (Table 3.6). Six regional Red Data species (Taylor *et al*. 2015) have been recorded including three classified as Endangered (Black Harrier, Ludwig's Bustard and Martial Eagle), and three as Vulnerable (Verreaux's' Eagle, Lanner Falcon and Southern Black Korhaan). Of these, only Southern Black Korhaan was frequently recorded.

Sixty four species were recorded at the control site. This lower number can be attributed to less time spent at the control site versus the WEF site, and is not necessarily a reflection of local diversity. All 64 species recorded at the control site were also recorded on the WEF site, while 18 species were recorded only in the WEF site including Black Harrier, Martial Eagle, Southern Black Korhaan, Spotted Eagle Owl, Cape Eagle Owl, Black-chested Snake Eagle and Grey-winged Francolin.

Table 3.6: Priority Bird Species and Regional Red Data Species Recorded During the Surveys on the WEF and Control Sites

Full Name	Regional Red Data Status	Priority Species Score	summer		autumn		winter		spring	
			WEF	Control	WEF	Control	WEF	Control	WEF	Control
African Harrier-Hawk		190			x		x			
Black-chested Snake Eagle		230					x		x	
Black Harrier	EN	345					x		x	
Booted Eagle		230	x						x	x
Cape Eagle-Owl		250	x							
Greater Kestrel		174					x		x	x
Grey-winged Francolin		190					x			
Jackal Buzzard		250	x	x	x	x	x	x	x	x
Lanner Falcon	VU	300						x	x	
Ludwig's Bustard	EN	320					x	x	x	
Martial Eagle	EN	350							x	
Pale Chanting Goshawk		200	x	x	x	x	x	x	x	x
Southern Black Korhaan	VU	270	x		x		x		x	
Spotted Eagle-Owl		170	x						x	
Verreaux's' Eagle	VU	360	x		x	x			x	x

Activity and abundance of priority species and red data species were generally found to be low on the Kap Vley WEF site after one year of pre-construction monitoring. Thorough fieldwork and monitoring did not reveal any key or important avifaunal landscape features or sensitivities (e.g. nest sites) on or within 5 km of the WEF site. Abundances of small passerines were also found to be low. While the drought conditions experienced during the first two surveys (summer and autumn 2017), may have influenced the results, the third and fourth surveys (winter and spring) were conducted after rainfall in the area. It is unlikely that inter annual variation in bird occurrence would be so substantial so as to significantly alter the findings of this study. This can be said, as historical data sets from the area (as well as other studies done on surrounding proposed projects), did not reveal substantially different findings/conclusions. The Kap Vley WEF site has some of the lowest activity and occurrence of priority species experienced by the specialists, relative to other project sites worked on in South Africa. Passage rates were very low. The

level of Verreaux's' 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 high risk to Ludwig's Bustard posed by the Grid Connection line.

A dedicated search for cliff nests was conducted by the specialist and six cliff nest sites for unidentified Raptors, White-necked Raven and Verreauxs' Eagles have been found. It must be noted that no nests were found closer than 6.8 km from the nearest proposed turbines. Therefore, the current recommended turbine exclusion buffers shown in Table 3.7, will have no impact on proposed layout of the Kap Vley WEF. The exclusion buffers (Figure 3.20) were based upon current international and South African best practise, as well as the recommendations of BLSA (BLSA 2017b).

Table 3.7: Cliff bird nest survey results

Nest	Approx. nest location	Approx. distance from nearest turbine	Species	Description	Comment	Turbine exclusion buffer
N1	29.769719°S 17.467132°E	6.8 km	Unidentified Raptor	Large nest on cliff. No clear evidence of use. No white-wash seen.	Only long distance view possible. Initially suspected inactive Verreaux's' Eagle nest, but species not recorded in autumn, winter or spring. More Likely a Jackal Buzzard nest.	1.5 km
N2	29.800851°S 17.501511°E	8.5 km	Unidentified Raptor	Medium size nest on cliff. No white-wash seen.	Adult Jackal Buzzard observed in vicinity. Suspect active Jackal Buzzard nest.	1.5 km
N3	29.803182°S 17.502349°E	8.5 km	White-necked Raven	Goat/sheep fur and rope observed in messy stick nest.	Pair of ravens observed in vicinity.	NA
N4	29.817942°S; 17.496148°E	7.8 km	Verreaux's' Eagle	Large stick nest on cliff.	Adult Verreaux's' Eagle observed sitting on nest. Assumed adult is a separate bird to the pair at N5 (2.8 km away).	3 km
N5	29.836030°S; 17.516480°E	9.75 km	Verreaux's' Eagle	Very large stick nest on cliff in a deep Kloof. Lots of evidence of use including prey items, feathers and whitewash.	Active nest site with pair observed flying above in April 2017. In winter 2017 a chick was observed on the nest. In spring 2017 a fledged sub adult and two adult birds were seen flying above nest site, indicating successful breeding.	3 km
N6	29.901507°S; 17.464862°	8.2 km	Unidentified Raptor	Medium sized stick nest on cliff in Kloof. No clear evidence of recent use.	Adult Jackal Buzzard observed in vicinity on two occasions. Suspect Jackal Buzzard nest.	1.5 km

The specialist identified and ranked bird sensitivity areas as shown below to inform the Kap Vley WEF layout:

3.3.4.1 High Sensitivity Areas

- Nest Site buffers (Various- See Table 3.7 and Figure 3.20)
- High Flight Sensitivity Zones (Figure 3.21)

These areas constitute a No-Go for turbine and overhead power-line placement. Other infrastructure (e.g. roads, underground cables, offices, substations etc.) is permitted except within 1 km of raptor nest sites (although none were located on the project site).

3.3.4.2 Medium Sensitivity Areas

- National Freshwater Ecosystem Priority Areas (NFEPA) rivers and wetlands buffers: 200 m
- Medium Flight Sensitivity Zones

Infrastructure (including overhead power lines and wind turbines) is permitted, but not recommended in these areas.

3.3.4.3 Low-Medium Sensitivity Areas

- Low-Medium Flight Sensitivity Zones
- 150 m Ridge Buffer

All infrastructure permitted

3.3.4.4 Low Sensitivity Areas

- Low Flight Sensitivity Zones

All infrastructure permitted.

The sensitivity layers identified by ARCUS (Figures 3.20 and 3.21) were incorporated by juwi into the WEF project layout. An integrated bird sensitivity map was compiled by ARCUS as can be seen in Figure 3.22.

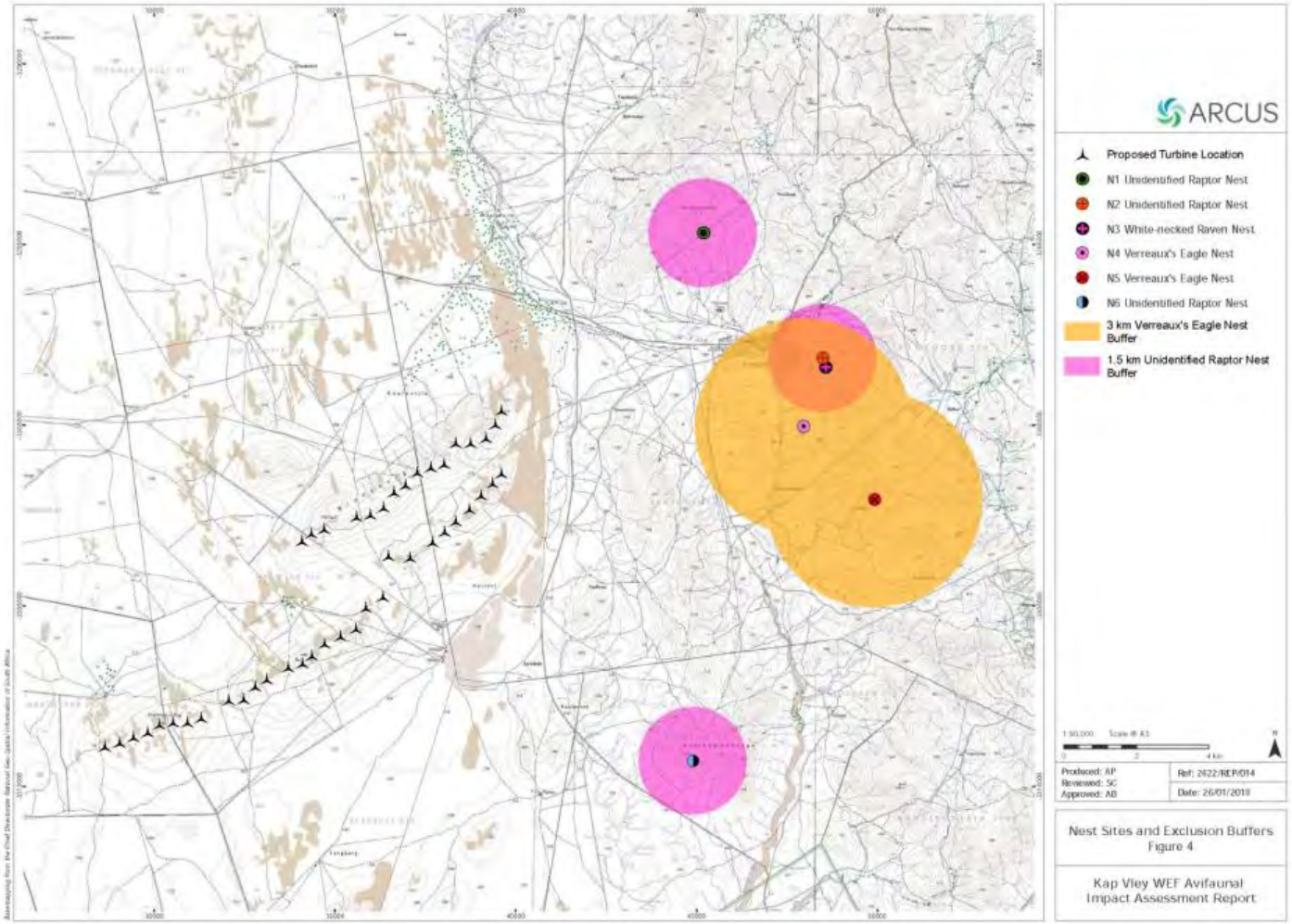


Figure 3.20: Nest sites and exclusion buffers (Source: ARCUS, 2018)

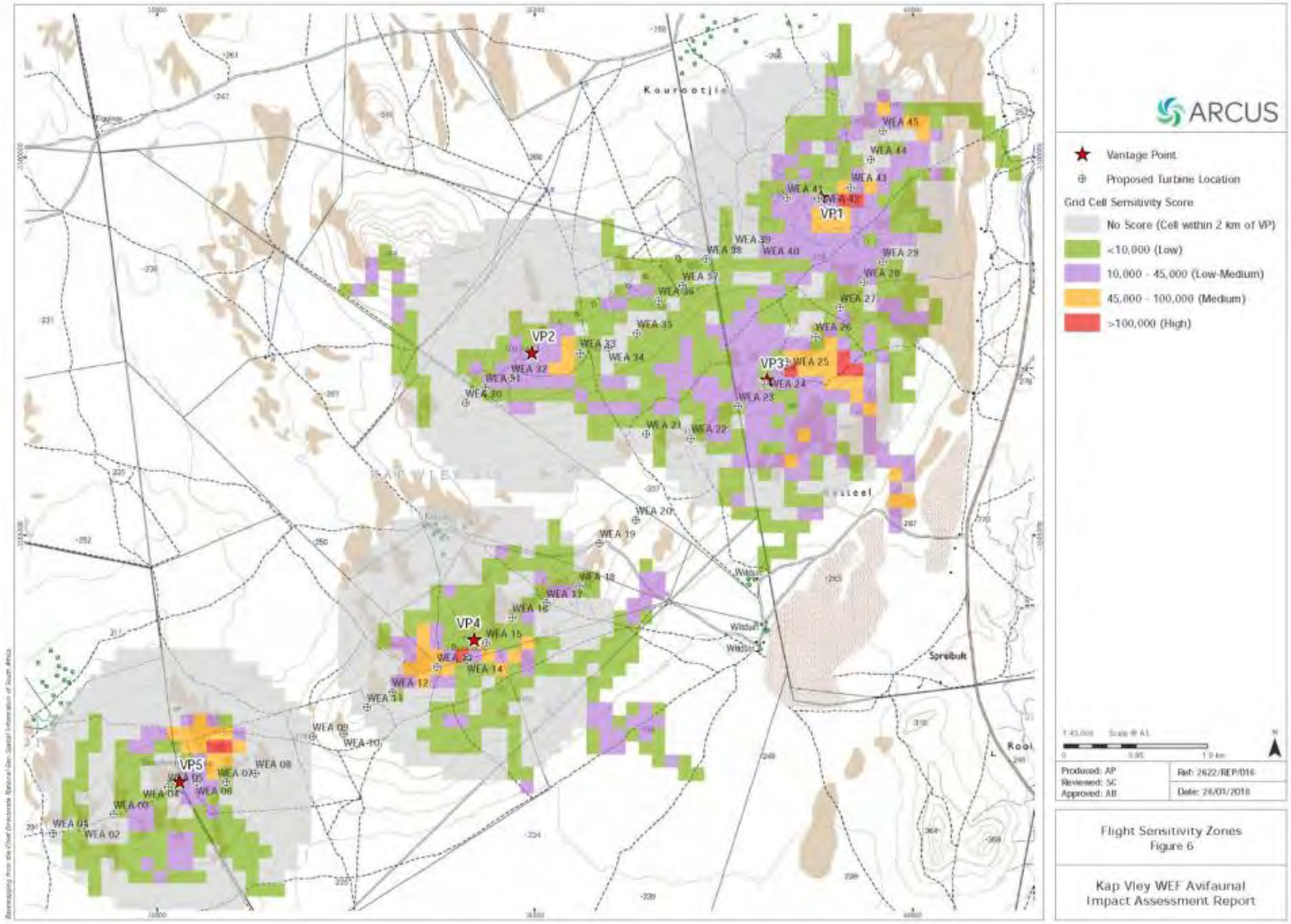


Figure 3.21: Bird flight sensitivity zones (Source: ARCUS, 2018)

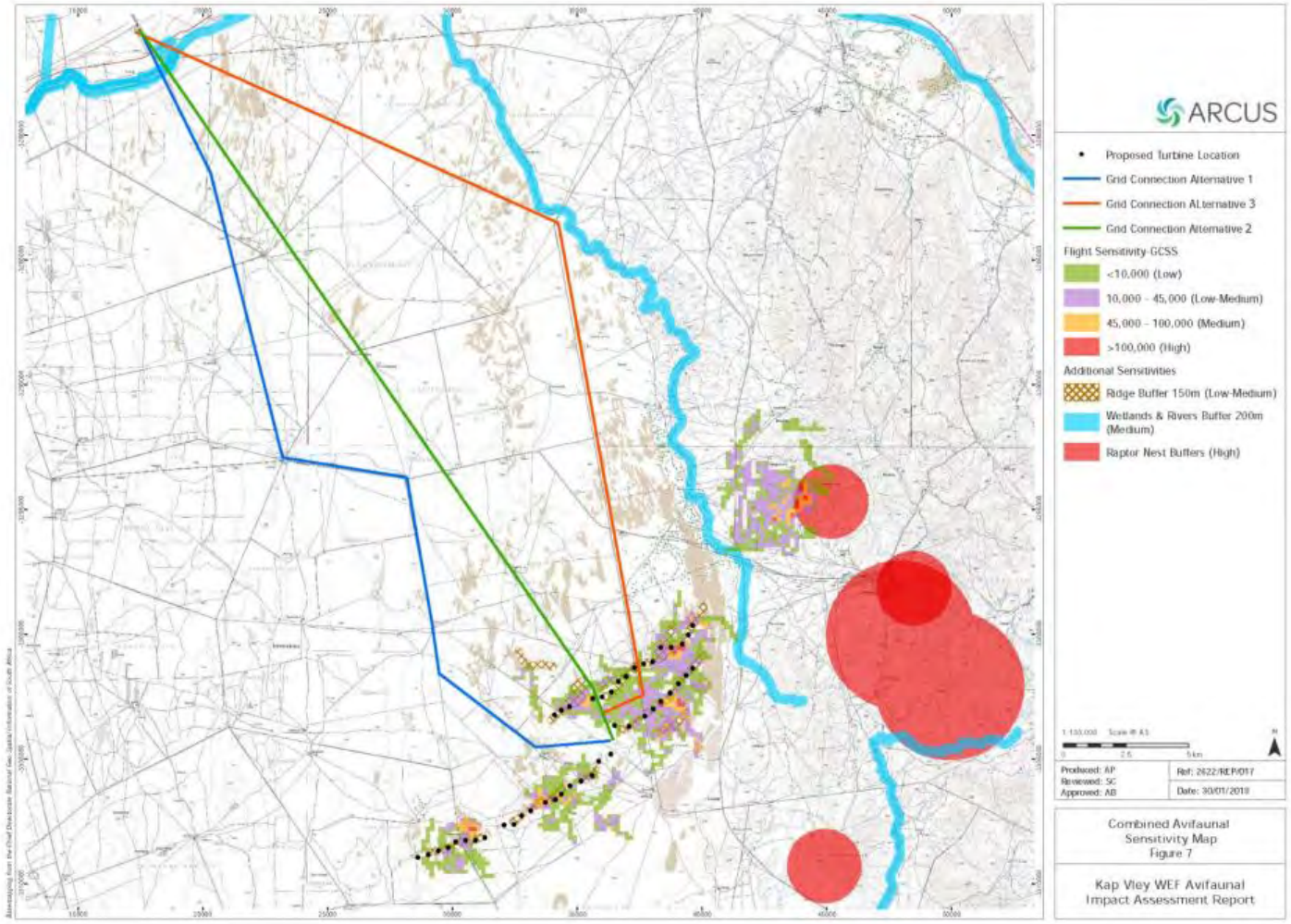


Figure 3.22: Combined Avifaunal (Bird) Sensitivity Map (*Source*: ARCUS, 2018)

3.3.5 Heritage Profile

Information taken from the Heritage Impact Assessment (ASHA Consulting, 2018) (Appendix L of this report).

- **Archaeology**

A number of archaeological sites were located along the alignment of the proposed roads and turbines for the proposed Kap Vley WEF. All of them are scatters of artefacts in varying density and contained only stone artefacts. A graveyard and some associated building foundations were also found along the access road.

The archaeological assessment for the proposed WEF uncovered several features of heritage significance on the site. In terms of artefacts, a good number of hollows on-site contained two or three artefacts that were not recorded. In general, the hollows were deflating which showed that buried archaeology was highly unlikely. Some of the hollows may have formed quite recently. However, in a few instances, the fine-grained surface deposits suggested accretion of sand and the chance of subsurface materials being present (ASHA Consulting, 2018).

A surprising aspect of the archaeology in the study area was the presence of a series of artefact scatters near the summit of the highest hills in the northern part of the study area. In a number of areas, these scatters were best thought of as background scatters of mixed age and were associated with quartz gravel. However, one sandy area, in a saddle between rocky summits, contained three artefact scatters, one located in a small deflation hollow (KAP2017/009, waypoint 1416; Figure 3.23), another was low density and at the foot of a koppie (KAP2017/007, waypoint 1414), while the third was an extensive and quite dense scatter (KAP2017/008, waypoint 1415; Figure 3.24).

Figure 3.23: View of the small deflation hollow and artefact scatter at KAP2017/009 (waypoint 1416).

Figure 3.24: View towards the east across KAP2017/008 (waypoint 1415).

- **Graves**

There are two graveyards recorded within the site. The one graveyard is unfenced and consists of nine graves that are marked only by the stone head and footstones whereas the second graveyard is fenced, formal and closer to one of the ruins, this graveyard was used between 1916 and 1990 (Figures 3.25 and

3.26). Furthermore, another farm graveyard occurs at the Kap Vley farmhouse to the west of the proposed layout but it was not visited because it is far away from the project footprint and will not be affected in any way.

Figure 3.25: View towards the north across the nine graves in the informal graveyard alongside the current access track (*Source*: ASHA Consulting, 2017)

Figure 3.26: View towards the north across the formal, fenced graveyard (ASHA Consulting, 2017)

- **Cultural and Natural Landscape (i.e. Visual Baseline)**

The Komaggas area contains many small stock posts which are actively used on a seasonal basis by members of the community who practice herding. Because this way of life has been ongoing for so long it is regarded as intangible heritage and the stock posts, although recent, are the physical manifestations of that heritage. They are also one of the primary components of the local cultural landscape, especially on the farm Kamaggas (ASHA Consulting, 2018).

Although there are several types of heritage present in and around the study area, only two are of concern in that significant impacts are more likely to occur. Archaeological sites comprised only of scatters of stone artefacts present in a number of areas of the proposed layout and will require excavation to mitigate the impacts to them, if they cannot be avoided. The landscape and its link with traditional land uses will also be impacted and it will be necessary to ensure that only minimal loss of land takes place within the Kamaggas farm area. The other aspects of heritage also considered but which will not be meaningfully affected, either through distance from the proposed development or because of the very low likelihood of impacts occurring, are palaeontology, graves, and the built environment.

<u>Finding of the Heritage study</u>

The section below describes the heritage resources recorded in the study area during the course of the project. Table 3.8 lists the finds, while they are mapped in Figure 3.27.

Table 3.8: List of heritage sites recorded during the field survey. Archaeological and historical sites are given names following the system that has been in use in the area for some years[4]. Background scatter and very ephemeral occurrences are not regarded as sites and thus ae not named.

Waypoint	Site name	GPS co-ordinate	Description	Significance (grade) Mitigation
1376	PAN2017/001	S29 52 22.8 E17 23 37.0	A set of 9 graves marked only by head and foot stones. Aligned east west with 7 in a single row and 2 forming a second row. Very close to the access road (about 3 m away).	High (IIIA) Avoid
1377	PAN2017/002	S29 52 05.9 E17 23 34.1	A house foundation that looks early 20th century but, according to historical literature, is likely late 19th century. It was built of locally made sun-dried mud bricks with straw added to them. A cement floor appears to have been cast inside the house at a later date. Also front steps added. There is also an outdoor over made in a drum. Very light scatter of glass, ceramics and metal fragments over wider area. Most seems to be 20th century but occasional pieces may be late 19th century. There are a number of mature Eucalyptus sp. trees in the vicinity.	Medium-low (GPB) Avoid
1382		S29 52 04.9 E17 23 32.7	Small square stone feature (1x2 m) near house ruin.	Low (GPC)
1383		S29 52 04.2 E17 23 34.5	Large pepper tree and a pile of 20th century rubble. Ephemeral glass, ceramic and metal scatter extends over this area (looks like mostly 20th C).	Low (GPC)
1378	PAN2017/003	S29 52 08.7 E17 23 30.6	Farm graveyard with 21 graves in it, 4 of them marked only by head and foot stones (3 of the latter were children). Surnames and dates of death for the other 17 graves are listed in Appendix 3 of the HIA (Appendix L). There are a number of mature Eucalyptus sp. trees alongside the graveyard.	High (IIIA) Avoid
1379	---	S29 51 33.4 E17 22 53.2	Small rectangular stone feature (1x2 m) on top of ridge. Seems highly unlikely to be a grave, especially given the scatter alongside (waypoint 1380) which suggests some other activity at this location.	Low (GPC)
1380	---	S29 51 33.7 E17 22 53.5	Very light scatter of ceramic (plate, cup) and metal fragments.	Low (GPC)
1381	---	S29 50 45.4 E17 24 24.9	Low density quartz scatter on ridge.	Low (GPC)
1384	KAP2017/001	S29 52 15.8 E17 21 44.3	A moderate density LSA artefact scatter in a deflation hollow with quartz, cryptocrystalline silica (CCS) and silcrete. Artefacts seen included a CCS adze and a quartzite hammer stone. The hollow gives the impression that there might be buried material here too.	Low-medium (GPA) 4 hours
1385	KAP2017/002	S29 52 31.9 E17 21 19.6	Low density LSA scatter of quartz artefacts in a sandy area between rocky outcrops.	Medium (GPA) 3 days
1386		S29 52 32.5 E17 21 18.4	Low density LSA scatter of quartz artefacts in a sandy area between rocky outcrops.	
1387		S29 52 33.0 E17 21 17.2	Low density LSA scatter of quartz artefacts in a sandy area between rocky outcrops.	
1388		S29 52 34.6 E17 21 16.0	High density LSA scatter of quartz artefacts in a sandy area between rocky outcrops.	
1389		S29 52 34.1	Very high density LSA scatter of quartz artefacts in a	

[4] E.g. KAP2017/001 = 1st site recorded on Kapvlei in 2017. PAN = Panvlei, KOM = Komaggas, GRW = Gra'water

Waypoint	Site name	GPS co-ordinate	Description	Significance (grade) Mitigation
		E17 21 14.7	sandy area below a rock shelter. This spot is effectively the talus scatter for the rock shelter. (Elevation at about 430 m.)	
1390		S29 52 33.6 E17 21 14.2	A small rock shelter with no deposit in it but with a bee hive in a hole in the rear wall. There are a few artefacts on the rocky floor. Also some historical/recent graffiti chipped into the back wall: "BS", "CI?" and "D???".	
1391		S29 52 34.4 E17 21 14.4	Very high density LSA scatter of quartz artefacts in a sandy area below a rock shelter. This is another spot on the talus scatter for the rock shelter and a CCS segment was seen here.	
1392	KAP2017/003	S29 52 35.8 E17 21 15.1	A moderate density quartz scatter in a sandy patch below the rocky ledge (one level below the talus scatter of waypoints 1388, 1389 and 1391. Uncertain to what degree this is 'spillage' from above or a separate scatter.	Low-medium (GPA) 4 hours
1393	KAP2017/004	S29 53 09.1 E17 20 09.7	LSA scatter located around 3 sides of a rocky outcrop. It includes quartz, ostrich eggshell and a piece of marine shell (*C. granatina*).	Medium (GPA) 1 day
1394		S29 53 08.6 E17 20 08.8		
1395	KAP2017/005	S29 53 09.1 E17 20 07.6	A moderate density quartz scatter in a sandy deflation hollow about 30 m downslope (towards the southwest) of waypoints 1393 and 1394. It also has silcrete and a quartzite hammer stone present.	Low-medium (GPA) 4 hours
1396	GRW2017/001	S29 53 37.9 E17 18 41.0	A moderate density quartz scatter in a sandy deflation hollow.	Low-medium (GPA) 4 hours
1397	GRW2017/002	S29 53 39.2 E17 18 44.2	A low density quartz scatter in a sandy deflation hollow.	Low (GPC)
1398	KAP2017/006	S29 53 24.3 E17 19 32.2	A moderate to high density quartz scatter in a sandy deflation hollow.	Low-medium (GPA) 4 hours
1399	PAN2017/004	S29 52 35.8 E17 23 35.5	Stone foundations with cement floors and pepper trees. There is also a widespread, very low density scatter of glass and ceramics scattered all over the area. There are also a few marine shells. Several mature Eucalyptus sp. trees occur in the vicinity.	Low-medium (GPB) Avoid
1413	PAN2017/005	S29 52 25.6 E17 23 32.9	A stone foundation with a later cement floor and two pepper trees. It looks 20th century but historical literature suggests it may be late 19th century. Also an ephemeral scatter of glass, ceramics and marine shell in the wider area. There is also a small ash and artefact dump about 20 m to the north.	Low-medium (GPB) Avoid
1414	KAP2017/007	S29 50 30.1 E17 21 48.8	A low density quartz scatter around a rock outcrop on the summit of a mountain. (Elevation at about 490 m.)	Low (GPC)
1415	KAP2017/008	S29 50 31.1 E17 21 45.8	A dense quartz scatter in a saddle between two rocky koppies. The substrate is quite sandy but has very fine gravel present throughout the site. (Elevation at about 490 m.)	Medium (GPA) 1 day
1416	KAP2017/009	S29 50 28.5 E17 21 45.9	A small, sandy deflation hollow with a scatter of quartz artefacts in it.	Low-medium (GPA) 2 hours
1417	---	S29 49 44.0 E17 20 47.0	A widespread, low density background quartz scatter among natural quartz gravel on the hilltops in this area.	Low (GPC)

Waypoint	Site name	GPS co-ordinate	Description	Significance (grade) Mitigation
1418	---	S29 49 45.0 E17 20 27.7	A low density background scatter of quartz artefacts among natural quartz gravel over a wide area on the hilltops.	Low (GPC)
1419	---	S29 49 41.1 E17 20 55.4	A low density quartz scatter on a dune between rocky ridges at the northern foot of a mountain.	Low (GPC)
1420	KOM2017/001	S29 49 46.1 E17 23 10.2	A stone farm boundary beacon that is likely to be historic.	Low (GPB) Avoid
1421	KOM2017/002	S29 49 59.9 E17 24 24.5	A low density quartz scatter in front of a rocky outcrop.	Low (GPC)
1422	KAP2017/010	S29 51 03.0 E17 23 04.3	A very small, low density quartz scatter in a deflation hollow.	Low (GPC)
1423	---	S29 52 26.7 E17 23 39.8	A well excavated into the substrate but lined with concrete rings in the upper few meters. Appears to be dry. Uncertain if an older well that has been modified, but seems far more likely to be relatively recent (maybe mid-20th century). Looks to have modern rubbish in it (possibly beer bottles). Also a wind pump located here.	---
1444	---	S29 48 57.3 E17 24 31.3	A quartz outcrop with a light background scatter of artefacts of mixed age around it.	Low (GPC)
1445	---	S29 49 05.0 E17 25 29.4	A very widespread and ephemeral background quartz scatter on red sand on the plains.	Low (GPC)

- **Palaeontology**

In terms of the palaeontology of the site, it was noted that the hills are of quartzites and schists of the Springbok Formation and are entirely unfossiliferous (Pether, 2017). The slopes around the hills are mantled by aeolian sand, talus, colluvium and ephemeral stream deposits, all of which are considered to have low fossil bone potential. The surface sands around the hills are similarly considered to have low sensitivity because of the likely sparseness of fossils. Bones would most likely occur on the surface of the buried dorbank layer and might be associated with archaeological material (in which case they would be protected as archaeology). Such material is virtually impossible to find unless the surficial sands have been removed.

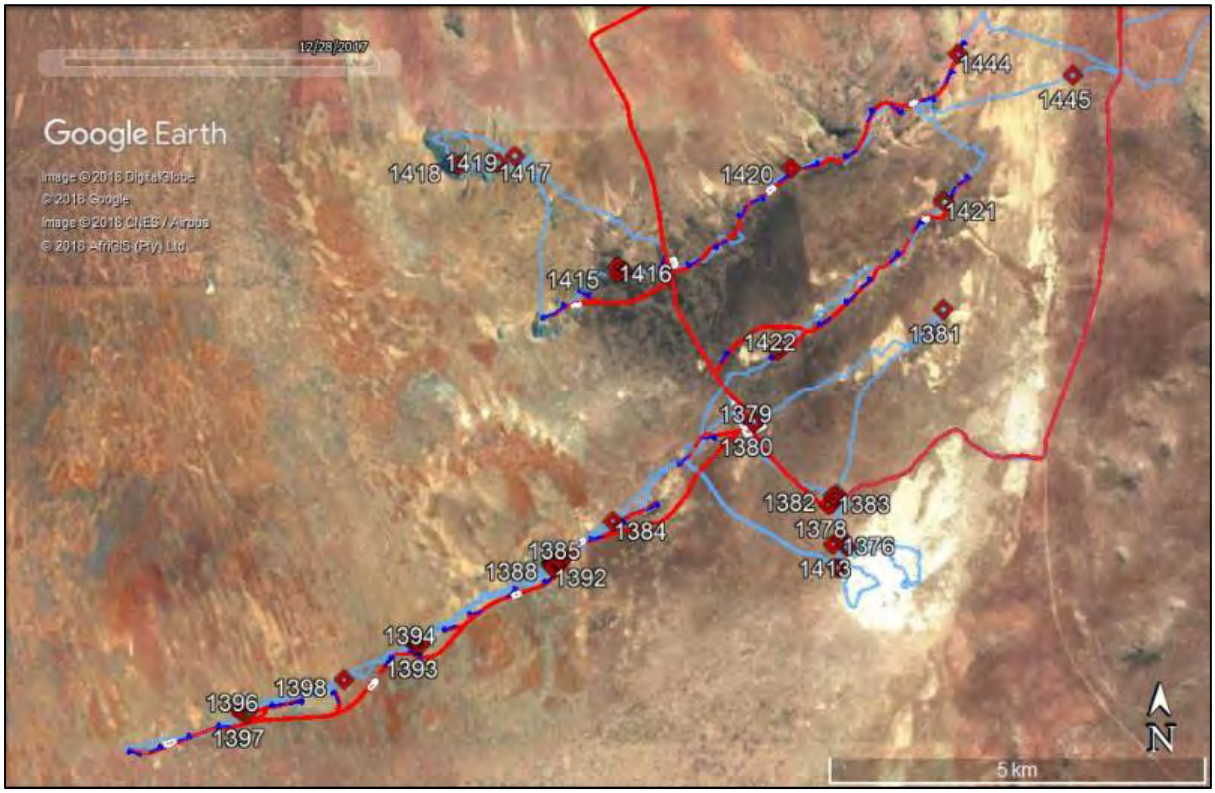


Figure 3.27: Map of the entire project area showing finds located during the site visit by the specialist (Orton, 2018). Enlargements of these areas are shown in Figures A2.2 to A2.15 in Appendix 2 of the Heritage Impact Assessment (Appendix L of this EIA report)

3.4 ENVIRONMENTAL SENSITIVITY MAP

Based on the sensitivities identified on site by the specialists in their specialist studies included in the EIA Report, an environmental sensitivity map has been compiled for the development footprint of the proposed Kap Vley WEF (Figure 3.28).

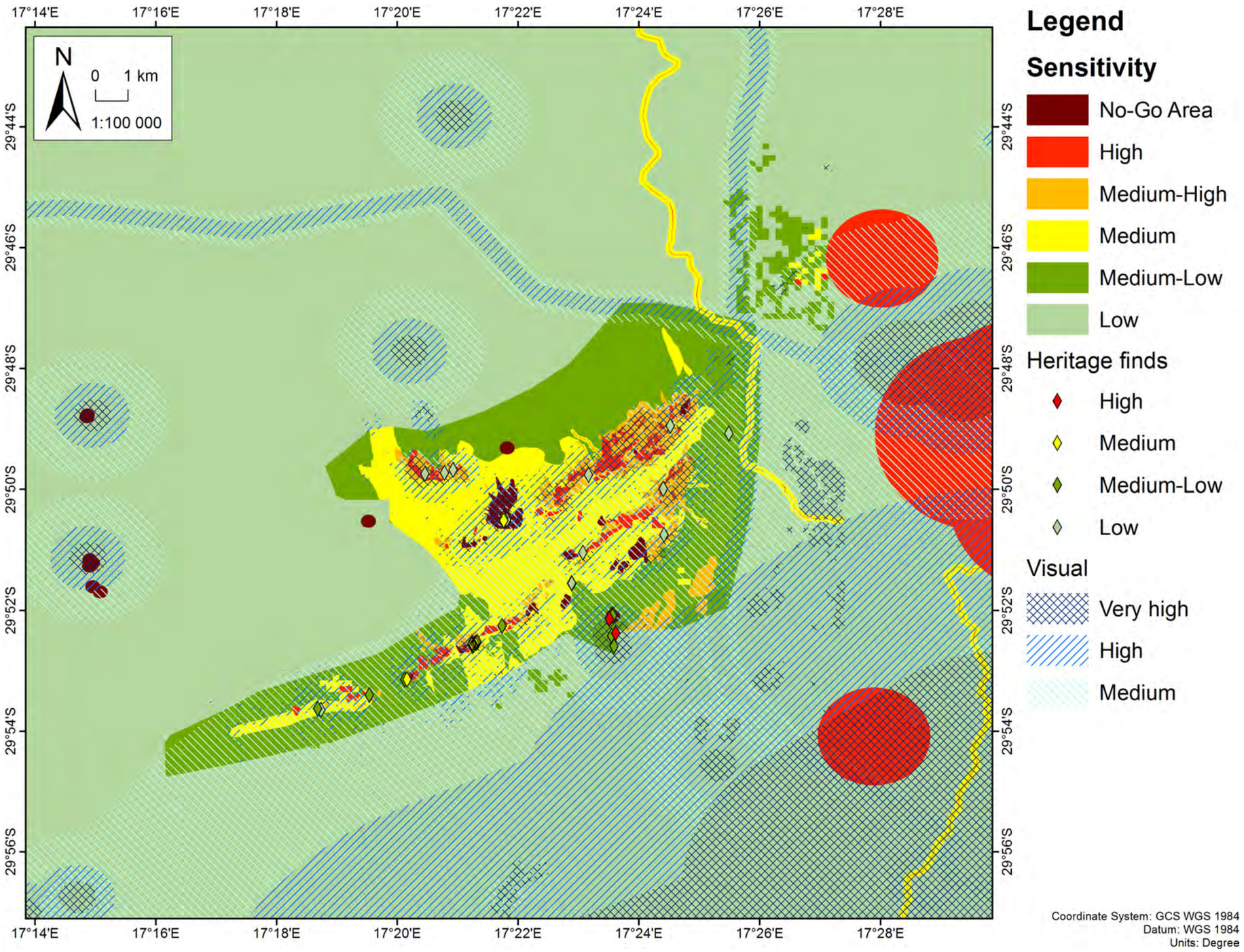


Figure 3.28: Environmental Sensitivity Map for the proposed Kap Vley WEF

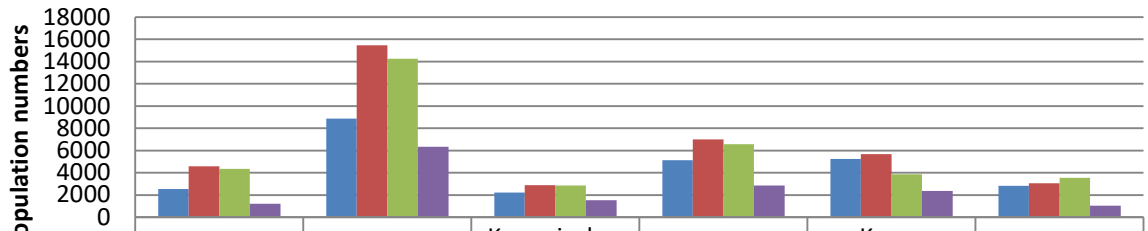
3.5 SOCIO-ECONOMIC ENVIRONMENT

Information taken from the Socio-Economic Impact Assessment (CSIR (Laurie), 2018) (Appendix N of this report).

It must be noted that documented data on the study area (i.e. Kleinzee and surrounds), particularly in terms of area specific socio-economic data is very limited. Accordingly, the available data is interpreted in terms of professional opinion and generally accepted trends within the study area and South Africa.

3.5.1 Demographic and Economic Profile

The Nama Khoi Local Municipality (LM) is part of the six local municipalities within the Namakwa District Municipality within the Northern Cape Province. This municipality is the least populated within the Province according to the Namakwa District Municipality's (DM's) IDP (2017-2022). Figure 3.29 shows the age group distribution of the population present within the Namakwa DM, shown via the representative of each Local Municipality. In addition, The Nama Khoi LM has the highest population group within the 15-54 and 54-64 age groups. The overall dominant age group within the DM is the 15-54 age groups, which, according to the Namakwa DM IDP, shows that within the DM there is need for job creation and new employment opportunities.



	Richtersveld	Nama Khoi	Kammiesberg	Hantam	Karoo Hoogland	Khai-Ma
0-14	2548	8864	2225	5125	5254	2834
15-54	4578	15457	2880	7006	5677	3049
54-64	4336	14252	2852	6560	3875	3557
65+	1225	6328	1540	2855	2362	1053

Figure 3.29: Population age by age groups for the LMs present within the Namakwa DM (Nama Khoi DM IDP, 2017)

Within the Namakwa District Municipality, several sectors contribute to the municipality's economy and the Gross Domestic Product (GDP). These sectors include agriculture, mining, electricity, construction and trade. From 2004 to 2014, most of these sectors have seen growth and the Nama Khoi LM remains the largest contributor to the economy in the District (Figure 3.30).

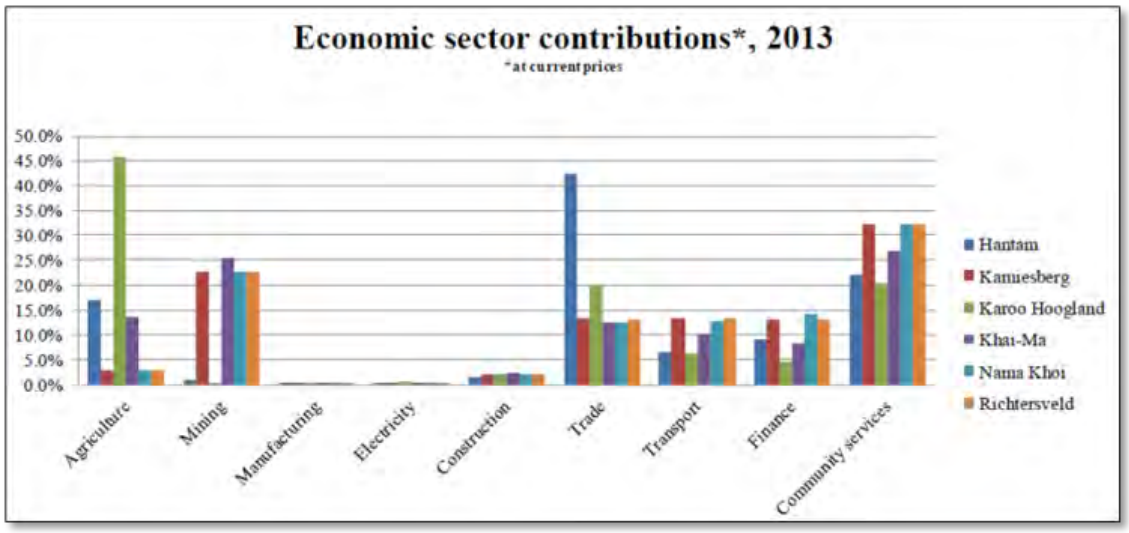


Figure 3.30: Sectors contributing to the LM's local economies in 2013

- ***Kleinzee***

According to a Mail and Guardian article in 2011, Kleinzee was established as a mining town in 1926. The town was supported by the mining company, De Beers, through the supply of free services such as water and electricity as well as 25 recreational clubs including a golf course, tennis courts and a swimming pool. At the peak of the mine, it was estimated that a million carats of diamonds were mined in the area per year. In the 1980's it was estimated that 3 000 people were employed in Kleinzee and the population was close to 6 000 people. In 2007, De Beers significantly scaled down their operations in the town and linked to this, residents lost their jobs and moved away. De Beers has subsequently sold their Namaqualand Mines to Transhex in 2011 and only a small amount of mining is still occurring in the area, approximately 100 000 carats a year. Rehabilitation efforts by Transhex are however still providing jobs to a limited number of residents. Within the town, most of the houses are empty and limited services are still available (Stilwell, 2011).

During the site visit in August 2017, a resident indicated that recently the pharmacy and the butchery closed down. The Cape Times noted in 2013 that only 10 children were enrolled at the town's preprimary school and 50 children in the primary school. Kleinzee does not have a high school or hospital (Dolley, 2012). According to the census data of 2011, Kleinzee had a total population of 728, with an average household size of 1,9 (StatsSA, 2013).

- ***Komaggas***

Komaggas is named after a tributary of the Buffelsrivier. Historically the area was established as a station of the London Missionary Society in 1829. According to the census data of 2011, Komaggas has a population size of 3116 with an average household size of 3,7 (StatsSA, 2013). According to the Nama Khoi SDF, because of the low population threshold and isolation of Komaggas, development strategies should be focused on developing human capital. For instance, it would not be feasible to develop schools and hospitals in Komaggas and as such mobile services such as clinics and libraries should be the main focus for investment. Learners should be transported to Springbok's schools.

Based on the demographic profiles of Kleinzee and Komaggas, the following comparisons can be made (as shown in the figures below). The majority of the residents in both towns are coloured (Figure 3.31). As shown in Figure 3.32 below, the majority of the people living in Kleinzee are in the age group between 45 - 49, and the second largest group of age 20 - 24. Compared to Kleinzee, the majority of the Komaggas population is aged between 0 – 29 years which shows a much younger population group. The lowest percentage of people in Komaggas is in the 35 – 39 age group (Figure 3.32). In terms of the highest education level reached by individuals within Kleinzee and Komaggas; the majority of the population in Kleinzee has completed secondary school, while the majority of residents in Komaggas has some secondary school grades completed (Figure 3.33) (Laurie, 2018).

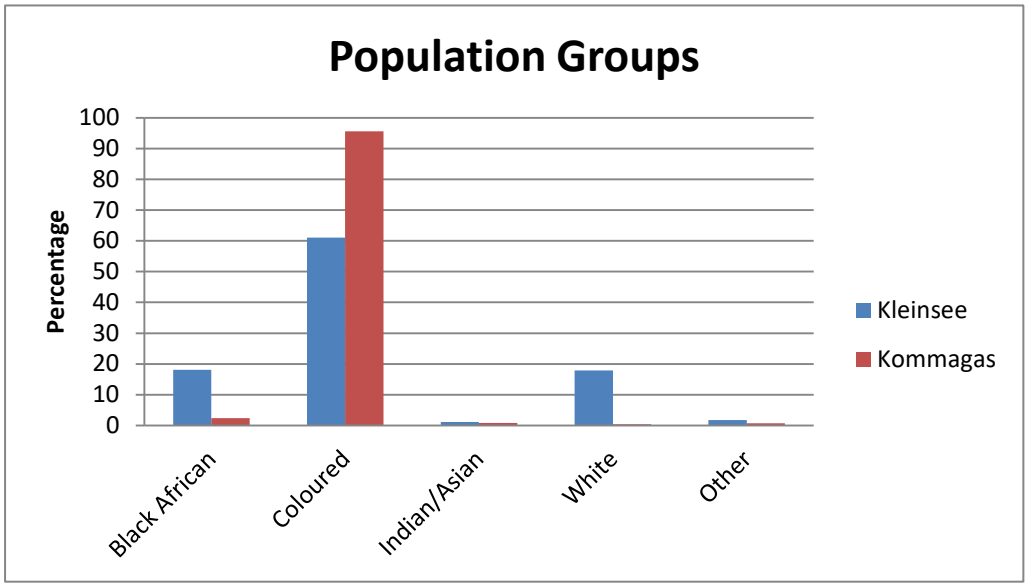
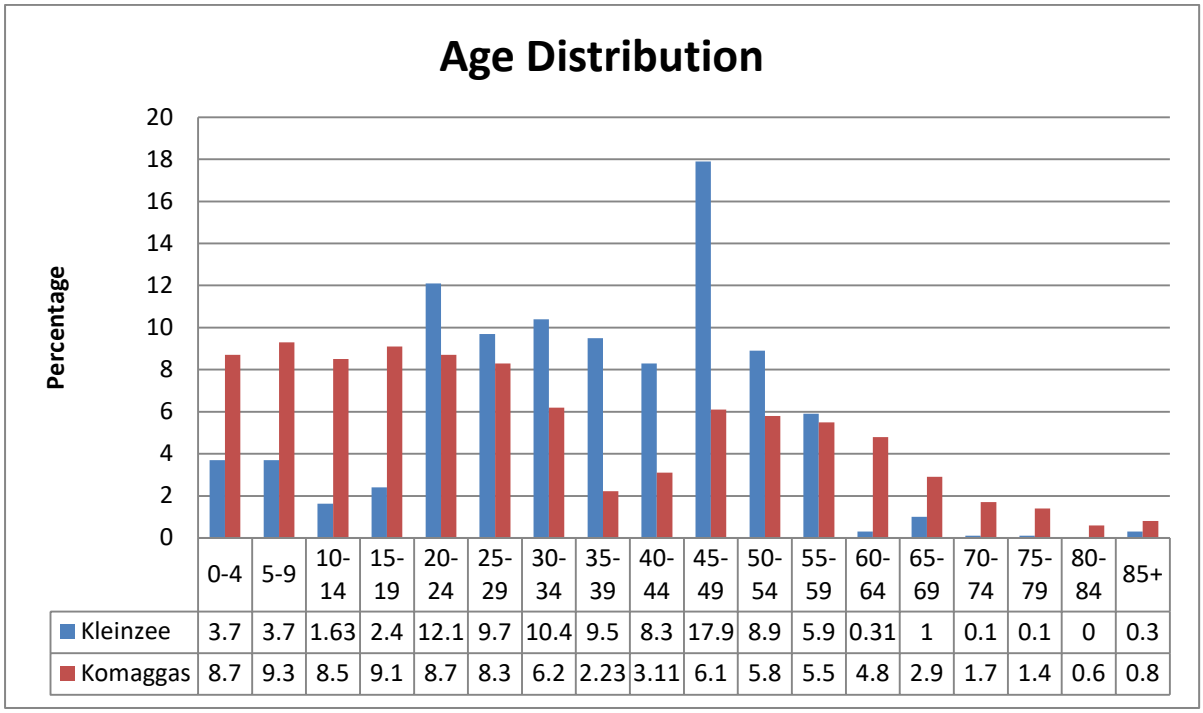


Figure 3.31: Population groups residing within Kleinzee and Komaggas (2011)) (StatsSA, 2013).



	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Kleinzee	3.7	3.7	1.63	2.4	12.1	9.7	10.4	9.5	8.3	17.9	8.9	5.9	0.31	1	0.1	0.1	0	0.3
Komaggas	8.7	9.3	8.5	9.1	8.7	8.3	6.2	2.23	3.11	6.1	5.8	5.5	4.8	2.9	1.7	1.4	0.6	0.8

Figure 3.32: Age distribution within Kleinzee and Komaggas (2011) (StatsSA, 2013).

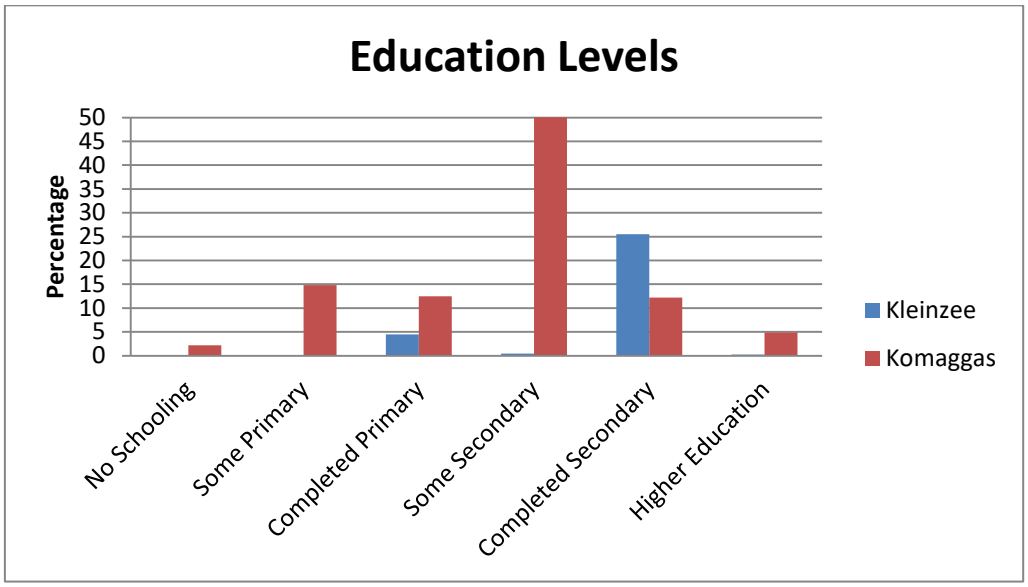


Figure 3.33: Highest education levels achieved by population in Kleinzee and Komaggas (2011) (StatsSA, 2013).

According to the Community Survey (2007) included in the Nama Khoi IDP in 2001, the unemployment rate in Kleinzee was 5% and 41% for Komaggas. The Labour Participation Rate, which refers to the measure of the economy's labour force who is either employed or actively looking for work, was 89% and 68% for Kleinzee and Komaggas, respectively (StatsSA, 2008).

Scoping and Environmental Impact Assessment for the proposed Kap Vley Wind Energy Facility near Kleinzee in the Northern Cape

UPDATED DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 4:

Approach to EIA Process and Public Participation

CONTENTS

TABLES

FIGURES

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 Updated Draft EIA 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 potentially forming part of this proposed development and therefore requiring EA were included in the Application Form for EA that was prepared and submitted to the DEA with the Draft Scoping Report. A letter of acknowledgement of the Draft Scoping Report dated 2 November 2017 was received from the DEA stipulating the DEA EIA Reference Number for the proposed project: 14/12/16/3/3/2/1046 (see Appendix E). The listed activities potentially triggered by the proposed project 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 Kap Vley Wind Energy Facility

Listed Activity Number	Listed Activity Description	Description of the project activity that potentially triggers the relevant listed activity
GN R327		
Activity 9	The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more	The proposed development will require drinking water and ablution facilities for staff during the operation of the proposed Kap Vley WEF. Water can be piped to site from the Orange River supply to Komaggas. This activity would therefore be triggered.
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: (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- a) 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 Dry and Ephemeral Watercourses Impact Assessment undertaken as part of the EIA, 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 Dry and Ephemeral Watercourses Impact Assessment Report, which is attached to this report as Appendix J.*
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;	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 Dry

Listed Activity Number	Listed Activity Description	Description of the project activity that potentially triggers the relevant listed activity
		and Ephemeral Watercourses Impact Assessment that was undertaken, draining lines (watercourses) occur on the project site. Construction of the internal gravel access road and/or the construction of infrastructure within drainage lines will require the removal of material. This activity would therefore be triggered *Additional information regarding the presence of watercourses on site is provided in the Dry and Ephemeral Watercourses Impact Assessment Report, which is attached to this report as Appendix J.*
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;	Existing roads (such as the R355, the Komaggas gravel road or mainly gravel roads from Garies via Hondeklipbaai and Koingaas) will be used to gain access to the preferred site. An internal gravel road up to 15m at some sections will be constructed to the proposed project site. The proposed project will take place outside of an urban area. This activity would therefore be triggered.
Activity 28 (ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The land is currently used for agricultural purposes (mainly grazing). The proposed Kap Vley WEF which is considered to be a commercial/industrial development, will have an estimated footprint of 128 ha. 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,	The proposed project will entail the construction of a WEF with a maximum of 45 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.
Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation,	The proposed Kap Vley WEF will have an estimated footprint of 128 ha. As a result, more than 20 ha of indigenous vegetation will be cleared for the construction of the proposed WEF. This activity would therefore be triggered.

Listed Activity Number	Listed Activity Description	Description of the project activity that potentially triggers the relevant listed activity
		Additional information regarding the presence of indigenous vegetation on site is provided in the Terrestrial Ecological Impact Assessment Report, which is attached as Appendix G.
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;	Existing roads (such as the R355, the Komaggas gravel road or mainly gravel roads from Garies via Hondeklipbaai and Koingaas) will be used to gain access to the preferred site. An internal gravel road of up to 15 m at some sections will be constructed on the proposed project site. The proposed project area falls within a CBA 1 and 2 and within a National Protected Area Expansion Strategy (NCPAES) focus area This activity would therefore be triggered. *Additional information regarding the location of the project site within a CBA 1 and 2 is provided in the Terrestrial Ecological Impact Assessment Report, which is attached as Appendix G.*
Activity 12	The clearance of an area of 300 square metres or more of indigenous vegetation. (g) In the Northern Cape (ii) Within critical biodiversity areas identified in bioregional plans;	The proposed facility's development footprint will result in in the clearance of more than 300 square meters of indigenous vegetation. The proposed project area falls within a CBA 1 and 2. This activity would therefore be triggered. *Additional information regarding the location of the project site within a CBA 1 and 2 is provided in the Terrestrial Ecological Impact Assessment Report, which is attached as Appendix G.*
Activity 14	The development of: (xi) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs- b) within a watercourse; c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; (g) In the Northern Cape (ii) Outside Urban Areas: (bb) National Protected Area Expansion Strategy Focus areas (ff) Critical biodiversity areas or ecosystem	The proposed WEF will entail the construction of building infrastructure and structures (such as wind turbines/hardstands, offices, workshop, ablution facilities, on-site substation, laydown area and security enclosures etc.) which will exceed a footprint of 10 square metres. Based on the Dry and Ephemeral Watercourses Impact Assessment that was undertaken, draining lines (watercourses) occur on site. Some of the buildings and infrastructure exceeding a footprint of 100 m^2 will occur within 32 m of a watercourse. The proposed project area falls within a CBA 1 and 2 and within the NCPAES Focus 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
	service areas as identified in in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	The proposed project will take place outside of an urban area. *Additional information regarding the location of the project site within a CBA 1 and 2 and a NCPAES is provided in the Terrestrial Ecological Impact Assessment Report, which is attached as Appendix G.*
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. (ii)Areas within a watercourse or wetland; or within 100 meters from the edge of a watercourse or wetland.	Existing roads (such as the R355, the Komaggas gravel road or mainly gravel roads from Garies via Hondeklipbaai and Koingaas) will be used to gain access to the preferred site. An internal gravel road wider than 15 m in some sections will be constructed to the proposed project site. The proposed project area falls within a CBA 1 and 2 and within the NCPAES Focus area. This activity would therefore be triggered. *Additional information regarding the location of the project site within a CBA 1 and 2 and a NCPAES is provided in the Terrestrial Ecological Impact Assessment Report, which is attached as Appendix G.*

Note regarding the identification of potential listed activities:

- *The relevant listed activities applicable to the construction of the proposed transmission lines and associated electrical infrastructure at the Gromis Substation were included in the **separate BA Report** and the Application for BA Process. The Applications for EA for the BA Process has been lodged with the DEA with the submission of the initial Draft EIA Report, 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 Draft EIA 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 the 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. Biodiversity offsets are a means of compensating for the loss of biodiversity after all measures to avoid, reduce or remedy biodiversity loss have been taken, but residual impacts still remain and these are predicted to be medium to high. The biodiversity offset study involves a biodiversity offset to be determined and implemented to compensate for the loss of sensitive vegetation on site. The draft study is included in Appendix F of this Scoping Report.

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 Ecological Impact Assessment that was undertaken for the project, none of the threatened ecosystems occur within the study area. However the site provides habitat to numerous SCC and falls within a CBA1 and 2.

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 were undertaken and are attached as Appendix L of this Updated Draft EIA Report of the proposed project. These relevant specialist studies will be released to I&AP's for review with the release of the Updated Draft EIA Report for comment.

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 was loaded onto the South African Heritage Resources Information System (SAHRIS) for comment. An application was created

and all necessary project information was uploaded to the SAHRIS. A SAHRIS Reference number, 11654, was issued for the proposed Kap Vley WEF.
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.

Two protected tree species have been observed at the site, *Aloe dichotoma* and *Acacia erioloba*. Although the numbers of affected individuals is low, a permit from DAFF would be required for any impacts to these species. Under the assessed layout, there are some individuals of *Acacia erioloba* present near the footprint which may be affected, but no individuals of *Aloe dichotoma* were observed within the footprint. The exact number of affected individuals that would need to be applied for would be clarified at the preconstruction phase following a preconstruction walk-through of the final approved development footprint.

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.

The predominant alien of concern at the site *Acacia cyclops*, which is listed as Category 1b. It will be managed in line with the EMPr. Rehabilitation after disturbance to agricultural land is also managed by CARA.. No application is required in terms of CARA (Lanz, 2018). The DAFF reviews and approves applications in terms of these Acts.

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 relevant WULAs will be applied for by juwi.

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 NEMA: Notice of Renewable Energy Development Zones (REDZs) published in Government Gazette No. 41445 on 16 February 2018

"The Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa", 2015 has identified eight REDZs that are of strategic importance for large scale wind and solar photovoltaic energy development, including the rollout of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy.

On 16 February 2016, Cabinet approved, amongst others, the REDZs contained in this Notice, which are of strategic importance for large scale wind and/or solar photovoltaic energy development and an integrated decision -making process for applications for environmental authorisation in terms of NEMA. Applications for environmental authorisation for large scale wind or solar photovoltaic energy facilities, when such facilities trigger activity 1 of Environmental Impact Assessment Regulations Listing Notice 2 of 2014 and any other listed and specified activities necessary for the realisation of such facilities, and where the entire proposed facility is to occur in such REDZs, must follow the basic assessment procedure contemplated in Regulation 19 and 20 of the Environmental Impact Assessment Regulations, 2014, in order to obtain environmental authorisation, as required in terms of the Act. The timeframe for decision- making as contained in the Environmental Impact Assessment Regulations, 2014 for purposes of the applications for environmental authorisation contemplated in this Notice is 57 days"

The proposed Kap Vley project site is located within REDZ 8, which supports the development of large scale wind and solar energy developments. The proposed project is therefore in line with the national planning vision for wind development in South Africa.

4.2.1.11 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);
- 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 (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 follows:

- 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. Based on the fieldwork that has been conducted by Mr Simon Todd (the Ecologist on the project team) at the Kap Vley project area there are a number of endemic and plant SCC present on site. These species are *Aspalathus albens, Metalasia adunca, Muraltia obovate, Agathosma elata, Argyrolobium velutinum, Caesia sabulos, Lampranthus procumbens, Phyllobolus tenuiflorus and Leucospermum praemorsum.* 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 these 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 Updated Draft EIA 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 plant on the coast and if desirable, promote development thereof. 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 Kap Vley WEF is located approximately 11 km from the coast. 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 Nama Khoi SDF (Nama Khoi Municipality 2014)

Spatial Objective 3 of the Nama Khoi Municipality SDF is to develop sustainable and diverse local economies by the utilisation of opportunities in the different spatial categories. The industrial areas category recognises the potentially high wind energy generation zones identified to the south of Vioolsdrift, and around Springbok and Koiingnaas. In addition, the Komaggas Node state that the industries must explore and promote wind energy projects. The proposed development of the Kap Vley WEF aligns with the municipality's spatial objectives and promotes wind energy development within the municipality.

4.2.3.2 Nama Khoi IDP (Nama Khoi Local Municipality 2012)

The Nama Khoi Municipality Integrated Development Plan (IDP) (2012-2017) states that an opportunity exists to utilise wind energy more widely and lessen the dependence on wood and gas as energy sources for cooking in households. Renewable energy is recently one of the cornerstones of the economy of the District and there needs to be engagement on national level to ensure that the District benefit from this resource. This opportunity has been identified because of the increasing number of households especially in rural areas that have led to backlogs in electricity provisioning. Even though this wind energy facility will not provide the municipality directly with electricity, the energy produced by the facility will feed into the national grid. The IDP has also identified embarking on renewable energy and upgrading electricity supply to water pump stations and incorporation of Eskom electricity network to address the electricity needs in the Komaggas area.

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);
  - Draft National Offset Guidelines (2017);
  - Guideline on Need and Desirability (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)
- Best-Practice Guidelines for assessing and monitoring the impact of wind-energy facilities on birds in southern Africa. Third Edition (previous versions 2011 and 2012). BirdLife South Africa and Endangered Wildlife Trust, Johannesburg, South Africa.
- 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; Third Edition (previous versions 2011 and 2012). BirdLife South Africa and Endangered Wildlife Trust); and
- 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 Kap Vley 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.
- *Category C* - Projects expected to have minimal or no adverse impacts, including certain financial intermediary projects.

Accordingly, projects such as the proposed Kap Vley 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 proposed Kap Vley WEF project.

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

4.3 PRINCIPLES FOR 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 Competent Authority (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.

In terms of Guideline 4 on Public Participation mentioned above, an effective PPP enables the following:

- "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; and
- 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, public participation aims to generate issues that are representative of societal sectors, not each individual. Hence, the PPP will be designed to be inclusive of a broad range of sectors relevant to the proposed project.

- The PPP will aim to raise a diversity of perspectives and will not be designed to force consensus amongst I&APs. Indeed, diversity of opinion rather than consensus building is likely to enrich ultimate decision-making. Therefore, where possible, the PPP will aim to obtain an indication of trade-offs that all stakeholders (i.e. I&APs, technical specialists, the authorities and the development proponent) are willing to accept with regard to the ecological sustainability, social equity and economic growth associated with the project.

4.4 PUBLIC PARTICIPATION PROCESS

The key steps in the PPP for the EIA Phase are described below. This approach has been confirmed with the DEA through their review and acceptance of the Plan of Study for EIA as part of their letter of Acceptance of the Final Scoping Report (as shown in Appendix E5 of this EIA Report). The PPP for the Scoping Process is described in Chapter 4 of the Final Scoping Report (CSIR, 2017).

A separate BA is being undertaken for the associated powerline and electrical infrastructure for the proposed Kap Vley WEF. A separate Draft BA and Draft Scoping and Draft EIA Report have therefore been compiled and have been made available for I&AP and authority review for a 30-day review period. All advertisements, notification letters and emails etc. served to notify the public and organs of state of the joint availability of the BA and Draft EIA report for comment.

The correspondence sent to I&APs during the Scoping Phase (including the submission of the finalised Scoping Report to the DEA for decision-making) is included in Appendix D3 of this EIA Report. Appendix D4 contains all the comments and correspondence received from I&APs during the Scoping Phase (i.e. during the Project Initiation Phase and 30-day review of the Scoping Report). The Final Scoping Report was accepted by DEA and a letter to this effect is included in Appendix E5 of this report. The correspondence sent to I&APs with the release of the Draft EIA Report is included in Appendix D3 of this Updated Draft EIA Report. The comments received from I&APs during the review of the Draft EIA Report are included in Appendix D4.

Task 1: I&AP Review of the Draft EIA Report and EMPr

The Draft EIA Report was released for a 30-day I&AP and stakeholder review period which extended to 17 may 2018. Relevant organs of state and I&APs were informed of the review process in the following manner:

- Placement of one advertisement in the “Plattelander” local newspaper dated 13 April 2018 to notify potential I&APs of the availability of the Draft EIA Report for comment (see Appendix D2);
- A letter has been sent via registered mail and/or email to registered I&APs and organs of state (where postal, physical and email addresses are available) on the database. The letter included notification of the 30-day comment period for the Draft EIA Report.
- The Draft EIA Report was 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 and CD copies have been placed at the Kleinzee Police Station for I&APs to access for viewing;
- Key authorities have been provided with either a hard copy and/or CD of the Draft EIA Report;
- The Draft EIA Report was uploaded to the project website: (i.e.https://www.csir.co.za/environmental-impact-assessment); and
- Telephonic consultations were held with key I&AP and organs of state groups, as necessary.

Task 2: I&AP Review of the Updated Draft EIA Report and EMPr (current stage)

The Draft EIA Report was updated following comments received from DENC and SANParks. This report comprises the Updated Draft EIA Report which is currently being released for a 30-day commenting period. Relevant organs of state and I&APs has been informed of the review process in the following manner:

- A letter will be send via courier or registered mail and/or email to 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 Updated Draft EIA Report.
- The Updated Draft EIA Report 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 and CD copies will be placed at the Kleinzee Police Station and/or Kleinzee Public Library for I&APs to access for viewing;
- Key authorities will be provided with either a hard copy and/or CD of the Updated Draft EIA Report;
- The Updated Draft EIA Report will be uploaded to the project website: (i.e.https://www.csir.co.za/environmental-impact-assessment); and
- Telephonic consultations were held with key I&AP and organs of state groups, as necessary.

Task 3: Comments and Responses Trail

A key component of the EIA Process is documenting and responding to the comments received from I&AP's and the authorities. The following comments on the EIA Report were documented:

- Written and emailed comments (e.g. letters and completed comment and registration forms);
- 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 Draft EIA Report were compiled into a Comments and Responses Trail and are included in Appendix F of this Updated Draft EIA Report. The Updated Draft EIA Report will be released again for public comment. Comments from I&APs on the Updated Draft EIA Report will be included in the updated Issues and Responses Trail that will be included in the Final EIA Report that will be submitted to the DEA in terms of Regulation 23 (1) (a) for decision-making. The Comments and Responses Trail indicates the nature of the comment, as well as when and who raised the comment. The comments received to date have been considered by the EIA team and appropriate responses provided by the relevant member of the team and/or specialist. The response provided indicates how the comment received has been considered in the EIA Report for submission to the DEA and in the project design or EMPrs.

Task 4: Compilation of the EIA Report for submission to the DEA

Following the 30-day commenting period of the Draft EIA Report and incorporation of the comments received into the report, 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 5: 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 CA has reached a decision, it must inform the Applicant of the decision, in writing, within five 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 "Plattelander" local newspaper to notify I&APs of the EA and associated appeal process (to be confirmed with DEA);
- 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.

4.5 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 CA (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 as CA (including the Biodiversity and Conservation Chief Directorate (which includes the Protected Area Systems Management Directorate)
- 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;
- SAHRA;
- Ngwao Boswa Kapa Bokoni (Heritage Northern Cape);
- South African Civilian Aviation Authority;
- South African National Road Agency Limited;
- Square Kilometre Array (SKA) Office;
- South African Astronomical Observatory (SAEON)
- Namakhoi Local Municipality; and the
- Namakwa District Municipality.

The authority consultation process for the EIA Phase is outlined in Table 4.2 below.

Table 4.2: Authority Communication Schedule

STAGE IN EIA PHASE	FORM OF CONSULTATION
During the EIA Process	A site visit was held with representatives from DEA, DENC, WWF, Simon Todd Consulting, juwi, and CSIR on 17 April 2018 following the release of the Draft EIA Report.
During preparation of EIA Report	Communication with the DEA on the outcome of Specialist Studies, if required. A meeting was held with representatives from DENC, DEA (Biodiversity section), WWF, Simon Todd Consulting, juwi and CSIR at the SANParks offices in Kimberley on 12 June 2018. The agenda and meeting notes are included in Appendix E10 and E11 respectively. The meeting was held prior to the release of this Draft EIA Report for comment. Meetings may also be held with authorities and key stakeholders following the release of the Updated Draft EIA Report for comment.
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.

4.6 APPROACH TO THE 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.

4.6.1 Generic Terms of Reference 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 projects is well understood so that the impacts associated with the projects 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.

The impact assessment methodology has been aligned with the requirements for EIA Report as stipulated in Appendix 3 (3) (j) of the 2014 EIA Regulations, as amended, which state the following:

- An EIA Report must contain the information that is necessary for the CA to consider and come to a decision on the application, and must include an assessment of each identified potentially significant impact and risk, including -
    - (i) cumulative impacts;
    - (ii) the nature, significance and consequences of the impact and risk;
    - (iii) the extent and duration of the impact and risk;
    - (iv) the probability of the impact and risk occurring;
    - (v) the degree to which the impact and risk can be reversed;
    - (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and
    - (vii) the degree to which the impact and risk can be mitigated.

As per the 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 were 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 Kap Vley WEF) that have been approved (i.e. positive EA has been issued) or is currently underway. The proposed and existing relevant projects that were considered as part of the cumulative impacts in the EIA Phase are provided in Chapter 6 of this Updated Draft EIA Report.

In addition to the above, the impact assessment methodology includes the following aspects:

- **Spatial extent** – The size of the area that will be affected by the impact/risk:
    - Site specific;
    - Local (<10 km from site);
    - Regional (<100 km of site);

- National; or
- International (e.g. Greenhouse Gas emissions or migrant birds).

- **Consequence** – The anticipated consequence of the risk/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).

- **Duration** – The timeframe during which the impact/risk will be experienced:
  - Very short term (instantaneous);
  - Short term (less than 1 year);
  - Medium term (1 to 10 years);
  - Long term (the impact will cease after the operational life of the activity (i.e. the impact or risk will occur for the project duration)); or
  - Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient (i.e. the impact will occur beyond the project decommissioning)).
- **Reversibility of the Impacts** - the extent to which the impacts/risks are reversible assuming that the project has reached the end of its life cycle (decommissioning phase) will be:
  - Yes: High reversibility of impacts (impact is highly reversible at end of project life);
  - Partially: Moderate reversibility of impacts; or
  - No: Impacts are non-reversible (impact is permanent).

- **Irreplaceability of Receiving Environment/Resource Loss caused by impacts/risks** – the degree to which the impact causes irreplaceable loss of resources assuming that the project has reached the end of its life cycle (decommissioning phase) will be:
  - High irreplaceability of resources (project will destroy unique resources that cannot be replaced);
  - Moderate irreplaceability of resources;
  - Low irreplaceability of resources; or
  - Resources are replaceable (the affected resource is easy to replace/rehabilitate).

Using the criteria above, the impacts will further be assessed in terms of the following:

- **Probability** – The probability of the impact/risk occurring:
  - Very likely;
  - Likely;
  - Unlikely;
  - Very unlikely; and
  - Extremely unlikely.

To determine the significance of the identified impact/risk, the consequence is multiplied by probability (as shown in Figure 4.1). This approach incorporates internationally recognised methods from the IPCC (2014) assessment of the effects of climate change and is based on an interpretation of existing

information in relation to the proposed activity. The significance is then rated qualitatively as follows against a predefined set of criteria (i.e. probability and consequence) as indicated in Figure 4.1:

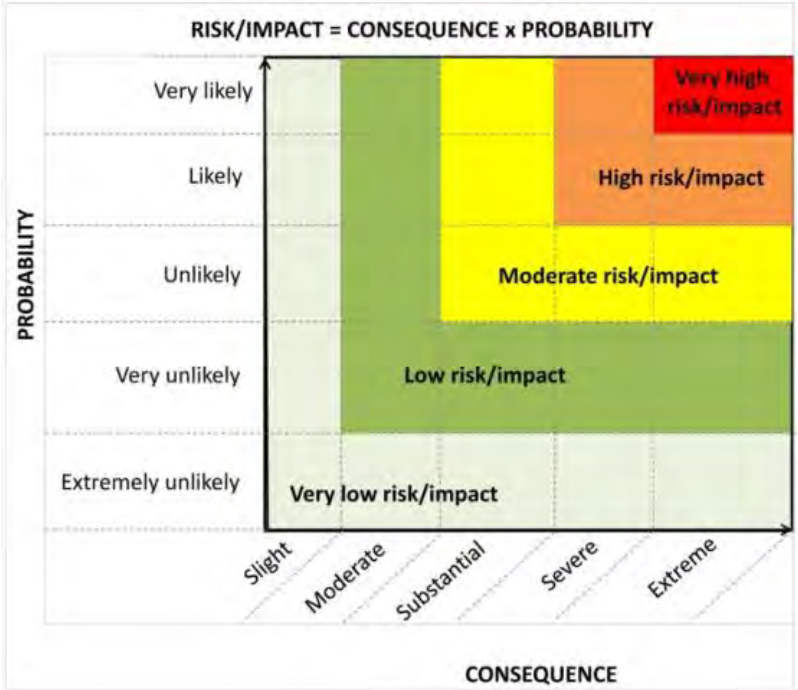


Figure 4.1: Guide to assessing risk/impact significance as a result of consequence and probability.

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

With the implementation of mitigation measures, the residual impacts/risks will be ranked as follows in terms of significance (based on Figure 4.1):

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

- Very high = 1.

- **Status** - Whether the impact/risk on the overall environment will be:
  - Positive - environment overall will benefit from the impact/risk;
  - Negative - environment overall will be adversely affected by the impact/risk; or
  - Neutral - environment overall not be affected.

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

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

Table 4.3: Example of Table for Assessment of 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
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)

4.6.1.1 Terms of Reference for Cumulative Impact Assessment

The known relevant projects within a 50 km radius of the proposed Kap Vley WEF are presented in Chapter 6.

The cumulative impact assessment for each field of study have been detailed in the **sub-sections and relevant impact tables in Chapter 6.** The cumulative impacts have been assessed 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 Kap Vley WEF) that have been approved (i.e. positive EA has been issued) or the EIA is currently underway.

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

- Clearance of vegetation;
- Impact on fauna and flora (especially on SCC);
- Habitat loss and fragmentation;
- Habitat loss for flora and displacement;
- Loss of bird habitat and displacement of bird species;
- Bird collisions and mortalities;
- Loss of bat habitat;
- Bat mortalities due to collisions and barotrauma;
- Impact on watercourses;
- Impact on visual character of the area;
- Impact on heritage (including archaeology, palaeontology and cultural sense of place);
- Loss of agricultural land;
- Increase in stormwater run-off and erosion;
- Increase in water requirements;
- Job creation;
- Social upliftment;
- Social decline;
- Increase in noise generation;
- Traffic generation;
- Upgrade of infrastructure and contribution of renewable energy into the National Grid.

4.7 TERMS OF REFERENCE FOR THE SPECIALIST STUDIES

The Terms of Reference (ToR) for the specialist studies essentially consists of the generic assessment requirements and the specific issues identified for each discipline. The Specialists Reports can be seen attached as Appendices G to P to this Updated Draft EIA 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 ToRs for each specialist study is discussed in detail below. The specialist studies and associated specialists are shown in Table 4.4 below.

Table 4.4: Specialist Studies and Associated Specialists for the proposed Kap Vley WEF

ROLE/STUDY TO BE UNDERTAKEN	ORGANISATION	NAME
Ecology: Terrestrial Fauna and Flora Biodiversity Offset study	Simon Todd Consulting	Simon Todd
Ecology: Dry and Ephemeral Watercourses Impact Assessment	CSIR External Reviewer: Freshwater Consulting	Luanita Snyman-van der Walt External Reviewer: Dr Liz Day
Bird Impact Assessment	ARCUS	Andrew Pearson and Anja Albertyn
Bat Impact Assessment	ARCUS	Jonathan Aronson
Visual Impact Assessment	BOLA and MLB Architects	Bernard Oberholzer and Quinton Lawson
Heritage Impact Assessment (Archaeology, and Cultural Landscape)	ASHA Consulting (Pty) Ltd	Dr. Jayson Orton Jayson
Desktop Palaeontological Impact Assessment	Private, sub-contracted by ASHA Consulting (Pty) Ltd	John Pether
Soils and Agricultural Potential Assessment	Private	Johann Lanz
Socio-Economic Impact Assessment	CSIR External Reviewer: Urban-Econ Development Economists	Surina: Laurie External Reviewer: Elena Broughton
Noise Impact Assessment	Enviro-Acoustic Research cc	Morné de Jager
Transportation Impact Assessment	WSP	Christo Bredenhann

Additional studies:

In addition to the specialist studies mentioned above, two other studies were conducted to inform the EIA process:

Ecological Offset study

The Kap Vley WEF site is located in a CBA1 and CBA2. As indicated in Chapter 3, an Ecological offset study is required which confirms the regional sensitivity of the Kapvlei site and quantifies the required offset and proposes an offset mechanism. The primary characteristic of the site which leads to its' high conservation value and hence CBA and NCPAES status is the presence of Sand Fynbos at the site with a high abundance of plant Species of Conservation Concern (SCC), as well as the unique broader context of Sandberg. A biodiversity offset is required and juwi is investigating the potential to contribute to the WWF land acquisition programme in the area to expand the Namaqua National Park as an offset. An Ecological Offset study was prepared by Simon Todd Consulting and is included in Appendix Q of this Updated Draft EIA Report. Meetings have been held with WWF, SANParks and the DENC to discuss offset requirements. In principle support letters were obtained from WWF and SANParks for the process of determining an offset whereby land will be acquired from WWF to expand the Namaqua National Park (letters included in Appendix Q2).

Wake Effect Analysis

A Wake Effect Analysis was undertaken by juwi as requested by DEA to assess the potential impact on performance of the Eskom WEF due to wake losses from the proposed Kap Vley WEF (see DEA letter dated 29/11/2017 included in Appendix E). The proposed development is located approximately 15 km

from the Eskom Kleinzee WEF which has already received EA. This potential impact was assessed and included as Appendix R in the Updated Draft EIA Report.

ToRs for the specialist studies:

The specialists were provided with a generic ToR as well as a specific ToR to their specialist study

Generic ToR for all 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. Please note that the DEA considers a 'no-go' area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure including access roads and internal cables is allowed in the 'no-go' areas. Should your definition of the 'no-go' area differ from the DEA definition; this must be clearly indicated in your assessment. You are also requested to indicate the 'no-go' area's buffer.
- 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 Kap Vley WEF project) that have been approved (i.e. positive EA has been issued) or the EIA is currently underway. In addition, the cumulative impact assessment for all identified and assessed impacts must be refined to indicate the following:

    - Identified cumulative impacts must be clearly defined, and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land.
    - The cumulative impacts significance rating must also inform the need and desirability of the proposed development.
    - A cumulative impact environmental statement on whether the proposed development must proceed.

- Provide a detailed description of your methodology, as well as indicate the locations and descriptions of turbine positions, and all other associated infrastructures that you have assessed and are recommending for authorisations.
- Provide a detailed description of all limitations to your studies. Your specialist studies must be conducted in the appropriate season and providing that as a limitation, will not be accepted by DEA.

Specific ToR for each specialist study:

In addition to the above-generic ToR that was provided to each specialist, the specific ToR for each specialist study was also provided (as indicated below).

4.7.1 Ecological Impact Assessment: Fauna and Flora

Chapter 6 of this Updated Draft EIA Report highlights the impacts that were addressed in the 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 fauna and flora). The findings of the Ecological Impact Assessment will be used to inform the project layout by avoiding no-go areas.

The Ecological Impact Assessment will also be informed by the Ecological Offset Study undertaken to compensate for the loss of biodiversity of high conservation importance on site. This study must include the total loss of biodiversity versus the net gain, where the loss will occur and where it will be replaced. This information will enable DEA to make an informed decision.

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 4.6 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 6.1 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.

4.7.2 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 4.6 of this Chapter;
- Provide an assessment of the different possible ranges, e.g: hub height: 80-150 m; rotor diameter: 100-160 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 6.1 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 juwi). 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.

4.7.3 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 4.6 of this Chapter;
- Provide an assessment of the different possible ranges, e.g: hub height: 80-150 m; rotor diameter: 100-160 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 6.1 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 juiw). 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.

4.7.4 Dry and Ephemeral Watercourses Impact Assessment

Please note that the Dry and Ephemeral Watercourses Impact Assessment was initially referred to as the Aquatic Impact Assessment. The "Dry and Ephemeral Watercourses" study included in this EIA Report fulfills the requirements and Terms of References set out in the Plan of Study for the Aquatic Ecology Impact Assessment. As the study progressed and upon site investigation it became clear that "Aquatic Ecology" was not the appropriate terminology to describe the on site-conditions, which were verified to be characterised by dry and ephemeral watercourses (including drainage lines) that play an important role within this particular arid landscape, but is not strictly aquatic.

The ToR for the Dry and Ephemeral Watercourses 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 4.6 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 4.6 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 6.1 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.

4.7.5 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 4.6 of this Chapter;
- Assess a max tip height of 230 m 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 6.1 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.

4.7.6 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 4.6 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 6.1 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 palaeontology 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.

4.7.7 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 4.6 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 6.1 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.

4.7.8 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 4.6 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 6.1 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.

4.7.9 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;
- 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 4.6 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 6.1 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.

4.7.10 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 & operational phases);
- Capacity analysis (construction & 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: N7, N14 and R355;
- 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 4.6 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 6.1 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.

4.7.11 Ecological Offset Study

In their letter of Acceptance of the Final Scoping Report, dated 12 February 2017, DEA requests that

- all necessary information which will include *inter alia* the total loss of biodiversity versus the net gain; and
- where the loss will occur and where it will be replaced, be provided in the Ecological Offset study in order to make an informed decision on the application.

The Ecological Offset study must adhere to the requirements of the Updated Draft Biodiversity Offset Guidelines (Brownlie, 2017).

4.7.12 Analysis of Potential Wake Loss Effect on Eskom WEF

The following ToR applies to this study:

- Assess the potential wake impact of the Kap Vley WEF on the Eskom WEF based on turbine placement information available in the Eskom WEF EIA report;
- If found that impacts are possible, these impacts need must be quantified and rated; and
- If possible and necessary mitigation measures to be proposed.

4.7.13 External Reviews of Aquatic and Socio-Economic Impact Assessment

Two specialist studies are conducted in-house by the CSIR. i.e. the "Dry and Ephemeral watercourses Impact Assessment" and the "Socio-Economic Impact Assessments". These studies were reviewed by two suitably qualified external specialists, i.e. Dr Liz Day of Freshwater Consulting and Ms Elena Broughton of Urban-Econ Development Economists, respectively.

ToR: The peer reviews must include the following:

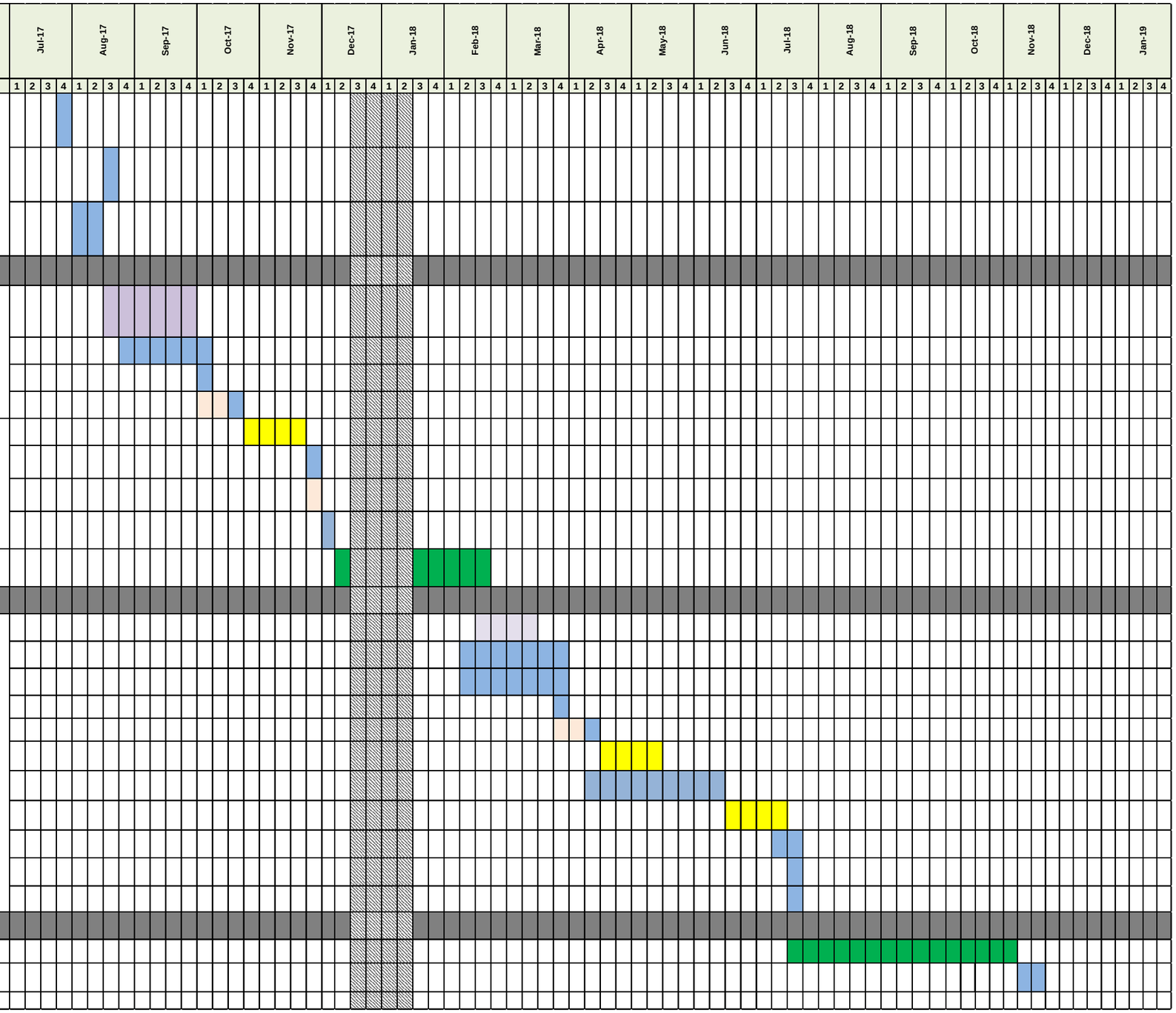
- A CV clearly showing expertise of the peer reviewer;
- Acceptability of the terms of reference;
- Is the methodology clearly explained and acceptable;
- Evaluate the validity of the findings (review data evidence);
- Discuss the suitability of the mitigation measures and recommendations;
- Identify any short comings and mitigation measures to address the short comings;
- Evaluate the appropriateness of the reference literature;
- Indicate whether a site-inspection was carried out as part of the peer review; and
- Indicate whether the article is well-written and easy to understand.

4.8 SCHEDULE FOR THE EIA

The proposed schedule for the EIA, based on the legislated EIA Process, is presented in Table 4.5. 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 4.5: Schedule for the Proposed juwi Kap Vley Wind Energy Facility (including the Scoping and EIA Project and the BA Project)

Phase	Task	Days
Inception Phase	Officially commence with project juwi & CSIR kick-off meeting)	21
	Pre-application meeting with the Department of Environmental Affairs	
	Procure and appoint specialists	
End of Inception Phase		
Scoping Phase	Specialists to provide description of receiving environment and Terms of Reference for inclusion in the Scoping Report	60
	Prepare Scoping Report and Plan of Study for EIA (PSEIA)	
	Prepare EA application form	
	juwi Review, finalisation and printing	
	Scoping Report public review period	44
	Collate comments received, integrate into Scoping Report and juwi Review	
	Finalisation and printing	
	Submission of Scoping Report and PSEIA to Competent Authority	
	Competent Authority to Accept Scoping Reports or Refuse EA	43
End of Scoping Phase		
EIA Phase	Specialist to provide EIR input based on comments received	106
	Compile EIR and EMPr.	
	Compile BA and EMPr	
	Prepare EA application form (BA)	
	juwi Review, finalisation and printing	
	EIR and BA Report public review period.	
	Prepare Updated Draft EIA Report	
	Updated Draft EIA Report for Public review	
	Collate comments received and integrate into EIR and BA report.	
	juwi Reviews, finalisation and printing	
	Submission of final EIR and BA Report to Competent Authority	
End of EIA Phase		
Decision Phase	Competent Authority to Grant or Refuse EA	107
	Competent Authority to provide written feedback and Notify I&APs of the EA decision	14
	Total days in Process	**330**



***+50days for exceptional circumstances*

	Public Participation Process
	CSIR (EAP) timeframes
	DEA (Competent Authority) timeframes
	Specialist studies
	Compulsory PPP exclusion period
	juwi review timeframe

Scoping and Environmental Impact Assessment for the proposed Kap Vley Wind Energy Facility near Kleinzee in the Northern Cape

UPDATED DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 5: Project Alternatives

CONTENTS

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; or
e) operational aspects of the activity; and
f) includes the option of not implementing the activity".

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

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.

For additional information regarding the alternatives that were considered during the Scoping Phase, refer to the finalised Scoping Report (CSIR, 2017).

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 (CA), 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 Kap Vley WEF. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area and no enlargement of the Namaqualand National Park through the proposed ecological offset. 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, especially to the Kommagas local community as a landowner and SED beneficiary;
- The Namaqua National Park will not be enlarged through the proposed environmental offset associated with the development;
- No additional power will be generated or supplied through means of renewable energy resources by this project at this location. The proposed 300 MW facility (maximum generation capacity) is predicted to generate approximately 400 GWh per year which could power approximately 40 000 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. The local municipality's vulnerability to economic downturns will increase because of limited access to capital and the downscaling of mining in the area ;
- There will be no opportunity for additional employment in an area, where job creation is identified as a key priority. Approximately 323 employment opportunities will be created during the construction period and approximately 35 permanent employment opportunities 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:

- Agricultural land use will remain;
- No vegetation will be removed or disturbed during the development of the proposed Kap Vley WEF. No impact on the CBA 1 and 2 and NPAES;
- No biodiversity (fauna and flora) will be removed or disturbed during the development of these facilities (there will also not be a need to implement a biodiversity offset as no sensitive vegetation will be lost on site);
- No impact on plant of Species of Conservation Concern (SCC);
- No aquatic resources will be impacted upon during the construction of the WEF;
- 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 bats with wind turbines or mortality to bats caused by barotrauma;

- 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 visual impact associated with the construction phase or the presence and rotation of wind turbines during the operational phase of the proposed project;
- No noise impacts either during the construction phase or during the operational phase when wind turbines are rotating;
- No additional traffic generation during the construction of the proposed Kap Vley WEF; and
- No additional water use during the construction phase.

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, or a reasonable and feasible alternative to be considered in this EIA process**.

5.1.2 Land-use Alternatives

All farm portions forming part of the project are zoned for agricultural land-use, and are mainly used for either commercial livestock grazing, communal use or subsistence farming. As noted in Chapter 3 of this Draft EIA Report, agricultural potential is uniformly low across the affected farms and the choice of placement of the proposed Kap Vley WEF on the farms therefore has no agricultural impacts of significance. The flatter plains have a land capability classification, on the 8 category scale, of Class 7 - non-arable, low potential grazing land. The ridges are 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 on AGIS is classified as low with > 31 hectares per large stock unit. **Hence, agricultural land use is not a preferred,or a reasonable and feasible alternative to be considered in this EIA process**. 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

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 such as 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, is discussed below.

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 no cumulative biomass energy potential (as shown in Figure 5.1), therefore, the implementation of a Biomass Facility at the proposed site in the Northern Cape is therefore considered not to be a reasonable and feasible alternative to be assessed as part of this EIA process.

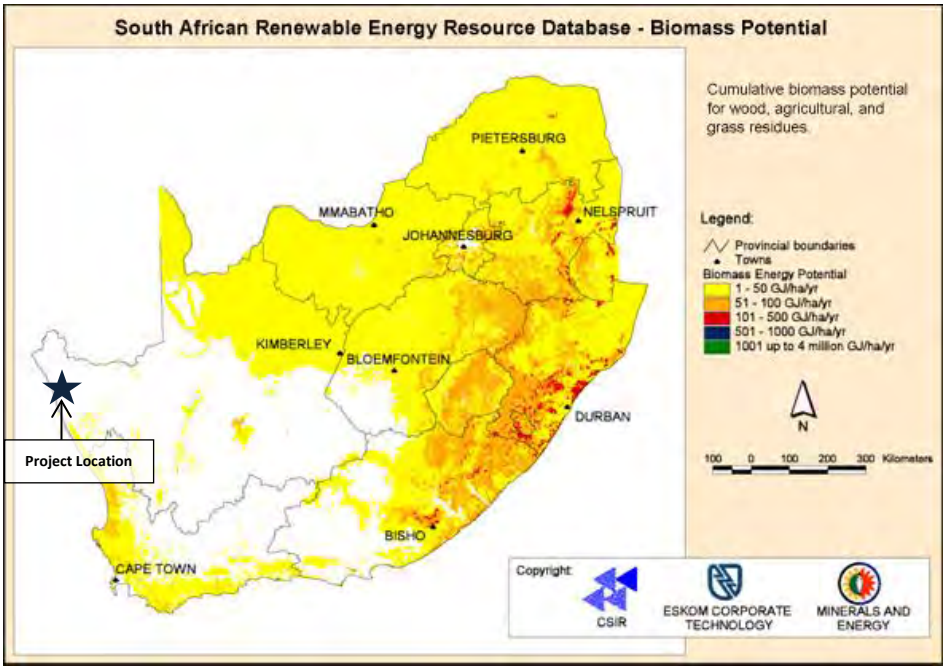


Figure 5.1: Biomass Potential (*Source*: SARERD, 2016).

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 not to be a reasonable and feasible alternative be assessed as part of this EIA process.

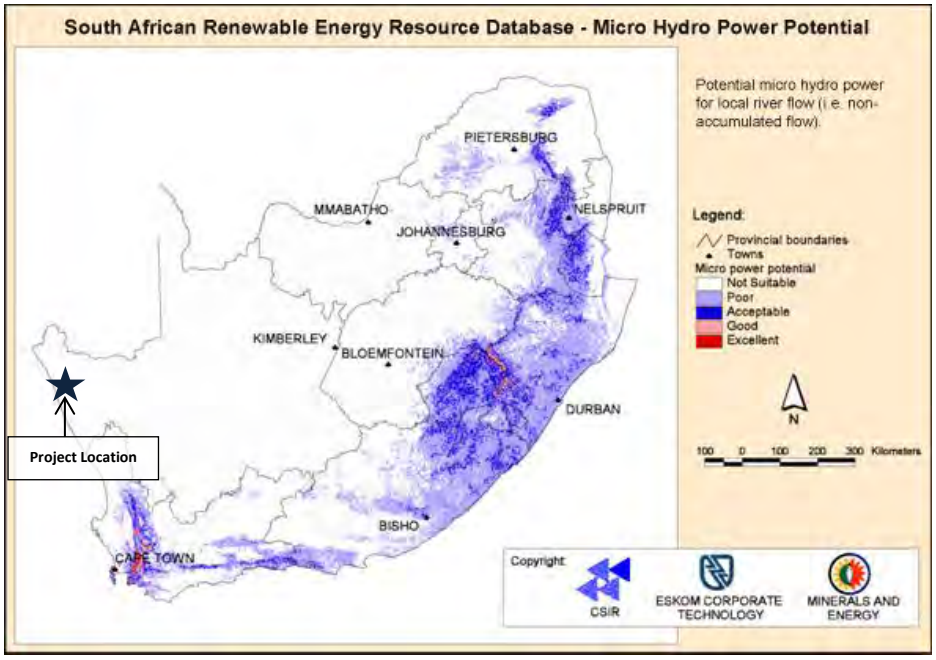


Figure 5.2: Micro Hydro Power Potential (*Source*: SARERD, 2016).

Wind and Solar Energy

- *REIPPPP and Strategic Environmental Assessment 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) propose to secure 17 800 MW of renewable energy capacity by 2030.
The Department of Energy (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 Concentrated Solar Power (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. As noted in Chapter 1 of this Draft EIA Report, the DEA, in discussion with the DoE, was mandated by MinMec to undertake a Strategic Environmental Assessment (SEA)[1] to identify the areas in South Africa that are of strategic importance for Wind and Solar PV development. The Wind and Solar PV SEA is in support of the Strategic Infrastructure Plan (SIP) 8, which focuses on the promotion of green energy in South Africa. The SEA aimed to identify strategic geographical areas best suited for the roll-out of large scale wind and solar PV energy projects, referred to as REDZs. Through the identification of the REDZs, the key objective of the SEA was to enable strategic planning for the development of large scale wind and solar PV energy facilities in a manner that avoids or minimises significant negative impact on the environment while being commercially attractive and yielding the highest possible social and economic benefit to the country – for example through strategic investment to lower the cost and reduce timeframes of grid access[2]. Following the completion of the SEA, the proposed REDZs, shown in Figure 5.3, were submitted for Cabinet approval. After a lengthy process, the REDZs were signed off by the Minister of Environmental Affairs and gazetted on 16 February 2018 in Government Gazette No. 41445. The proposed project site is located within REDZ 8, which supports the development of large scale wind and solar energy developments. The proposed project is therefore in line with the national planning vision for wind and solar development in South Africa.

[1] Information on this process can be obtained at: http://www.csir.co.za/nationalwindsolarsea/background.html
[2] More information on the SEA can be read at https://redzs.csir.co.za/

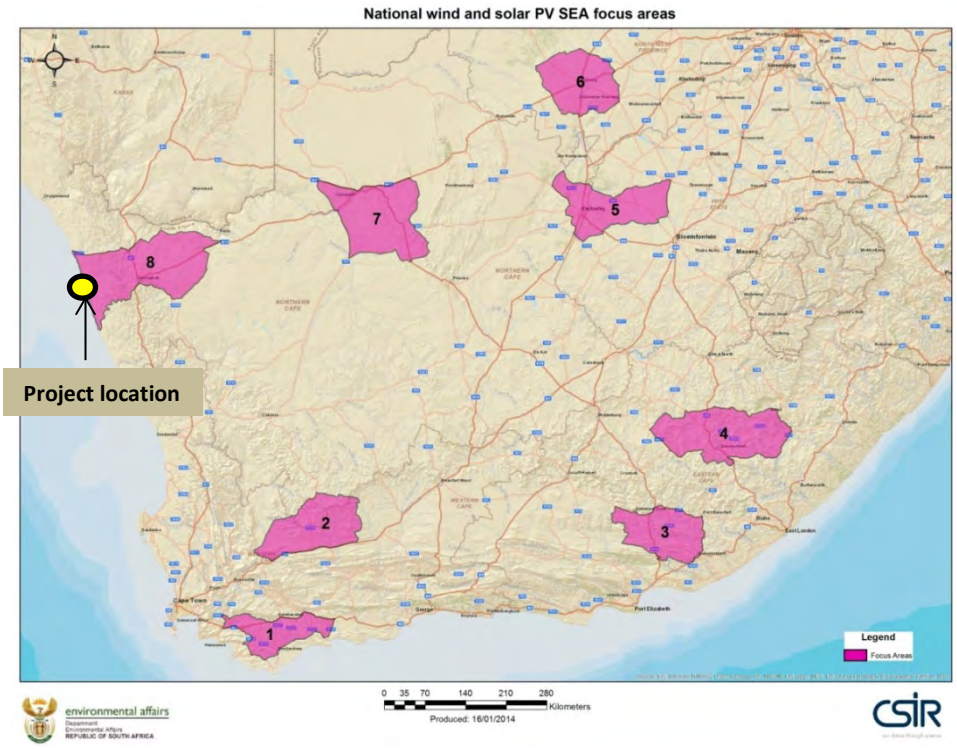


Figure 5.3: Renewable Energy Development Zones identified in the Strategic Environmental Assessment which were gazetted on 16 February 2018 in Government Gazette 41445 (the proposed juwi Kap Vley WEF falls within the REDZ 8).

Solar Energy

- *National Level Considerations: Solar Radiation*

The north-western part of South Africa has the highest Global Horizontal Irradiation[3] (GHI), relevant to PV installations and Direct Normal Irradiance[4] (DNI), relevant to Concentrated Photovoltaic (CPV) and tracking PV installations (Figure 5.4). 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 solar radiation of 2 100 kWh/m^2 per annum. This means that the generation of renewable energy from solar is not unfeasible, but more favourable locations (based on economic considerations) may occur east of the site where the solar radiation is 2 300 kWh/m^2 (as seen in Figure 5.4).

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

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

[4] 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.

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. Furthermore the site is foggy in the morning, so the solar panels will only be able to absorb the sun later in the day, hence the generation of electricity will be less effective. Solar panels need to be cleaned regularly and access to good quality water is required. Due to the scarcity of water in the area 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, no additional procurement target was allocated for CPV in Government Gazette 39111 published on 18 August 2015.

Due to the proximity to the coast and resulting fogging, the scarcity of water, and the uneven topography of the site, solar PV and CSP technologies are therefore not considered to be a reasonable and feasible alternative to be assessed as part of this EIA process.

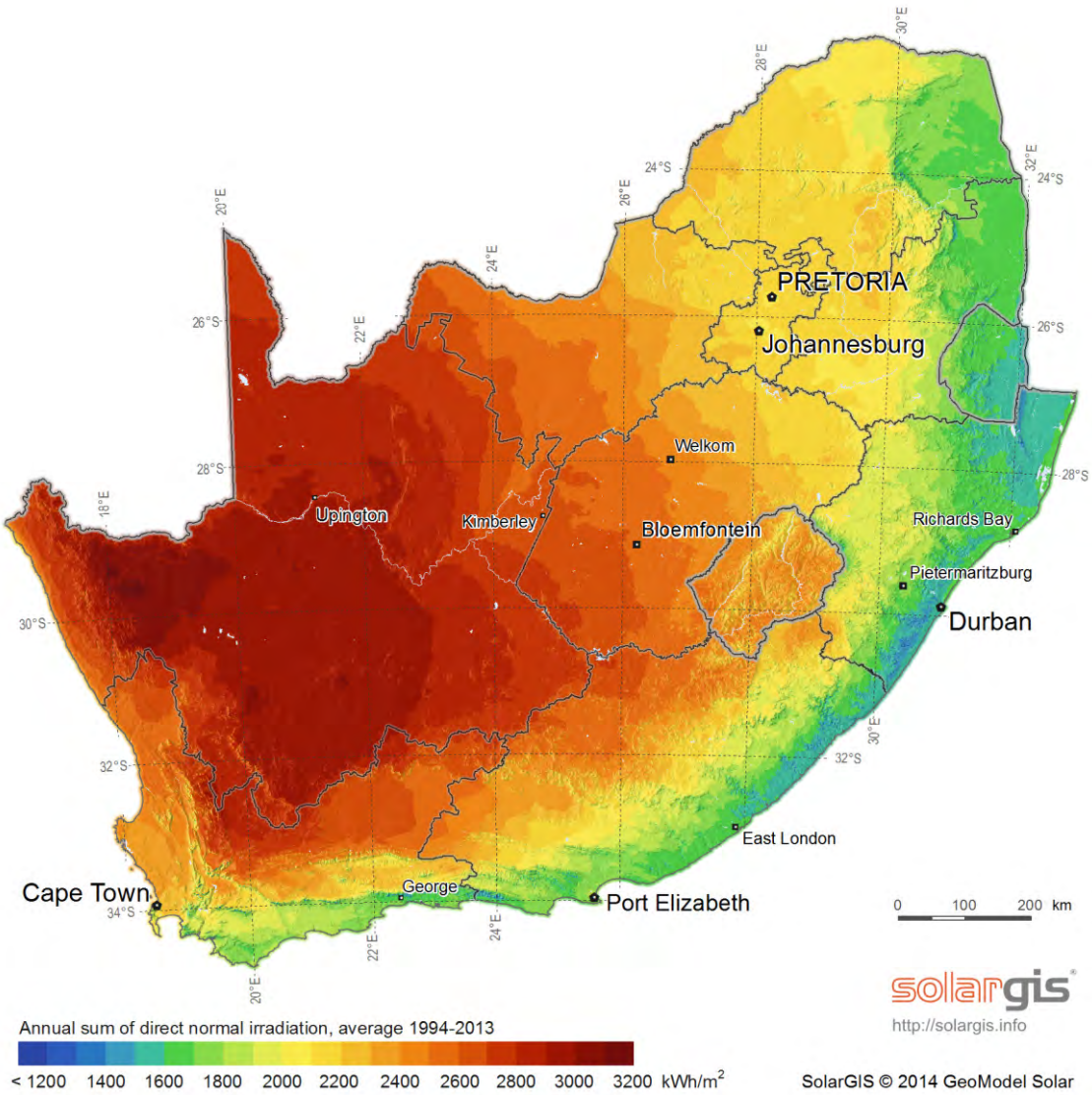


Figure 5.4: Solar Resource Availability in South Africa (*Source*: SolarGIS map© 2013 GeoModel Solar).

Wind Energy

One of the most important criterion to take into consideration when selecting a potential site for a WEF is the availability of a reliable wind resource. Wind resource is defined in terms of average wind speed and includes Weibull distribution (used to describe wind speed distributions); turbulence, wind direction, and pattern of wind direction (as depicted by a wind rose). These factors are all key considerations used in determining whether a site is suitable for the development of a WEF.

Measurements provided by the Wind Atlas of South Africa (WASA) indicate that the mean wind speed is the highest at the coastal regions of South Africa (as shown in Figure 5.5). This is also the case for the proposed Kap Vley WEF site which has very high wind speeds as can be seen in Figure 5.5.

Based on juwi's research of the Kap Vley site as a potential site for the development of a WEF, the proposed land portions located near Kleinzee were selected as an area with a good wind resource. A wind measuring mast has been installed on site to provide wind measurements to verify the potential of the resource. The process of collecting on-site wind data is necessary to confirm the bankable viability of the proposed project. The provision of at least 12 months on-site wind monitoring data also forms a requirement of the REIPPPP. Data received from consistent measurements for more than a year indicated that the wind resource at the proposed Kap Vley site is exceptional. 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, juwi has determined that the proposed Kap Vley WEF is considered to be the preferred technology alternative, as it would be able to generate sufficient energy to support an economically viable wind energy project.

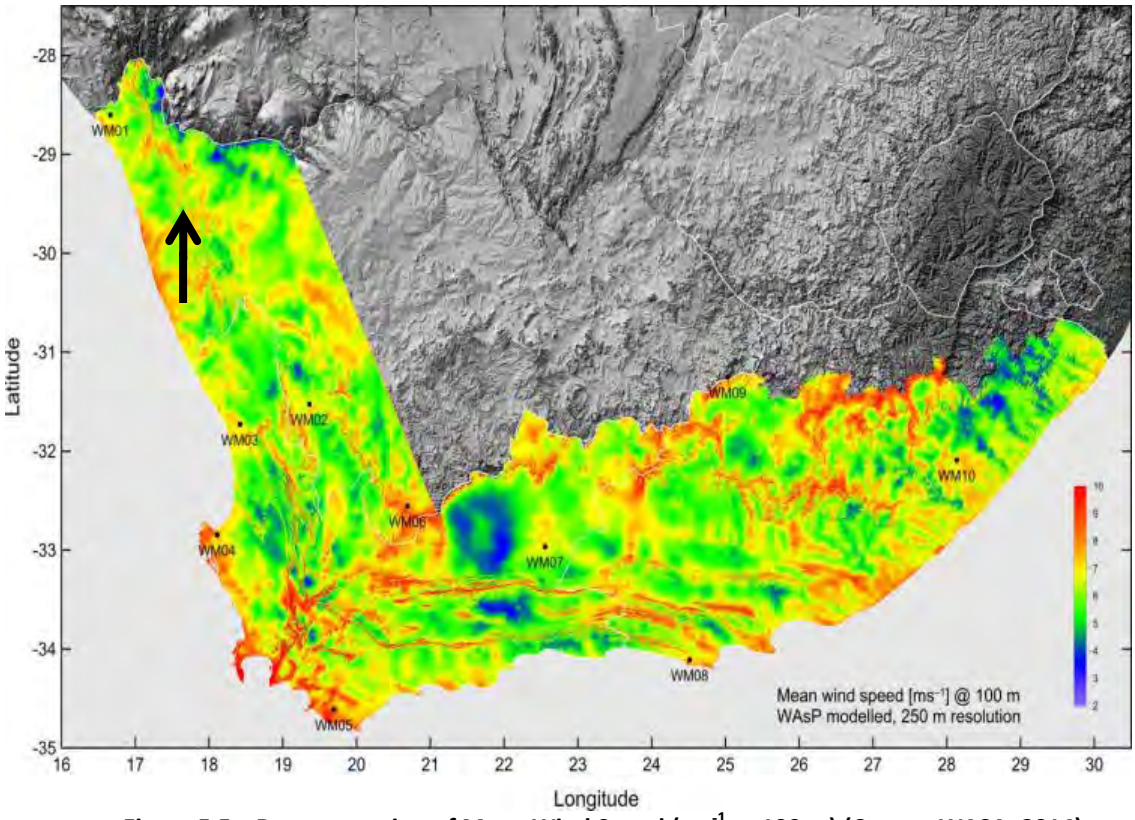


Figure 5.5: Representation of Mean Wind Speed (ms^{-1} at 100 m) (*Source*: WASA, 2014).

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

- The proposed Kap Vley WEF falls within the REDZ 8. The REDZs were recently gazetted on 16 February 2018 in Government Gazette No. 41445. The proposed project is therefore in line with the criteria of the SEA and located in an area of strategic importance for wind energy development;
- The site has a good wind resource based on WASA data and on-site measurements;
- Solar energy, a potential developable technology on site, would not be as economically viable compared to wind development at this location. Limitations include the topography of the site, fog in the morning which prohibits the absorption of sunlight and the scarcity of water in the area to wash the solar panels; and
- Government Gazette 39111 allocated a higher allocation target to wind energy compared to solar energy.

Since the alternative technologies considered were deemed not to be reasonable and feasible for the area and the site, no other renewable energy technologies alternatives were 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 Kap Vley 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 feasible sites. During the screening phase of the project, juwi identified three potentially feasible sites. For these sites (as shown in Figure 5.6), a fatal flaw analysis considering the site selection factors was undertaken.

Figure 5.6: The three potential sites that were investigated by juwi during the project screening stage (Kiap, Brazil and the Kap Vley sites).

A summary of the screening exercise that led to the selection of the Kap Vley site as being the preferred site alternative is briefly outlined below (Table 5.1).

Table 5.1: Screening phase or fatal flaw analysis of feasible sites

FACTOR	Site 1 Kiap	Site 2 Brazil	Site 3 Kap Vley
Land Availability	✓	X	✓
No unacceptable environmental sensitivities on site	X	✓	✓
Suitable Wind speed Levels	✓	✓	✓
Acceptable maximum distance to and availability of the Grid	✓	✓	✓
Site Accessibility	✓	✓	✓
Topography	✓	✓	✓
Low Fire Risk	✓	✓	✓
Current Land Use	✓	✓	✓
Landowner Willingness	✓	X	✓

Based on the above, the outcomes of the fatal flaw analysis can be summarised as:

- **Site 1 Kiap**: The site is deemed **unfeasible** due to its environmental sensitivity and its proximity to the Goegab Nature Reserve (8 km). It is located within a Terrestrial CBA and Ecological Support Area (ESA);
- **Site 2 Brazil**: The site is deemed **unfeasible** due to land ownership and existing planned development constraints; and
- **Site 3 Kap Vley**: Although the site is located in a CBA 1 and 2, it is deemed feasible as a biodiversity offset is being determined by the project applicant in consultation with WWF, SANPARKS, DENC and DEA to mitigate some of the potential negative impacts on the plant species and habitats of special concern on the Kap Vley WEF site (see section below). As such, the development, with the implementation of an offset is considered to have acceptable terrestrial ecological impacts and is therefore supported from a terrestrial ecological point of view.

5.1.4.1 Site Specific Considerations

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

- Remainder (RE) Kamaggas Farm 200 Portion 5;
- RE Kap Vley Farm 315;
- Portion 1 of Kap Vley Farm 315;
- Portion 2 of Kap Vley Farm 315,
- Portion 3 of Kap Vley Farm 315;
- Portion 3 of Platvley Farm 314;
- RE Kourootjie Farm 316; and
- RE Gra'water Farm 331.

The Kap Vley site was deemed feasible for the proposed WEF. A detailed outline of the outcomes of the site selection is detailed in Table 5.2.

Table 5.2: Site selection factors and suitability of the Kap Vley site for the development of the proposed Kap Vley WEF

FACTOR	SUITABILITY OF THE PREFFERED SITE
Land Availability	The site is of a suitable size for the proposed project. The land available to develop the Kap Vley WEF extends approximately 75 572 ha, while only approximately 128 ha (i.e. 0.17% of the available land) will be required for the proposed Kap Vley WEF (see Section 5.1.5 below)
Environmental Sensitivity	Although the site falls within a CBA 1 and 2 and contains 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	Above average as shown in Figure 5.5
Distance to and availability of the Grid	The proposed WEF is located approximately 40 km from the Gromis Substation – or potentially closer to a new Eskom substation (location still needs to be confirmed). An Environmental Authorisation for the construction of the proposed Eskom 400 kV Transmission line was granted to Eskom Holdings SOC Limited by the DEA (Reference Number: 12/12/20/720). The connection of the WEF to a substation was assessed under a separate Basic Assessment process that was undertaken for the electrical infrastructure associated with the proposed Kap Vley WEF project.
Site Accessibility	Access to the site is currently possible via existing farm access road from the public roads to the north and south of the site. Existing roads (such as the R355, the Komaggas gravel road or mainly gravel roads from Garies via Hondeklipbaai and Koingaas) will be used to gain access to the preferred site.
Topography	The maximum slopes that would be impacted by any footprint of the development is not likely to exceed 10%.
Fire Risk	The vegetation type for the site is Namaqualand Klipkoppe Shrubland on the ridges with Namaqualand Strandveld on the lower lying coastal plain areas. For the Namaqualand Klipkoppe Shrubland the fire risk is very low and not likely to be an issue. However, many parts of the lowlands are actually Namaqualand Sand Fynbos which has a moderate fire risk and will burn on occasion. In the west, the vegetation is Namaqualand Strandveld, which has a low fire risk as it is dominated by succulent species which don't burn easily.
Current Land Use	Agriculture – Low potential grazing
Landowner Willingness	The landowners have signed consents for the undertaking of the EIA process. The farm Kamaggas is on communal land and consent to undertake the EIA process was obtained from the local municipality on behalf of the Komaggas Community.

Furthermore, from an impact and risk assessment perspective, the implementation of the proposed Kap Vley WEF on the said farms will result in fewer risks in comparison to its implementation at alternate sites within the Northern Cape (i.e. regions with similar wind speeds). The following risks and impacts will be likely in this case:

- There is no guarantee that suitable land will be available for development of a WEF;
- Site geotechnical conditions, topography, fire potential and ready access to a site might not be suitable, thus resulting in negative environmental implications and reduced financial viability;

- There is no guarantee that the current land use of alternative sites will be flexible in terms of development potential, for example the agricultural potential for alternative sites might be higher and of greater significance;
- There is no guarantee of the willingness of other landowners to allow the implementation of a WEF on their land and if the landowners strongly object, then the project will not be feasible; and
- There is no guarantee that other sites within the Northern Cape will be located close to existing or proposed electrical infrastructure to enable connection to the national grid. The further away a project is from the grid, the higher the potential for significant environmental and economic impacts.

Given the outcome of the site selection process and the fatal flaws identified on the other two sites, the **Kap Vley WEF site is the only reasonable and feasible site, and therefore the preferred site and no other site alternatives were considered further in the EIA process.**

5.1.5 Alternative locations of the Development Footprint

The preferred site extends approximately 75 572 ha, while only approximately 128 ha (i.e. 0.17% of the available land) will be required for the proposed development of the Kap WEF. The preferred development footprint of the Kap Vley WEF on the site is shown in Figure 5.7 below. The determination of the development footprint within the site was determined through a desktop screening assessment of the site and consultation with the relevant landowner identifying possible areas that should not be proposed for the development (i.e. exclusion zones). These have already been excluded from the proposed development footprint as shown in Figure 5.7 below. The specialist studies (Appendices G to P) have highlighted sensitive features within the original development footprint, and thus the footprint has been adjusted to avoid such features (Please see Chapter 3 for development footprint overlain with environmental sensitivities). 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 resources are, however limited to the ridges where the footprints are currently located. Therefore, **no reasonable and feasible development footprint alternatives exist to be considered as part of this EIA process.**

5.1.6 Layout Alternatives

Based on the findings of the specialist studies, an environmental sensitivity map has been produced (see Figure 5.7). This map shows the sensitivities on site (terrestrial, watercourse features, and sensitive heritage features) within area that was assessed. Based on this map, the preferred location for the 128 ha Kap Vley WEF, avoids the sensitive features that were identified by the specialists. Based on the environmental sensitivities identified, a site layout has also been determined for this project (Chapter 2).

Semi-detailed engineering design has also been undertaken to develop the current footprint that is technically feasible in the challenging topographic onsite conditions. The current layout is thus a culmination of extensive technical, economic and environmental planning.

Therefore, the findings of a range of specialist inputs have been used to inform the layout of the proposed facility within the preferred site and the current layout is the only reasonable and feasible one, and therefore the preferred layout with no further alternatives considered in the EIA process.

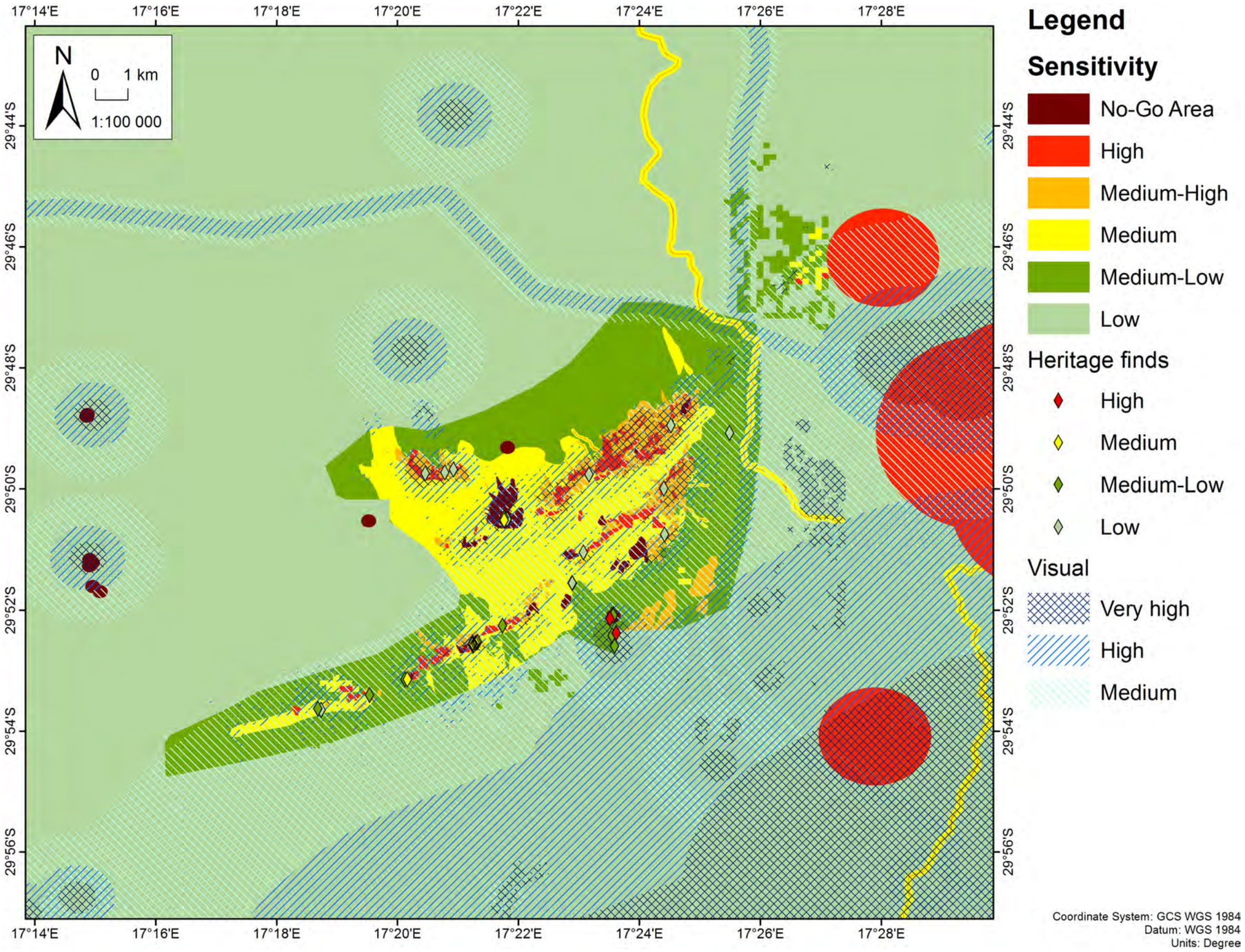


Figure 5.7: Preliminary environmental sensitivity Map for the proposed Kap Vley WEF

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 Kap Vley WEF. This alternative would result in no environmental impacts (positive and negative) on the site or surrounding local area, as a result of the facility. It is a baseline against which other alternatives were compared and considered during the EIA process.

- **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 was 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:**
  - The development of a WEF is the preferred renewable energy technology alternative to be developed on site because:
    - The proposed Kap Vley WEF falls within the REDZ 8. The proposed project is therefore in line with the criteria of the SEA and located in an area of strategic importance for wind energy development;
    - The site has a good wind resource based on WASA data and 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 Kap Vley WEF extends over the following farm portions:
    - Remainder (RE) Kamaggas Farm 200 Portion 5;
    - RE Kap Vley Farm 315;
    - Portion 1 of Kap Vley Farm 315;
    - Portion 2 of Kap Vley Farm 315,
    - Portion 3 of Kap Vley Farm 315;
    - Portion 3 of Platvley Farm 314;
    - RE Kourootjie Farm 316; and
    - RE Gra'water Farm 331.

  - The development footprint within the site was determined through a screening assessment of the site by the specialist team and in consultation with the landowners to identify possible areas that should be avoided by the proposed development (i.e. exclusion zones). The preferred development footprint was further refined following the outcome of the impact assessment where sensitive features were identified and defined in the specialist studies undertaken (Appendices G to P). The current proposed development footprint of the proposed Kap Vley WEF is approximately 128 ha which comprises only 0.17 % of the available land on the affected farms.

Layout Alternatives:

- Layout alternatives for the project were determined following the input from the various environmental and technical specialists involved in the project. 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. This area has since been significantly reduced to a level where semi-detailed technical planning has been undertaken with the aim to avoid environmentally sensitive areas, while still retaining a technically and financially viable layout.
- Existing access roads will be used, i.e. via the R355 from Springbok, the Komaggas gravel road off the R355 or a combination of gravel roads from Garies via Hondeklip Bay and Koingnaas.

Note: Three different powerline routing alternatives are discussed and assessed in the separate BA that was undertaken for the electrical infrastructure component of this project. These powerline routing alternatives were therefore not discussed and included in this Draft EIA Report.

Scoping and Environmental Impact Assessment for the proposed Kap Vley Wind Energy Facility near Kleinzee in the Northern Cape

UPDATED DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 6: Impact Assessment

CONTENTS

TABLES

FIGURES

6. IMPACT ASSESSMENT

The issues and impacts presented in this chapter have been identified by considering the environmental status quo of the receiving environment, as well as inputs from the specialists that form part of the project team. The impact assessment methodology undertaken for this EIA is included in Chapter 4 (Section 4.6) of this Updated Draft EIA Report.

6.1 EIA PHASE IMPACT ASSESSMENT

The specialist findings presented in this chapter represent a summary of the detailed and original specialist studies contained in the relevant appendices (Appendix G to P) to this report. The current summary of specialist findings is provided in the interest of brevity and with a view to facilitating public participation; as contemplated in the NEMA principles. The CA, with its mandate of substantive review of the EIA Report, is therefore urged to also read the original specialist studies in the relevant appendices to this report with the aim to inform its decision-making. Should any discrepancy occur between this summary, and the relevant detailed specialist study; the detailed specialist study will prevail.

Cumulative impacts have been discussed in each sub-section below for the respective field of study. Table 6.1 and Figure 6.1 shows the projects that were considered in the cumulative impact assessments conducted by the specialists (projects within a 50 km radius of the proposed Kap Vley WEF).

Note: An Ecological Offset study was conducted by Simon Todd of Simon Todd Consulting. The Ecological Offset study was prepared in terms of the Draft National Biodiversity Offset Policy and not a specialist study as per Appendix 6 of the NEMA EIA regulations (as amended 7 April 2017). This study should be considered in addition to the Terrestrial Ecology study to inform the biodiversity offset required as the site falls within a CBA1 and CBA2. The site also falls within a Northern Cape Protected Area Expansion Strategy (NCPAES) Focus Area (2017). Apart from highlighting the significance of the study area for conservation, the NCPAES also highlights areas where an offset would be seen as being most beneficial and desirable. The Ecological Offset Study is not included in the impact assessment tables below but the full Ecology Offset study is attached as **Appendix Q.**

Note: A Wake Effect statement was conducted on request by DEA in their comment letter on the Draft Scoping Report. As it is not a specialist study as per Appendix 6 of the NEMA EIA regulations (as amended 7 April 2017), but rather a technical statement, it is not included in the impact assessment tables below. The full Wake Effect statement is attached as **Appendix R.**

Table 6.1: EIA Processes currently underway within 50 km of the proposed Kap Vley WEF project

DEA Reference number	Project title	Applicant	EAP	MW	Status
Wind Energy Projects					
12/12/20/2331/1	Project Blue Wind Energy Facility Near Kleinsee within the Nama Khoi Local Municipality, Northern Cape Province	WWK Development (Pty) Ltd	Savannah Environmental (Pty) Ltd	20	Approved
12/12/20/2331/2	Project Blue Wind Energy Facility Near Kleinsee within the Nama Khoi Local Municipality, Northern Cape Province	WWK Development (Pty) Ltd	Savannah Environmental (Pty) Ltd	56	Approved
12/12/20/2331/3	Project Blue Wind Energy Facility (Phase 2 and 3) near Kleinsee Within The Nama Khoi Local Municipality, Northern Cape Province	WWK Development (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	74	In process
12/12/20/2212	Proposed 300 MW Kleinzee (Brazil) WEF in the Northern Cape Province	Eskom Holdings SOC Limited	Savannah Environmental Consultants (Pty) Ltd	300	Approved
12/12/20/2154	Proposed construction of the 7.2 MW Koingnaas Wind Energy Facility within the De Beers Mining Area on the Farm Koingnaas 745 near Koingnaas, Northern Cape Province	Just PalmTree Power Pty Ltd	Savannah Environmental Consultants (Pty) Ltd	7.2	Approved
12/12/20/1721/AM3	Proposed 55.5 MW Springbok wind power generation facility, Northern Cape	Mulilo Renewable Energy (Pty) Ltd	Holland and Associates Environmental Consultancy (Pty) Ltd	55.5	Approved
Solar PV Projects					
14/12/16/3/3/1/416	Nigramoep PV Solar Energy Facility on a site near Nababeep, Northern Cape	SARGE	Savannah Environmental Consultants (Pty) Ltd	20	In process
14/12/16/3/3/2/562	Proposed Phase 2 - Construction of a 75 MW solar PV on Farm 134/17 Klipdam, Springbok, within	NK Energie (Pty) Ltd	Cederberg Conservation Services (Pty) Ltd	75	Approved

DEA Reference number	Project title	Applicant	EAP	MW	Status
	Nama Khoi Municipality, Northern Cape				
14/12/16/3/3/1/511	The Construction of a 19 MW Photovoltaic Solar Energy Facility on Portion 1 and 3 of the Farm Melkboschkuil 132 in Carolusberg, Northern Cape Province	NK Energie (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	20	Approved
14/12/16/3/3/1/974	Proposed 20 MW Solar PV on Farm 132/26 Melbokskuil within Nama Local Municipality, Northern Cape	NK Energie (Pty) Ltd	Cape Environmental Assessment Practitioners (Pty) Ltd	20	In process
14/12/16/3/3/1/510	Proposed construction of the O'Kiep 3 (15 MW) Photovoltaic solar energy facility on the remainder of the Farm Brakfontein No. 133, O'Kiep Copper mine near Springbok, Northern Cape Province	Llio Energy (Pty) Ltd	Savannah Environmental (Pty) Ltd	15	Approved
12/12/20/2656	O'Kiep 2 PV Solar Energy Facility on a site in O'Kiep 2 near Springbok, Northern Cape Province	BluePort Trade 118	Savannah Environmental (Pty) Ltd	20	Approved
14/12/16/3/3/1/557	The Kokerboom Photovoltaic Solar Power Facility on Voëlklip South of Springbok within the Nama Khoi Local Municipality, Northern Cape Province	Brax Energy (Pty) Ltd	Savannah Environmental (Pty) Ltd	10	Approved
14/12/16/3/3/1/558	The establishment of 10 MW Namaqua Photovoltaic Solar Energy Facility on the Farms Mesklip 14/259 and 23/259 near Kamieskroon Northern Cape Province	BQR South Africa (Pty) Ltd	Savannah Environmental (Pty) Ltd	10	Approved

Powerlines

DEA Reference number	Project title	Applicant	EAP	Status
12/12/20/720	Proposed deviation of the Eskom Juno-Gromis 400kV transmission line in the Northern and Western Cape	Eskom Holdings SOC Limited	Nsovo Environmental Consulting	Approved

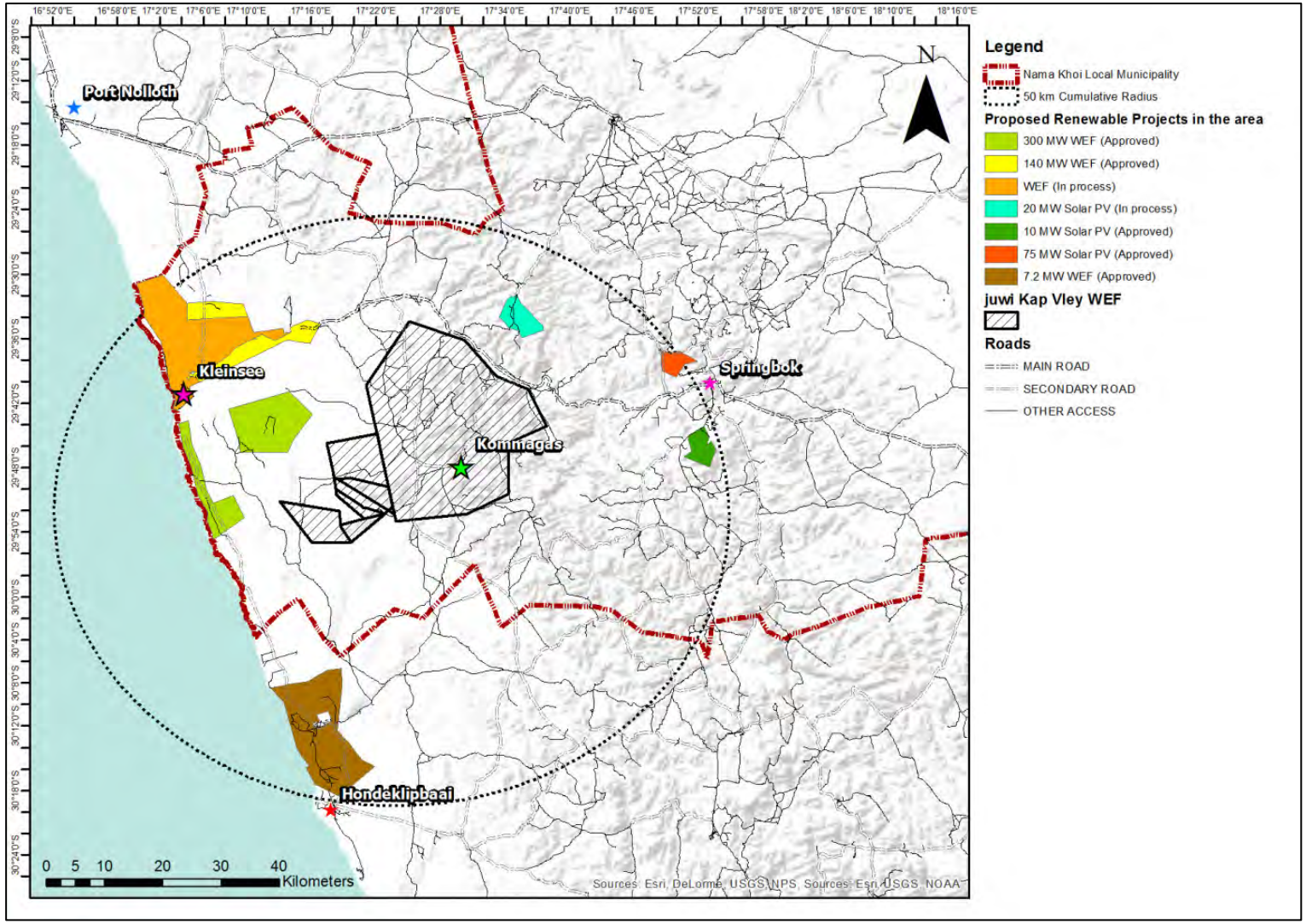


Figure 6.1: Other Wind and Solar PV Energy Facilities proposed within 50 km of the proposed Kap Vley WEF site.

6.1.1 Terrestrial Ecology (including Fauna and Flora)

6.1.1.1 Findings of the Terrestrial Ecological Assessment

6.1.1.1.1 Flora

An assessment of the terrestrial ecology (fauna and flora) on the proposed site was conducted by Simon Todd (2018) and attached as **Appendix G.** A summary of the affected terrestrial ecological environment is provided in Chapter 3 and the findings of the study are discussed below.

The Kap Vley site is located within an area recognised for its biodiversity significance. This is reflected in the inclusion of the area as a Tier 1 and Tier 2 Critical Biodiversity Area (CBA) (Figure 3.16). Extensive fieldwork was conducted by the specialist across the proposed Kap Vley WEF site for the current study and confirms the presence of numerous plant species and habitats of conservation concern at the site. A number of avoidance and mitigation measures have however been implemented by the developer in the layout and planning phases of the development to reduce impacts on these features as far as possible. This includes detailed vegetation surveys and a full walk-through of the entire development footprint to identify and map populations of SCC,as well as map sensitive features and no-go areas. These areas are delineated with the specific purpose of avoiding high residual impacts at the site and maintaining the ecological functioning of the area. Following several iterations to the proposed the layout, all turbines have been excluded from No-Go and areas of High Sensitivity areas.

The detailed mapping of the distribution of plant SCC has allowed for impact on these species to be minimised. As all populations of these species within or near the development footprint have been mapped, the extent of impact on these species can be well estimated. Significant avoidance of important populations of these species has been implemented and no more than 2% of the on-site population of any of these species would be impacted by the development. No local or regional populations of these species would be compromised by the development or elevated to a higher level of conservation concern as a result of the development.

Due to the extensive on-site mitigation that has been implemented, direct impacts on fauna and flora are likely to be Low after the additional recommended construction-phase mitigation. It is only the potential impact on the affected CBAs and the loss of future conservation options which are likely to result in impacts of moderate significance after mitigation. As development within CBAs is not considered desirable, this raises the potential need for off-site mitigation measures to be implemented to mitigate this impact to a low level. A stand-alone Ecological Offset study has been developed (included in Appendix Q of this Updated Draft EIA Report) to inform the utility and feasibility of developing a biodiversity offset to mitigate the residual impacts of the development on CBAs. The Offset Study finds that suitable offset areas are available in the broader area and if implemented, would contribute to meeting conservation targets for the affected habitat types. Based on the results and analysis contained within the offset study, an offset is considered a viable possibility that can be used to offset the residual impact of the current development and is a recommended outcome of this study as well.

6.1.1.1.2 Fauna

The construction of the development will result in significant habitat loss, noise and disturbance on site. This will lead to direct and indirect disturbance of resident fauna. Some slow-moving or retiring species such as many reptiles would likely not be able to escape the construction machinery and would be killed. There are also several species present at the site which are vulnerable to poaching and there is a risk that these species may be targeted. This impact would be caused by the presence and operation of

construction machinery and personnel on the site. This impact would however be transient and restricted to the construction phase, with significantly lower levels of disturbance during the operational phase.

Operational activities as well as the presence of the turbines and the noise they generate may deter some sensitive fauna from the area. In addition, the access roads may function to fragment the habitat for some fauna, which are either unable to or unwilling to traverse open areas. For some species this relates to predation risk as slow-moving species such as tortoises are vulnerable to predation by crows and other predators. In terms of habitat disruption, subterranean species such as Golden Moles and burrowing snakes and skinks are particularly vulnerable to this type of impact as they are unable to traverse the hardened roads or become very exposed to predation when doing so. This is a low-level continuous impact which could have significant cumulative impact on sensitive species.

6.1.1.2 Ecological Impact Statement:

The Kap Vley site is considered to be a broadly sensitive environment due to the presence of numerous species and habitats of conservation concern. These have however been mapped in detail which was informed by detailed vegetation surveys undertaken during numerous site visits by the specialist to the area in spring, and effective avoidance accordingly implemented with regards to the layout of the proposed wind farm. As a result of this avoidance, on-site impacts on fauna and flora have been reduced to Low Significance after mitigation and are considered acceptable. However, impacts on CBAs and Protected Area Expansion Strategy Expansion focus areas cannot be mitigated to a low level and impacts of Moderate significance after post-onsite-mitigation impacts on these features are expected. This fulfils the basic requirements for an offset, and with the implementation of an offset, residual impacts associated with the development can be reduced to an overall Low Significance. As such, the development, with the implementation of an offset, which has been separately investigated and found to be a viable option, is considered to have acceptable terrestrial ecological impacts and is therefore supported from a terrestrial ecological point of view.

6.1.1.3 Impact Assessment for Ecology (including fauna and flora)

Impacts on ecology have been described based on the construction, operation and decommissioning phases, as well as the cumulative impacts associated with the proposed project. A number of potential impacts have been identified and thoroughly described in **Section 1.6 of Appendix G.** The proposed development will result in the loss of approximately 128 ha of vegetation during site clearing in the construction phase. The proposed development site will also have an impact on plant SCC and fauna through habitat loss and mortality.

The proposed development will result in a number of impacts including:

- Impact on CBA 1 & 2;
- Impact on plant SCC;
- Direct and indirect impacts on fauna;
- Increased alien plant invasion;
- Increased erosion;
- Cumulative impact on habitat loss and broad-scale ecological processes; and
- Cumulative impact leading to decreased ability to meet future conservation targets.

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.

- **Construction Phase**
  - Impact on vegetation and plant SCC; and
  - Direct and indirect impacts on fauna.

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

- **Decommissioning Phase**
  - Increased soil erosion; and
  - Increased alien plant invasion.

- **Cumulative impacts**
  - Cumulative habitat loss and impact on broad-scale ecological processes; and
  - Decreased ability to meet conservation targets.

Although there are a number of the different proposed renewable energy facilities in the broad area around the Kap Vley site, not all of these are within a similar environment and would not affect the same range of habitats as present at Kap Vley. Those developments to the east of Kap Vley above the escarpment are considered to be in a different environment and the proposed Kap Vley WEF would not significantly affect cumulative impacts in that area. As such, the consideration of cumulative impact in the area should be focused on other developments on the coastal plain. This includes the 300 MW Eskom wind energy facility west of the site as well as the 140 MW Project Blue wind energy facilities north west of the site. There is also the 7.2MW Koingnaas Wind Energy Facility to the south of the site. These projects are generally closer to the coastline and largely restricted to the Namaqualand Strandveld vegetation type. It is estimated that the total footprint of these developments is approximately 500 ha. Within the context of the coastal plain and the affected vegetation types, this is a relatively low total extent. Existing impact in the area is largely restricted to the coastal forelands where diamond mining has had a significant impact on this environment. There are also a number of diamond mines along the Buffels River north of the site. Overall, existing impact on the coastal plain away from the actual coastline is relatively low and the contribution of the anticipated 128 ha footprint of the Kap Vley WEF is not considered highly significant. This does not however take the specific features present or the CBA status of Kap Vley site into account. As the nature and combination of features present at the Kap Vley site are relatively rare in the area, the impact on these features would be more significant and provides some of the motivation towards the development of a biodiversity offset to mitigate the residual on-site impacts of the development. An Ecological Offset study was prepared by Simon Todd Consulting and is included as Appendix Q of this Updated Draft EIA Report.

The impact assessment for each phase can be seen in the tables below (Table 6.2):

Table 6.2: Impact Assessment: Terrestrial Ecology (Fauna and Flora)

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
TERRESTRIAL ECOLOGY: FAUNA AND FLORA															
CONSTRUCTION PHASE-DIRECT IMPACTS															
Habitat Loss	Impact on vegetation and plant SCC	Negative	Local	Long-term	Severe	Very Likely	Low	Moderate	High	Partly	Partly	No development of turbines, roads of other infrastructure within no-go areas. Preconstruction walk-through of the development footprint to further refine the layout and reduce impacts on SCC through micro-siting of the turbines and access roads. Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However caution should be exercised to avoid using material that might entangle	Moderate	3	High

[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
												fauna.			
Habitat Loss	Faunal Impacts due to construction (direct and indirect impacts)	Negative	Local	Long-term	Substantial	Very Likely	Moderate	Moderate	Moderate	Partly	Partly	Avoidance of identified areas of high fauna 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. Limiting access to the site and ensuring that construction staff and machinery remain within the demarcated construction areas during the construction phase.	Moderate	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
												Environmental induction for all staff and contractors on-site. All construction vehicles 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 site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which should be directed downwards.			
OPERATIONAL PHASE-DIRECT IMPACTS															
Disturbance	Increased soil erosion	Negative	Local	Long-term	Substantial	Very Likely	Moderate	Moderate	Moderate	Yes	Yes	Erosion management at the site should take place according to the Erosion Management Plan and	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
												Rehabilitation Plan included in the EMPr (Part B of the EIA Report). All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. All cleared areas should be revegetated with indigenous perennial species from the local area.			

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
												Avoid areas of high wind erosion vulnerability as much as possible. Use net barriers, geotextiles, active rehabilitation and other measures during and after construction to minimise sand movement at the site.			
Disturbance	Increased alien plant invasion	Negative	Local	Medium-term	Substantial	Very 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	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
												will need to be implemented. Problem woody species such as *Acacia cyclops* are already present in the area and are likely to increase rapidly if not controlled. Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems. Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.			
Noise & Disturbance	Operational impacts on fauna	Negative	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.	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
												Appropriate design of roads and other infrastructure where appropriate to minimise faunal impacts and allow fauna to pass through or underneath these features. No electrical fencing within 20 cm of the ground as tortoises become stuck against such fences and are electrocuted to death. If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs) as far as possible, which do not attract insects. All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as			

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
												related to the nature of the spill. All vehicles accessing the site should adhere to a low speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises.			
Habitat loss and disturbance	Impacts on Critical Biodiversity Areas	Negative	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 quartz patches or active dune fields. Investigate the potential of implementing an offset to mitigate the residual impact on CBAs.	Moderate	3	High
DECOMMISSIONING PHASE-DIRECT IMPACTS															
Habitat loss and disturbance	Increased soil erosion	Negative	Local	Long-term	Severe	Very Likely	Low	Moderate	High	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 or until the rehabilitation benchmarks and criteria have been met. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.			
Habitat loss and disturbance	Increased alien plant invasion	Negative	Local	Long-term	Severe	Very Likely	Low	Moderate	High	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.	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
												Active rehabilitation and revegetation of previously disturbed areas with indigenous species selected from the local environment. Wherever excavation is necessary for decommissioning, topsoil should be set aside and replaced after decommissioning activities are complete to encourage natural regeneration of the local indigenous species. Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. Regular monitoring for alien plants within the disturbed areas for at least five years after decommissioning or until alien invasive species			

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
												are no longer a problem at the site. Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.			

Cumulative impacts

Impact pathway	Nature of potential impact/risk	Status[4]	Extent[5]	Duration[6]	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
TERRESTRIAL ECOLOGY: FAUNA AND FLORA															
CUMULATIVE IMPACTS															
Habitat loss and disturbance.	Cumulative habitat loss and impact on broad scale ecological processes	Negative	Regional	Long-term	Substantial	Very Likely	Low	Moderate	Moderate Risk	Partly	Partly	Avoid impact to restricted and specialised habitats such as quartz patches or dune fields. Ensure that on-site impacts on plant SCC are maintained at acceptable levels through avoidance of significant populations of these species. Investigate the potential for an offset to mitigate the residual impacts of the development.	Moderate	3	High

[4] Status: Positive (+) ; Negative (-)
[5] Site; Local (<10 km); Regional (<100); National; International
[6] 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[4]	Extent[5]	Duration[6]	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
Clearance of land and vegetation for the WEF and ancillary infrastructure.	Altered drainage patterns, increased runoff and sedimentation of related ecosystems	Negative	Regional	Long-term	Substantial	Very Likely	Low	Moderate	Moderate Risk	Partly	Partly	Investigate the potential for the development of an offset to mitigate the residual impact of the current development. Identify other areas with a similar range of habitats and features to the current site, that might be used as target for the offset. Engage with the provincial and national conservation authorities on the implications of the current development for future conservation expansion in the area.	Low	4	High

6.1.2 Birds

6.1.2.1 Findings of the Bird Impact Assessment

The bird assessment was conducted by ARCUS (2018) to evaluate the impact on birds from the proposed Kap Vley WEF. This report is attached as Appendix H.

Activity and abundance of priority species and red data species were generally found to be low on the Kap Vley WEF site after one year of pre-construction monitoring. Thorough fieldwork and monitoring did not reveal any key or important avifaunal landscape features or sensitivities (e.g. nest sites) on or within 5 km of the WEF site. Abundances of small passerines were also found to be low. While the drought conditions experienced during the first two surveys (summer and autumn 2017), may have influenced the results, the third and fourth surveys (winter and spring) were conducted after rainfall in the area. It is unlikely that inter-annual variation in bird occurrence would be so substantial so as to significantly alter the findings of this study. This can be said, as historical data sets from the area (as well as other studies done on surrounding proposed projects), did not reveal substantially different findings/conclusions. The Kap Vley WEF site has some of the lowest activity and occurrence of priority species experienced by the specialists, relative to other project sites worked on in South Africa. Passage rates were very low. The level of Verreaux's' 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.

A sensitivity mapping exercise found that one turbine (WEA 14) is currently within a high sensitivity area and should be relocated approximately 120 m to the south or 125 m to the south east, while the turbine blade of WEA 25 may protrude into a high sensitivity area and should be set back approximately 65 m north or 75 m north east to avoid this. These requirements have been included as mitigation measures, and if implemented should reduce the potential collision impacts. Overall, the potential impacts on birds as a group are not viewed as being of a significance so as to preclude development and it is the specialists' opinion that the project may proceed, subject to the implementation of all recommendations and mitigations referred to in the Bird Impact Assessment Report (ARCUS, 2018), included as Appendix H of this Updated Draft EIA Report.

6.1.2.2 Impact assessment

It is important to assess the impacts of WEFs on birds, and to base this assessment on a thorough investigation of the local bird population prior to construction, which was done for the proposed development. A one year pre-construction bird monitoring programme was 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). The impacts of the associated powerlines on birds will be assessed in the separate BA undertaken for the electrical infrastructure component.

The following potential impacts to birds have been identified for the proposed Kap Vley WEF:

- **<u>Construction Phase</u>**
  - Habitat destruction;

- Habitat loss through perceived increased predation risk (displacement); and reduced breeding success.

❖ **Operational Phase**

- Bird mortality due to collisions with operational wind turbines;
- Habitat loss through perceived increased predation risk (displacement); and
- Disruption of local bird movement patterns.

❖ **Decommissioning Phase**

- Habitat loss through perceived increased predation risk (displacement); and
- Reduced breeding success.

❖ **Cumulative Impacts**

- Habitat destruction; and
- Bird mortality due to collisions with operational wind turbines.

Five wind energy-and eight solar PV energy developments are proposed or approved within a 50 km radius of the proposed site, which could lead to cumulative impacts on birds. All of the above mentioned impacts, and particularly those associated with the operational phase of the proposed project, could be intensified due to potential cumulative effects.

The Kleinzee WEF avifaunal specialist concludes in the Final EIA report (Savannah Environmental 2015) that the species to be most likely impacted on are flamingos, cormorants, pelicans, bustards, korhaans, eagles and ducks. Of these groups only bustards, korhaans and eagles occur on the Kap Vley WEF site and could potentially be impacted on cumulatively, as the others are birds associated with the shoreline habitat and are unlikely to be influenced by the Kap Vley WEF. In addition Verreaux's' Eagle, which occurs at Kap Vley WEF site was not recorded or identified as a target species at the Kleinzee WEF site.

Similarly, the Koingnaas WEF avifaunal specialist assessment identified flamingos, raptors, shelduck and Ludwig's Bustard as species likely to be impacted on, with particular emphasis on Ludwig's Bustard. Of these only Ludwig Bustard and some smaller raptors are likely to be impacted on by the proposed Kap Vley WEF, while flamingos may be impacted upon by the proposed Kap Vley grid connection.

At Springbok WEF Verreaux's' Eagle, which also occurs at Kap Vley WEF site, was identified as the species that will potentially be impacted on. However, Verreaux's' Eagle was only recorded sporadically at Kap Vley WEF site, and is not considered a species of high concern there. Therefore the cumulative impact of the proposed Kap Vley WEF on Verreaux's' Eagle is expected to be moderate.

The Project Blue Wind Energy Facility avifaunal specialist report mentions Black Harrier, Secretarybird, Jackal Buzzard and two kestrels (Greater and Rock Kestrel) as SCC. Of these, Jackal Buzzard, Black Harrier and the kestrels were recorded at a low frequency at the Kap Vley WEF site with no record of Secretarybird.

Eight solar PV projects are planned within a 50 km radius. The main impact of solar PV facilities on birds is habitat destruction and collision impacts associated with the grid connection lines. Due to the relatively small footprint and resulting low significance of the habitat destruction impact at the Kap Vley WEF and

Grid Connection, the cumulative habitat destruction impact for these developments is concluded to be of low significance.

In summary the cumulative effect of Kap Vley WEF and Grid Connection along with the impacts of the proposed five wind farms and eight solar PV facilities has the potential to affect various bird species at a higher significance than the impacts of the Kap Vley WEF and Grid Connection alone. Key species most likely to impacted upon cumulatively include Ludwig's Bustard, Southern Black Korhaan, Jackal Buzzard, Verreaux's' Eagle, Cape Long-billed Lark and Black Harrier. Jackal Buzzard and Verreaux's' Eagle are prone to impacts from collisions with wind turbines. There may be some moderate effects on other small raptors and passerines, but this is not considered to be of high concern.

Impact statement by the bird specialist

Overall, the potential impacts on avifauna as a group are not viewed as being of a significance so as to preclude development and it is the specialists' opinion that the project may proceed, subject to the implementation of all recommendations and mitigations referred to in this report.
The following conditions applicable to avifauna should be included in the EA (if granted):

- All recommendations in the avifaunal specialist report are to be implemented;
- 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. The walkthrough must also cover the Grid Connection route;
- Appropriate marking devices [Bird Flight Diverters (BFDs)] must be attached 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 applicable (i.e. at the start of operations at the wind farm) South African monitoring guidelines; and
- Develop and implement a 24 month post-construction bird activity monitoring program that mirrors the pre-construction monitoring surveys completed by Arcus 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.

The impact assessment for each phase can be seen in the tables below (Table 6.3):

Table 6.3: Impact Assessment: Birds

Impact pathway	Nature of potential impact/risk	Status[7]	Extent[8]	Duration[9]	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
BIRDS															
CONSTRUCTION PHASE-Direct impacts															
Clearing of vegetation	Habitat destruction	Negative	Site	Long-term	Moderate	Very Likely	Moderate	Moderate	Low	No	Yes	Where feasible, construct minimum number of turbines required to meet project MW output. Implement CEMP	Low	4	Medium
Noise and disturbance from construction activities	Habitat loss through perceived increased predation risk (Displacement). Reduced breeding success.	Negative	Site	Medium-term	Moderate	Likely	High	Moderate	Low	No	Yes	Buffer nest sites. Amend construction schedule. No turbines in No-go areas. Implement CEMP	Low	4	Medium
OPERATIONAL PHASE-Direct impacts															
Collisions with operational wind turbines	Bird mortality	Negative	Regional	Long-term	Severe	Very Likely	Non-reversible	Moderate	High	No	Yes	Where feasible, construct minimum number of	Moderate	3	Medium

[7] Status: Positive (+) ; Negative (-)
[8] Site; Local (<10 km); Regional (<100); National; International
[9] 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[7]	Extent[8]	Duration[9]	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
												turbines required to meet project MW output. Adherence to no-go area buffers for turbine placement. Operational monitoring in line with applicable guidelines. Further operational mitigation measures to be researched, by appointed bird specialist, and the appropriate selected mitigation implemented, if post construction monitoring reveal high levels of impacts.			
Disturbance and noise from maintenance activities	Habitat loss through perceived increased predation risk (Displacement)	Negative	Site	Long-term	Moderate	Likely	Moderate	Moderate	Low	No	Yes	Reduce disturbance by adhering to OEMP; on-site manager / ECO to be trained to ID priority species and signs of breeding; monitor raptor nest breeding success and conduct post-construction monitoring; No turbines in No-go areas.	Low	4	Medium

Impact pathway	Nature of potential impact/risk	Status[7]	Extent[8]	Duration[9]	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
Avoidance of turbines	Disruption of local bird movement patterns	Negative	Regional	Long-term	Moderate	Unlikely	High	Moderate	Low	No	No	Intermittent coloured lighting on turbines; No turbines in high sensitivity areas; Where feasible, construct minimum number of turbines required to meet project MW output.	Low	4	Low
DECOMMISSIONING PHASE-Direct impacts															
Noise and disturbance from decommissioning activities	Habitat loss through perceived increased predation risk (Displacement). Reduced breeding success.	Negative	Site	Medium-term	Moderate	Likely	High	Moderate	Low	No	Yes	Adhere to Decommissioning Phase EMP. Amendments to decommissioning schedule required if any of the Red Data species are confirmed to be breeding decommissioning activities within 500 m of the breeding site must cease, and an avifaunal specialist may advise changes to the schedule.	Low	4	Medium

Cumulative impacts: Birds

Impact pathway	Nature of potential impact/risk	Status[10]	Extent[11]	Duration[12]	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
CUMULATIVE IMPACTS: BIRDS															
CONSTRUCTION PHASE															
Clearing of vegetation	Habitat destruction	Negative	Site	Long-term	Substantial	Very Likely	Moderate	Moderate	Moderate	No	Yes	Implement CEMP. Where feasible, construct minimum number of turbines required to meet project MW output.	Low	4	Medium
OPERATIONAL PHASE															
Collisions with operational wind turbines	Bird mortality	Negative	Regional	Permanent	Severe	Very Likely	Non-reversible	Moderate	High	No	Yes	Where feasible, construct minimum number of turbines required to meet project MW output. Adherence to no-go area buffers for turbine placement.	Moderate	3	Medium

[10] Status: Positive (+) ; Negative (-)
[11] Site; Local (<10 km); Regional (<100); National; International
[12] 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[10]	Extent[11]	Duration[12]	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
												Operational monitoring in line with applicable guidelines. 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.			

6.1.3 Bats

6.1.3.1 Findings of the Bat Impact Assessment

The bat assessment was conducted by ARCUS (2018) to evaluate the impact on bats from the proposed Kap Vley WEF. This report is attached as **Appendix I**.

The bat monitoring data presented from one year pre-construction bat monitoring suggest that the development of the proposed Kap Vley WEF and associated powerline (assessed as part of a separate BA process) 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 to bats. A confirmed roost was located at a farmstead approximately 1,600 m to the nearest turbine. This roost has been buffered with a no go buffer of 1 km in which no turbines, or parts of a turbine, should be constructed. Other infrastructure, such as roads and powerlines, is permitted in this buffer. This buffer does not impact the current turbine layout and no adjustments to the proposed layout are required to accommodate the buffer.

The significance ratings for the majority of the impacts to bats posed by the development are predicted to be of low significance before mitigation and very low after mitigation, including those for cumulative impacts. Impacts related to bat mortality are predicted to be of high significance before mitigation but low after mitigation. However, cumulative impacts are predicted to be of moderate significance after mitigation.

At this stage, the mitigation measures are related to the design of the proposed Kap Vley WEF and associated powerline and avoiding the placement of turbines in areas that bats are most active based on the pre-construction monitoring data. This has been adhered to in the proposed layout (see Figure 3.28 in Chapter 3 of this updated Draft EIA Report or Figure 1 in the Bat specialist report (Appendix I). Bats were most often recorded in the lower lying areas of the site and were recorded less on ridges, where all turbines are proposed. Monitoring of bat activity and bat fatality during the operational phase of the WEF is needed to determine if any additional mitigation measures are needed. Mitigation options at this stage may include using an operational minimization strategy (i.e. curtailment) during specific seasons and time periods for specific turbines coincident with periods of increased bat activity and fatality.

6.1.3.2 Impact assessment

WEFs have the potential to impact bats directly through collisions and barotrauma resulting in mortality (Horn et al. 2008; Rollins et al. 2012), and indirectly through the modification of habitats (Kunz et al. 2007b). Direct impacts pose the greatest risk to bats and, in the context of the project, habitat loss and displacement should not pose a significant risk because the project footprint (i.e. turbines, roads and powerline foundations) 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. Of the five bat species that were recorded on site, at least four exhibit behaviour that may bring them into contact with wind turbine blades and they are potentially at risk of negative impacts if not properly mitigated, although the magnitude of these impacts are unknown at this stage.

The following potential impacts to bats have been identified for the proposed Kap Vley WEF:

- **Construction Phase**
  - Roost disturbance;
  - Roost destruction; and
  - Habitat modification.

- **Operational Phase**
  - Bat mortality during commuting and/or foraging and during migration by colliding with the operational wind turbines and/or due to barotrauma;
  - Habitat creation in high risk locations leading to bat mortality; and
  - Displacement and reduced foraging opportunities for bats due to light pollution.

- **Decommissioning Phase**
  - Roost disturbance.

- **Cumulative impacts:**
  - Roost disturbance;
  - Bat mortality due to destruction or removing buildings, trees or rocky outcrops; and
  - Habitat modification.

It is important to consider cumulative impacts of the WEF and grid connection infrastructure across the entire scale that potentially affected animals which are likely to move, especially mobile animals like bats. Impacts at a local scale could have negative consequences at larger scales if the movement between distant populations is impacted (Lehnert et al. 2014; Voigt et al. 2012). For example, Lehnert et al. (2014) demonstrated that among Noctule bats collected beneath wind turbines in eastern Germany, 28% originated from distant populations in the Northern and North-eastern parts of Europe. The cumulative impacts could be lower for species that do not migrate over such large distances or resident species that are not known to migrate. The sphere of the cumulative impact would then likely be restricted to the home ranges and foraging distances of different species, which can range from 1 km to at least 15 km for some insectivorous bats (Jacobs and Barclay 2009; Serra-Cobo and Sanz-Trullen 1998).

The cumulative impact for each issue was considered by searching for current and future development of WEFs within a 50 km radius of the project. Five onshore wind facilities are approved within this radius. However, for migratory bats such as the Natal long-fingered bat (Miller-Butterworth et al. 2003) the cumulative impacts region might be significantly higher. This species is known to migrate over hundreds of kilometres between winter and summer roosts (Miller-Butterworth et al. 2003). This was taken into consideration when undertaking the cumulative impact assessment (Table 6.4).

Cumulative impacts on bats could increase as new facilities are constructed but are difficult to accurately predict or assess without baseline data on bat population size and demographics (Arnett et al. 2011; Kunz et al. 2007b) and these data are lacking for many South African bat species. It is possible that cumulative impacts could be mitigated with the appropriate measures applied to wind farm design and operation. Cumulative impacts could result in declines in populations of even those species of bats currently listed as Least Concern, if they happen to be more susceptible to mortality from wind turbines (e.g. high-flying open air foragers such as free-tailed) even if the appropriate mitigation measures are applied.

The impact assessment for each phase can be seen in the tables below (Table 6.4):

Table 6.4: Impact Assessment: Bats

Impact pathway	Nature of potential impact/risk	Status[13]	Extent[14]	Duration[15]	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
BATS															
CONSTRUCTION PHASE-Direct impacts															
Excessive noise, dust and blasting	Roost Disturbance	Negative	Site	Medium	Moderate	Unlikely	Moderate	Low	Low	Yes	Yes	Avoid construction near roosts. Adhere to sensitivity map (Figure 1 of Bat Specialist Report (Appendix I). Survey turbine locations and infrastructure for presence of roosts.	Very low	5	Medium
Removal of buildings, trees or rocky outcrops (bat roosts)	Roost Destruction	Negative	Site	Permanent	Moderate	Likely	Moderate	Low	Low	Yes	Yes	Avoid destroying roosts. Survey turbine locations and infrastructure for presence of roosts. Construction Phase EMP.	Very low	5	Medium
	Bat Mortality	Negative	Site	Permanent	Moderate	Likely	Non-reversible	Low	Low	Yes	Yes		Very low	5	Medium

[13] Status: Positive (+) ; Negative (-)
[14] Site; Local (<10 km); Regional (<100); National; International
[15] 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[13]	Extent[14]	Duration[15]	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
Removal of foraging and commuting habitat	Habitat Modification	Negative	Site	Long Term	Moderate	Likely	High	Low	Low	No	Yes	Limiting the removal of vegetation. Construction Phase EMP. Rehabilitate disturbed areas.	Very low	5	Medium
OPERATIONAL PHASE-Direct impacts															
Collisions with Operational Wind Turbines	Bat Mortality during commuting and/or foraging	Negative	Regional	Long term	Severe	Very Likely	Non-reversible	Moderate	High	No	Yes	Avoid areas more frequently used by bats.	Low	4	Medium
	Bat Mortality during migration	Negative	National	Permanen t	Severe	Unlikely	Non-reversible	Moderate	Moderate	No	Yes	Operational acoustic monitoring and carcass searches to advise operational minimization strategies.	Low	4	Medium
Habitat creation in high risk locations	Bat Mortality	Negative	Regional	Long term	Severe	Very Unlikely	Non-reversible	Moderate	Low	Yes	Yes	Artificial roost (e.g. roofs of buildings, road culverts and wind turbines) must be sealed. Ongoing maintenance and inspections of buildings to ensure no access to bats.	Very low	5	Medium
Light Pollution	Displacement and reduced foraging opportunities for bats	Negative	Local	Long term	Moderate	Likely	High	Low	Low	Yes	Yes	Using as little lighting as possible. Low pressure sodium and warm white LED lights are favourable.	Low	4	Medium
	Bat Mortality	Negative	Regional	Long term	Severe	Very	Non-reversible	Low	Low	Yes	Yes		Very low	5	Medium

Impact pathway	Nature of potential impact/risk	Status[13]	Extent[14]	Duration[15]	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
						Unlikely						High pressure sodium and white mercury lighting to be avoided.			
DECOMMISSIONING PHASE-Direct impacts															
Excessive noise and dust could result in bats abandoning their roosts	Roost Disturbance	Negative	Site	Medium	Moderate	Unlikely	Moderate	Low	Low	Yes	Yes	Avoid decommissioning activities near roosts. Limit decommissioning activities to daylight hours.	Very low	5	Medium

Cumulative impacts: Bats

Impact pathway	Nature of potential impact/risk	Status[16]	Extent[17]	Duration[18]	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
CUMULATIVE IMPACTS: BATS															
CONSTRUCTION PHASE															
Excessive noise, dust and blasting could result in bats abandoning their roosts	Roost Disturbance	Negative	Regional	Medium	Moderate	Likely	Moderate	Low	Low	Yes	Yes	Avoid construction near roosts. Survey turbine locations and infrastructure for presence of roosts.	Very low	5	Medium
Physically destroying or removing buildings, trees or rocky outcrops	Roost Destruction	Negative	Regional	Permanent	Moderate	Likely	Moderate	Low	Low	No	Yes	Avoid destroying roosts.	Very low	5	Medium
	Bat Mortality	Negative	Site	Permanent	Moderate	Likely	Non-reversible	Low	Low	Yes	Yes	Survey turbine locations and infrastructure for presence of roosts. Construction Phase EMP.	Very low	5	Medium
Removal of foraging and commuting habitat	Habitat Modification	Negative	Regional	Long Term	Moderate	Likely	High	Low	Low	No	Yes	Limiting the removal of vegetation.	Very low	5	Medium

[16] Status: Positive (+) ; Negative (-)
[17] Site; Local (<10 km); Regional (<100); National; International
[18] 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[16]	Extent[17]	Duration[18]	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
												Construction Phase EMP. Rehabilitate disturbed areas.			
OPERATIONAL PHASE															
Collisions with Operational Wind Turbines	Bat Mortality during commuting and/or foraging	Negative	Regional	Long term	Severe	Very Likely	Non-reversible	Low	High	No	Yes	Avoid areas more frequently used by bats. Operational acoustic monitoring and carcass searches to advise operational minimization strategies.	Moderate	3	Low
	Bat Mortality during migration	Negative	National	Long term	Severe	Very Likely	Non-reversible	Low	High	No	Yes		Moderate	3	Low
Habitat creation in high risk locations – inadvertent provision of new roosts for bats attracting to the WEF	Bat Mortality	Negative	Regional	Long term	Severe	Very Unlikely	Non-reversible	Low	Low	Yes	Yes	Artificial roost (e.g. roofs of buildings, road culverts and wind turbines) must be sealed. Ongoing maintenance and inspections of buildings to ensure no access to bats.	Very low	5	Medium
Light Pollution	Displacement and reduced foraging opportunities for bats	Negative	Regional	Long term	Moderate	Likely	High	Low	Low	Yes	Yes	Using as little lighting as possible. Low pressure sodium and warm white LED lights are favourable. High pressure sodium and white mercury lighting to be avoided.	Low	4	Medium
	Bat Mortality	Negative	Regional	Long term	Severe	Very Unlikely	Non-reversible	Low	Low	Yes	Yes		Very low	5	Medium

Impact pathway	Nature of potential impact/risk	Status[16]	Extent[17]	Duration[18]	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
DECOMMISSIONING PHASE															
Excessive noise and dust could result in bats abandoning their roosts	Roost Disturbance	Negative	Regional	Medium	Moderate	Unlikely	Moderate	Low	Low	Yes	Yes	Avoid decommissioning activities near roosts. Limit decommissioning activities to daylight hours.	Very low	5	Medium

6.1.4 Dry and Ephemeral Watercourses Impact Assessment

6.1.4.1 Findings of Dry and Ephemeral Watercourses assessment

The assessment was conducted by Luanita Snyman-van der Walt from the CSIR (2018) to evaluate the impact on watercourses from the proposed Kap Vley WEF. The report was externally reviewed and approved by Dr Liz Day. The specialist report and the review letter are included in **Appendix J**.

The aspect associated with the Kap Vley WEF that is most likely to drive impacts to dry and ephemeral watercourses is the clearance of land (surface disturbance) and vegetation clearance for the establishment of physical footprints of infrastructure and roads. The clearance of land and vegetation could impact dry and ephemeral watercourses through increasing runoff and sedimentation in the surrounding ecosystems. However, this is not expected to be a significant concern given the limited rainfall of the arid region (< 100 mm Mean Annual Precipitation) to stimulate damaging overland flow.

Due to the arid climate and very limited rainfall, not many permanent watercourses exist within the landscape. Dry and ephemeral rivers, salt pans (depressions) and drainage lines were identified. The proposed WEF layout avoids these as far as possible in its current design.

The impacts of physical disturbance to dry and ephemeral watercourses, altered drainage patters, increased runoff, erosion and sedimentation due to clearance of land and vegetation for the WEF are expected to be 'Low' to 'Very Low', with the effective implementation of the mitigation and management actions outlined in this report.

Table 6.5: Summary of sensitive dry and ephemeral watercourses in the study area that may be impacted, and recommended actions required.

Sensitive dry and ephemeral watercourses	WEF
Drainage lines	Avoided ACTION: None required. Implement recommended mitigation measures
Drainage lines proposed buffer	Some roads coincide with the proposed drainage line buffers. ACTION: None required Implement recommended mitigation measures
Potential Namaqualand Salt Pan and proposed buffer *(Verified to not be a hydrological feature)*	Not impacted
Buffels River, associates NFEPA wetland and proposed buffers	Not impacted
Kommagas River	Not impacted

Impact Statement from the specialist

Based on the findings in this assessment it has been concluded that the Kap Vley WEF (and 132 kV overhead powerline), from a dry and ephemeral watercourses perspective, may receive EA with adherence to the mitigation and management measures set out in specialist report (Appendix J).

6.1.4.2 Impact assessment

The following potential impacts to water courses have been identified for the proposed Kap Vley WEF:

- **Construction Phase**
  - Physical disturbance and destruction of dry and ephemeral watercourses (incl. drainage lines); and
  - Altered drainage patterns, increased runoff, erosion and sedimentation of surrounding ecosystems.

- **Operational Phase**
  - Altered drainage patterns, increased runoff, erosion and sedimentation of surrounding ecosystems.

- **Decommissioning Phase**
  - Physical disturbance and destruction of dry and ephemeral watercourses (incl. drainage lines); and
  - Altered drainage patterns, increased runoff, erosion and sedimentation of surrounding ecosystems.

- **Cumulative impacts**

Impacts of WEF projects in the area may cumulatively lead to the degradation and loss of dry and ephemeral watercourses (incl. drainage lines), although most impacts are expected to have local, or limited regional, consequences per facility. Due to climatic conditions, there are limited permanent watercourses or aquatic features present within the landscape.

The impact assessment for each phase can be seen in the tables below (Table 6.6):

Table 6.6: Impact Assessment: Dry and Ephemeral Watercourses

Impact pathway	Nature of potential impact/risk	Status[19]	Extent[20]	Duration[21]	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
DRY AND EPHEMERAL WATERCOURSES															
CONSTRUCTION PHASE															
Physical disturbance and destruction of dry and ephemeral watercourses (incl. drainage lines).	Clearance of land and vegetation for the WEF	Negative	Local	Short-term	Substantial	Unlikely	Low	Moderate	Low	No	Yes	Design As far as possible, avoid identified sensitive dry and ephemeral watercourses, drainage lines and associated buffers. (The current design already avoids the identified drainage lines). Construction Ecology specialist/Environmental Control Officer (ECO) to confirm adequate avoidance of sensitive features Minimise the footprint of	Very Low	5	High

[19] Status: Positive (+) ; Negative (-)
[20] Site; Local (<10 km); Regional (<100); National; International
[21] 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[19]	Extent[20]	Duration[21]	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
												cleared vegetation. Phased clearance of the area in order to reduce the amount and duration of bare soil exposure. Establish an effective record keeping system of all areas where soil is disturbed, to serve as basis for effective monitoring of rehabilitation process and success. Commence with restoration of disturbed, cleared land as soon as possible (e.g. non-permanent features such as the crane platforms and laydown and construction areas).			
Altered drainage patterns, increased runoff, erosion and sedimentation of surrounding ecosystems.		Negative	Regional	Long-term	Substantial	Likely	Low	Moderate	Moderate	No	Yes	<u>Design</u> As far as possible, avoid identified sensitive dry and ephemeral watercourses, drainage lines and associated buffers. (The current layout already avoids the identified drainage lines).	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[19]	Extent[20]	Duration[21]	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
												<u>Construction</u> Keep the footprint of the disturbed area to the minimum and designated areas only. Limit hard surfaces on site to reduce runoff. Clear site only before a section is due to be constructed. Phased clearance of the area in order to reduce the amount and duration of bare soil exposure. Commence with restoration of disturbed, cleared land as soon as possible (e.g. non-permanent features such as the crane platforms and laydown and construction areas). Implement net barriers, active rehabilitation and other erosion control measures.			

Impact pathway	Nature of potential impact/risk	Status[19]	Extent[20]	Duration[21]	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
												Implement an effective system of storm water runoff control using bunds and ditches, where it is required (at points where water accumulation might occur).			
OPERATIONAL PHASE															
Altered drainage patterns, increased runoff, erosion and sedimentation of surrounding ecosystems.	Clearance of land and vegetation for the WEF	Negative	Regional	Long-term	Substantial	Likely	Low	Moderate	Moderate	No	Yes	The storm water runoff system must effectively collect and safely disseminate any runoff water from all hardened surfaces and it must prevent any potential down slope erosion. Undertake periodic site inspections, especially after rainfall events, to verify and inspect the effectiveness and integrity of the storm water runoff control system and to specifically record the occurrence of any erosion on site or downstream. Correct or improve the runoff control system in the event of any erosion occurring.	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[19]	Extent[20]	Duration[21]	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
DECOMMISSIONING PHASE															
Physical disturbance and destruction of dry and ephemeral watercourses (incl. drainage lines).	Clearance of land and vegetation for the WEF	Negative	Local	Short-term	Substantial	Unlikely	Low	Moderate	Low	No	Yes	During decommissioning activities, avoid identified sensitive watercourses/aquatic features (ephemeral rivers, wetlands), major drainage lines and associated buffers as far as possible. Commence with restoration of disturbed, cleared land as soon as permanent structures have been removed. Ecology specialist to monitor progress and success of rehabilitation.	Very Low	5	High
Altered drainage patterns, increased runoff, erosion and sedimentation of surrounding ecosystems.		Negative	Regional	Long-term	Substantial	Unlikely	Low	Moderate	Moderate	No	Yes	During decommissioning activities, avoid identified sensitive watercourses/aquatic features (ephemeral rivers, wetlands), major drainage lines and associated buffers as far as possible. Commence with restoration of disturbed, cleared land as soon as permanent structures	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[19]	Extent[20]	Duration[21]	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
												have been removed. Ecology specialist to monitor progress and success of rehabilitation.			

Impact pathway	Nature of potential impact/risk	Status[22]	Extent[23]	Duration[24]	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
CUMULATIVE IMPACTS: DRY AND EPHEMERAL WATERCOURSES															
Cumulative Impacts of renewable energy projects (Construction, Operation and Decommissioning phases)	Degradation of dry and ephemeral watercourses (incl. drainage lines).	Negative	Regional	Long-term	Moderate	Unlikely	Low	Moderate	Moderate	No	Yes	Adequate implementation of proposed mitigation measures and best practice to impacts to dry and ephemeral watercourses (incl. drainage lines) by all renewable energy projects in the area.	Low	4	High

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

6.1.5 Visual Assessment

6.1.5.1 Findings of visual assessment

The visual assessment was conducted by Bernard Oberholzer Landscape Architect / Environmental Planner in association with Quinton Lawson MLB Architects / Urban designers (2018) to evaluate the potential visual impact from the proposed Kap Vley WEF. This report is attached as **Appendix K**.

The proposed site for the Kap Vley WEF consists of a low mountain range set in a broad, semi-arid coastal peneplain. The range, being less than 500 m above the surroundings, is considered to be a local, rather than a regional, landscape feature when seen in the context of the rugged mountains to the east.

The most important receptors are the Komaggas settlement about 7 km to the north-east, the Houthoop Guest Farm about 21 km to the north-west and the Namaqualand National Park, about 14 km to the south of the proposed Kap Vley WEF. There are also a number of small farmsteads in the otherwise sparsely populated area. It was found that the potential visibility of the proposed WEF would be moderate to marginal for most of the receptors, and in some cases practically not visible.

The proposed wind turbines would be highly visible on the skyline of the low mountain range and seen over a long distance of the surrounding plain. However, the mountain range is a local feature within the district and the receptors are mostly at a considerable distance from the proposed WEF, resulting in a visual significance rating of moderate-high based on the current preferred layout.

Related infrastructure, such as the substation and O&M buildings, are smaller in scale and therefore expected to have less visual effect. Recommended mitigations have been provided for the siting of these structures. The potential visual impact is expected to be of moderate significance before mitigation and moderate to low after mitigation.

6.1.5.2 Impact assessment

The field survey and study of the photographic panoramas indicated that the proposed Kap Vley WEF would be prominently visible on the skyline of the mountain ridgelines. However, the mountain range is fairly low (< 500 m above the surrounding plain), and only of local visual significance in the broader landscape context.

The following potential impacts to birds have been identified for the proposed Kap Vley WEF:

- **<u>Construction Phase</u>**
  - Potential visual intrusion, dust and noise affecting the rural sense of place.

- **<u>Operational Phase</u>**
  - Potential visual intrusion caused by large-scale wind turbines on the skyline of the rural landscape.
  - Potential visual clutter caused by infrastructure (substation and operations / maintenance structures and overhead powerlines) on the open landscape.
  - Potential visual effect of lighting at night on dark skies.

- **Decommissioning Phase**
  - Potential visual effect of remaining roads, platforms and concrete slabs on the landscape after decommissioning of the WEF.

Cumulative Impacts

The site lies within a gazetted REDZ (REDZ 8) and is therefore within an identified wind development area for which cumulative visual impacts would be expected.

Cumulative visual impacts could arise from the proximity of the proposed Eskom 300 MW WEF, about 12 km to the north-west of the site, because of its proximity. The other proposed wind energy and solar energy facilities in the region would, however, have a limited visual influence on the proposed Kap Vley WEF because of their distance from the site, which suggests that a major overall cumulative visual effect is not expected, and significance rated as moderate. Kleinzee could also potentially be seen as a renewable energy node in the future.

Given the remoteness of the proposed Kap Vley WEF site, the sparsely populated area, the previous disturbance by diamond-mining, and the local scale of the project, no potential fatal flaws from a visual perspective are expected. However, the visual mitigations outlined in the Visual Assessment Report (**included as Appendix K**) should be included in the EA (should this be granted) and EMPr to minimise potential adverse visual impacts.

The impact assessment for each phase can be seen in the tables below (Table 6.7):

Table 6.7: Impact Assessment: Visual

Impact pathway	Nature of potential impact/risk	Status[25]	Extent[26]	Duration[27]	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															
CONSTRUCTION PHASE-Direct impacts															
Effect of construction activities	Visual intrusion, dust and noise.	Negative	Local	Short-term	Severe	Very likely	High	Low	Moderate	No	Yes	Careful siting of construction camp. Implementation of EMPr.	Moderate	3	Medium
OPERATIONAL PHASE-Direct impacts															
Visual effect of wind turbines on ridgeline	Visual intrusion of turbines on skyline.	Negative	Local	Long-term	Severe	Very likely	Moderate-High	Low after decommissioning	Moderate-High	No	No	Avoidance of steep slopes (>1:5 gradient).	Moderate-High	3	High
Visual effect of related infrastructure.	Visual clutter of infrastructure on the open landscape.	Negative	Local	Long-term	Substantial	Very likely	Moderate-High	Low after decommissioning	Moderate	No	Yes	Careful siting of substation and O&M buildings.	Moderate-Low	4	High
Introduction of lighting at the WEF	Effect of lighting at night on dark skies.	Negative	Local	Long-term	Substantial	Very likely	High	Replaceable	Moderate	Yes	Yes	Low-level lighting and use of reflectors.	Moderate-Low	4	Medium

[25] Status: Positive (+) ; Negative (-)
[26] Site; Local (<10 km); Regional (<100); National; International
[27] 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[25]	Extent[26]	Duration[27]	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
DECOMMISSIONING PHASE-Direct impacts															
Removal of WEF structures	Visual impacts of remaining roads, platforms and concrete slabs.	Neutral	Local	Permanent	Slight	Very likely	Moderate-High	Low after decommissioning	Low	Yes	Yes	Regrading, ripping and revegetation.	Low	4	Medium

Cumulative impacts: Visual

Impact pathway	Nature of potential impact/risk	Status[28]	Extent[29]	Duration[30]	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
CUMULATIVE IMPACTS															
Combined visual effect of WEF, related infrastructure and adjacent renewable energy projects.	Visual intrusion on character of the area.	Negative	Regional	Long-term	Substantial	Very Likely	High	Low	Moderate	No	No	Minimal potential for mitigation.	Moderate	3	Medium

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

6.1.6 Heritage Impact Assessment

6.1.6.1 Findings of heritage assessment

An assessment of the heritage features of the proposed site was conducted by Jayson Orton (2018) and attached as **Appendix L**.

The HIA has shown that, although there are several types of heritage present in and around the study area, only two are of concern in that significant impacts are more likely to occur. Archaeological sites comprised only of scatters of stone artefacts are present in a number of areas close to the proposed layout and will require *in situ* conservation. Further survey of the final approved layout may well reveal further sites that will require excavation to mitigate the impacts to them. The landscape and its link with traditional land uses will also be impacted and it will be necessary to ensure that only minimal loss of land takes place within the Kamaggas farm area. The impacts to the cultural landscape are two-fold. First, there is the visual intrusion of wind turbines in an otherwise rural (or even largely natural) landscape and, second, there is the potential loss of land to traditional land uses (herding and collection of natural materials) to the people of Komaggas. The provision of electricity outweighs the cultural value of the landscape and, because only a very small proportion of the Kamaggas farm will be lost for traditional activities it is likely that this would still be outweighed by the provision of electricity. Furthermore, the municipality, on behalf of and in consultation with the community, has agreed to the facility being built if it receives authorisation.

The other aspects of heritage also considered but which will not be meaningfully affected, either through distance from the proposed development or because of the very low likelihood of impacts occurring, are palaeontology, graves and the built environment.

With mitigation the impact significance can always be reduced to very low, except in the case of the landscape impacts which will remain at the moderate level after mitigation. Importantly, however, the Nama Khoi municipality on behalf of the Komaggas community has agreed to a part of the proposed development occurring on their communal land, should it receive Environmental Authorisation.

The nature of the archaeological sites seen during the survey suggests that any new sites that might be impacted would not be any different in terms of cultural significance and mitigation requirements from the sites reported here. It is likely that at least some new sites would be found.

The only project alternatives available for assessment are the access roads. While neither will result in any impacts, the northern one, Option 1, is slightly favoured because Option 2 runs in close proximity to heritage resources.

Recommendation

Because the impacts to heritage resources are manageable, it is recommended that the proposed Kap Vley WEF should be authorised. This should be subject to the following conditions which must be incorporated into the EA (should it be granted):

- All significant archaeological sites identified must be protected from harm. Where necessary to effect this, sites should be cordoned off;
- The graveyards at PAN2017/001 (waypoint 1376) and PAN2017/003 (waypoint 1378) must be cordoned off as necessary, avoided and protected;

- The historical sites at PAN2017/002 (waypoint 1377), PAN2017/004 (waypoint 1399), PAN2017/005 (waypoint 1413) and KOM2017/001 (waypoint 1420) must be cordoned off if necessary, protected and avoided;
- Roads must be designed in such a way as to minimise cut and fill operations in order to reduce landscape scarring;
- The final approved layout should be subjected to a pre-construction walk-down survey to identify any further sites that may require mitigation; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

6.1.6.2 Palaeontology

A desktop assessment of the palaeontology of the proposed site was conducted by John Almond (2018) and attached as an annexure in **Appendix L.**

The desktop study concludes that due to the low palaeontological potential of the hillslope colluvia and aeolian sands the impact of the construction of the proposed WEF on fossil heritage is considered to be Low. Notwithstanding, the history of these vast tracts of sands, gravels and pedocretes of the Northern Cape is very poorly known, with very few fossils to rely on. Hence, though of low probability, any find will be of considerable importance.

Impact statement by the specialist:

In view of the low fossil potential, monitoring of bulk earth works by a specialist is not justified. Notwithstanding, the sporadic fossil occurrences are then particularly important and efforts made to spot them are often rewarded. Buried archaeological material may also be encountered. It is recommended that a requirement to be alert for possible fossils and buried archaeological material be included in the EMPr for the Construction Phase of the proposed Kap Vley WEF, with a Fossil Finds Procedure in place. In the event of the exposure of fossil bones all work at that spot must cease and the ECO must inform SAHRA and a professional palaeontologist, who will then decide if avoidance or mitigation are preferred. Only a professional palaeontologist may excavate uncovered fossils with a valid mitigation permit from SAHRA.

6.1.6.3 Impact assessment

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 impacts to built heritage resources will not occur and are not considered further during the EIA phase. 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 Heritage Impact Assessment are:

- **Construction Phase**
  - Potential direct and indirect impacts to archaeological resources;
  - Potential direct and indirect impacts to palaeontological resources;
  - Potential direct and indirect impacts to graves; and
  - Potential direct impacts to the cultural landscape and disruption of traditional activities.

- **Operational Phase**
  - Potential direct impacts to the cultural landscape and disruption of traditional activities.
- **Decommissioning Phase**
  - Potential direct and indirect impacts to archaeological resources;
  - Potential direct and indirect impacts to palaeontological resources;
  - Potential direct and indirect impacts to graves; and
  - Potential direct impacts to the cultural landscape and disruption of traditional activities.

- **Cumulative impacts**
  - Potential impacts to archaeological resources;
  - Potential impacts to palaeontological resources;
  - Potential impacts to graves; and
  - Potential impacts to the cultural landscape and disruption of traditional activities.

The impact assessment for each phase can be seen in the tables below (Table 6.8):

Table 6.8: Impact Assessment: Heritage (including Archaeology, Palaeontology and Cultural landscape)

Impact pathway	Nature of potential impact/risk	Status[31]	Extent[32]	Duration[33]	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															
CONSTRUCTION PHASE (Direct impacts)															
Clearing of vegetation and excavation of foundations	Destruction or disturbance of archaeological materials	Negative	Site	Permanent	Severe	Unlikely	No (resources cannot be recreated)	High (heritage resources are unique)	Moderate	No	Yes	Avoidance. Remain in authorised footprint. Excavation and sampling of affected archaeological sites.	Very low	5	High
	Destruction or disturbance of palaeontological materials	Negative	Site	Permanent	Moderate	Very unlikely	No (resources cannot be recreated)	High (heritage resources are unique)	Low	No	Yes	Reporting of chance finds.	Very low	5	Medium
	Destruction or disturbance of graves	Negative	Site	Permanent	Extreme	Extremely unlikely	No (resources cannot be recreated)	High (heritage resources are unique)	Very low	No	Yes	Avoidance. Remain in authorised footprint. Reporting of chance finds o	Very low	5	High

[31] Status: Positive (+) ; Negative (-)
[32] Site; Local (<10 km); Regional (<100); National; International
[33] 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[31]	Extent[32]	Duration[33]	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
												of graves. Exhumation			
All activities	Visual intrusion into cultural landscape & disruption of traditional activities	Negative	Local	Long-term	Substantial	Very likely	Moderate (some landscaping scarring to remain)	High (heritage resources are unique)	Moderate	No	Yes	Minimise landscape scarring from cut and fill operations. Minimise overall footprint. Minimise fencing in communal lands.	Moderate	3	High
CONSTRUCTION PHASE (Indirect impacts)															
Any activities occurring outside of authorised footprint	Destruction or disturbance of archaeological materials	Negative	Site	Permanent	Substantial	Very unlikely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Low	Yes	Yes	Remain in authorised footprint, avoid sites of archaeological significance. Reporting of chance finds.	Very low	5	High
	Destruction or disturbance of palaeontological materials	Negative	Site	Permanent	Moderate	Extremely unlikely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Very low	No	Yes	Reporting of chance finds.	Very low	5	Medium
	Destruction or disturbance of graves	Negative	Site	Permanent	Extreme	Extremely unlikely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Very low	No	Yes	Remain in authorised footprint. Reporting of chance finds.	Very low	5	High
OPERATIONAL PHASE (Direct impacts)															

Impact pathway	Nature of potential impact/risk	Status[31]	Extent[32]	Duration[33]	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
Existence of facility in landscape	Visual intrusion into the cultural landscape	Negative	Local	Long term	Substantial	Very likely	Moderate (some landscape scarring likely to remain)	High (heritage resources are unique)	Moderate	No	No	Keep traffic on site to a minimum.	Moderate	3	High
DECOMMISSIONING PHASE (Direct Impacts)															
Removal of facility and rehabilitation of site	Destruction or disturbance of archaeological materials	Negative	Site	Permanent	Severe	Unlikely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Moderate	Yes	Yes	Avoidance. Remain in authorised footprint. Excavation and sampling of affected archaeological sites.	Very low	5	High
	Destruction or disturbance of palaeontological materials	Negative	Site	Permanent	Moderate	Extremely unlikely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Very low	Yes	Yes	Reporting of chance finds.	Very low	5	Medium
	Destruction or disturbance of graves	Negative	Site	Permanent	Extreme	Extremely unlikely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Very low	Yes	Yes	Avoidance. Remain in authorised footprint. Reporting of chance finds.	Very low	5	High
All activities	Visual intrusion into cultural landscape & disruption of	Negative	Local	Short-term	Moderate	Very likely	Moderate (some landscaping	High (heritage resources are unique)	Low	No	Yes	Ensure effective rehabilitation	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[31]	Extent[32]	Duration[33]	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
	traditional activities						scarring to remain)								
DECOMMISSIONING PHASE (Indirect Impacts)															
Any activities occurring outside of authorised footprint	Destruction or disturbance of archaeological materials	Negative	Site	Permanent	Substantial	Very unlikely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Low	Yes	Yes	Remain in authorised footprint. Reporting of chance finds. Excavation and sampling of affected archaeological sites.	Very low	5	High
	Destruction or disturbance of palaeontological materials	Negative	Site	Permanent	Moderate	Extremely unlikely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Very low	No	Yes	Remain in authorised footprint. Reporting of chance finds.	Very low	5	Medium
	Destruction or disturbance of graves	Negative	Site	Permanent	Extreme	Extremely unlikely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Very low	No	Yes	Remain in authorised footprint. Reporting of chance finds. Exhumation	Very low	5	High

Cumulative impacts: Heritage

Impact pathway	Nature of potential impact/risk	Status[34]	Extent[35]	Duration[36]	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
CUMULATIVE IMPACTS (Direct impacts)															
All activities	Destruction or disturbance of archaeological materials	Negative	Site	Permanent	Slight	Very unlikely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Very Low	No	Yes	Avoidance. Remain in authorised footprint. Reporting of chance finds. Excavation and sampling of affected archaeological sites.	Very low	5	Medium
	Destruction or disturbance of palaeontological materials	Negative	Site	Permanent	Slight	Very unlikely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Very Low	No	Yes	Reporting of chance finds.	Very low	5	Medium
	Destruction or disturbance of	Negative	Site	Permanent	Slight	Extremely unlikely	Non-reversible (resources	High (heritage resources are	Very Low	Yes	Yes	Avoidance.	Very low	5	High

[34] Status: Positive (+) ; Negative (-)
[35] Site; Local (<10 km); Regional (<100); National; International
[36] 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[34]	Extent[35]	Duration[36]	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
	graves						cannot be recreated)	unique)				Remain in authorised footprint. Reporting of chance finds. Exhumation.			
	Visual intrusion into the cultural landscape	Negative	Local	Long term	Substantial	Very likely	Non-reversible (resources cannot be recreated)	High (heritage resources are unique)	Moderate	No	Yes	Minimise landscape scarring from cut and fill operations. Minimise overall footprint. Minimise fencing in communal lands.	Moderate	3	High

6.1.7 Soils and Agricultural Potential

6.1.7.1 Findings of the Soils and Agricultural Assessment

The Soils and Agricultural Potential Impact Assessment was undertaken by Johann Lanz (2018) and is included as **Appendix M** to this report.

The proposed development is located on land zoned and used for agriculture. South Africa has very limited arable land and it is therefore critical to ensure that development does not lead to an inappropriate loss of potentially arable land. The assessment has found that the proposed development will only impact agricultural land which is of extremely low agricultural potential and only suitable for low intensity grazing.

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 available grazing land on the effected 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, the proposed site is on land of extremely limited agricultural potential that is only viable for low intensity grazing. These factors also mean that cumulative regional effects as a result of other surrounding developments, also have low significance.

There are no agriculturally sensitive areas that need to be avoided by the development.

Impact statement by the specialist:

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 be authorised.

There are no conditions resulting from this assessment that need to be included in the EA should this be granted. Mitigation measures are provided and these are included in the EMPr in Section B of this Updated Draft EIA Report.

6.1.7.2 Impact Assessment

Impacts to Agriculture and soil potential are assessed to **be Low to Very low** (after mitigation). Cumulative impacts are likely to occur as a result of the regional loss of agricultural land and production because of other developments on agricultural land in the region. Because the loss of land is so small, and because the land is of low agricultural potential, the cumulative loss of agricultural resources is not significant either.

The potential impacts to agriculture and soil potential associated with the proposed Kap Vley WEF are listed below:

- **<u>Construction Phase</u>**
  - Minimal loss of agricultural land use under project footprint;
  - Soil erosion;
  - Loss of topsoil; and

- Degradation of veld vegetation.

❖ **Operational Phase**
- Minimal loss of agricultural land use under project footprint;
- Soil erosion; and
- Additional land use income.

❖ **Decommissioning Phase**
- Soil erosion;
- Loss of topsoil; and
- Degradation of veld vegetation.

❖ **Cumulative impacts**
- Regional loss of agricultural land.

Impacts and mitigation measures are described in the table below (Table 6.9). Recommendations for the monitoring and review of all identified mitigation measures are described below, as well as in the EMPr.

Table 6.9: Impact assessment: Agriculture and Soil Potential

Impact pathway	Nature of potential impact/risk	Status[37]	Extent[38]	Duration[39]	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
AGRICULTURE AND SOIL POTENTIAL															
CONSTRUCTION PHASE-Direct impacts															
Occupation of the land by the project infrastructure	Minimal loss of agricultural land use under project footprint	Negative	Site	Short term	Moderate	Very Likely	Low	Low	Very Low	No	No	None	Very Low	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
Construction 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

[37] Status: Positive (+) ; Negative (-)
[38] Site; Local (<10 km); Regional (<100); National; International
[39] 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[37]	Extent[38]	Duration[39]	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
OPERATIONAL PHASE-Direct impacts															
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	Very Low	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	Low	4	High
DECOMMISSIONING PHASE-Direct impacts															
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	Loss of topsoil	Negative	Site	Medium	Slight	Unlikely	Low	Low	Very low	No	Yes	Strip, stockpile and re-	Very low	5	High

Impact pathway	Nature of potential impact/risk	Status[37]	Extent[38]	Duration[39]	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
that disturb the soil profile.				term								spread topsoil during rehabilitation.			
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

Cumulative impacts: Agriculture and Soil potential

Impact pathway	Nature of potential impact/risk	Status[40]	Extent[41]	Duration[42]	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
CUMULATIVE IMPACTS															
Occupation of the land by the project infrastructure of multiple developments	Regional loss of agricultural land	Negative	Regional	Long term	Slight	Very Likely	High	Low	Very low	No	No	None	Very Low	5	High

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

6.1.8 Socio-Economic

6.1.8.1 Findings of Socio-Economic Assessment

The Socio-Economic Assessment was undertaken by Surina Laurie of the CSIR and externally peer reviewed and approved by Elena Broughton of Urban-Econ (2018).

The specialist study, review letter and responses table to indicate how the comments of the reviewer have been addressed are included in **Appendix N.**

The Socio-Economic Impact Assessment has been undertaken to determine the potential social and economic impacts (both positive and negative) that may occur due to the development of the Kap Vley WEF. The study found that the two key towns that will be affected by the proposed Kap Vley WEF are Kleinzee and Komaggas. The study shows that the two key towns' socio-economic structures do differ significantly and potentially, the identified impacts may manifest differently or with higher or lower impact significance within these two towns.

Socio-economic impacts and the respective significance of these impacts are highly dependent on the receiving social and economic environment or context in which the impacts occur. For example, a small community with high unemployment numbers and a declining economy would experience impacts differently compared to a community where everyone is fully employed and there is a growing economy with various economic drivers.

During the construction phase, it is anticipated that negative impacts may occur due the influx of people and the presence of workers on site. Positive impacts during this phase may occur due to the employment opportunities that will be created in addition to the project expenditure as part of the development of the WEF and associated electrical infrastructure. In terms of the economic opportunities, these are expected to be high (positive), should the recommended mitigation measures be implemented. The influx of people seeking employment opportunities will have a moderate negative impact, following mitigation. On a cumulative level, this impact is still considered to be a moderate negative impact.

During the operational phase, long term employment opportunities will be created and the IPP will have Social and Economic Development spend within the area. These are considered to be positive impacts and will have a high and very high, respectively, impact significance following mitigation. In terms of the negative impacts, the presence of the WEF may affect the Sense of Place. However, based on other specialist studies undertaken for this proposed development this impact is considered to be of very low negative significance. On a cumulative level, the impacts of project expenditure and the diversification of the local economy are considered to be of a high positive significance and the negative impact on the Sense of Place is considered to be very low.

Impact statement by the specialist:

The measures included within Section 1.6 of the Socio-Economic Impact Assessment report (Appendix N) should be considered to be included within the EA, should it be granted by the DEA. Based on the current socio-economic context of the area and the impacts identified, it is the opinion of the specialist that the project can go ahead, provided that the mitigation measures proposed are adopted and adhered to by the EA holder.

6.1.8.2 Impact Assessment

The potential impacts identified during the Socio-Economic Impact Assessment are:

- **Construction Phase**
  - Influx of people causes a disturbance in the existing social order;
  - Additional strain on municipal services;
  - Employment opportunities and skills development;
  - The presence of workers could increase the risk of stock theft, poaching, increased veld fires and damage to farm infrastructure; and
  - Increased income via employment and new economic opportunities.

- **Operational Phase**
  - Employment opportunities and skills development;
  - Impact of project expenditure and long-term diversification of the economy; and
  - Impact of the visibility, operation and audibility of the development.

- **Decommissioning Phase**
  - Loss of increased income through employment;
  - Loss of new economic opportunities;
  - Loss of SED spending; and
  - Loss of employment.

- **Cumulative impacts**
  - Influx of people causes a disturbance in the existing social order. Additional strain on municipal services;
  - Increased income via employment;
  - New economic opportunities;
  - SED spending; and
  - The visibility, operation and audibility of the development may affect the Sense of Place.

The impact assessment for each phase can be seen in the tables below (Table 6.10):

Table 6.10: Impact assessment: Socio-Economic

Impact pathway	Nature of potential impact/risk	Status[43]	Extent[44]	Duration[45]	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
SOCIO-ECONOMIC															
CONSTRUCTION PHASE															
Influx of people	Influx of people caus a disturbance in the existing social order Additional strain on municipal services	Negative	Regional	Long-term	Severe	Very Likely	Low	Moderate	High	No	Yes	Initiating the education campaign among the local community (in partnership with the community members already active in the area) focusing on alcohol abuse, drug abuse, HIV/AIDS, Sexually Transmitted Diseases etc. prior the start of construction and maintaining these throughout the project's duration. The applicant and the contractor should implement an HIV/AIDS awareness programme for all workers at the outset of the construction phase.	Moderate	3	Medium

[43] Status: Positive (+) ; Negative (-)
[44] Site; Local (<10 km); Regional (<100); National; International
[45] 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[43]	Extent[44]	Duration[45]	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
												Arrangements must be made to enable workers from outside the area to return home over the weekends/at regular intervals. This would reduce the risk posed by non-local construction workers to local family structures and social networks. Make condoms freely available to employees and all contractor workers. Introduce alcohol testing on a weekly basis for construction workers. Developing a Code of Conduct for all employees related to the project, which includes no tolerance of activities such as alcohol and drug abuse. Recruitment should be done following a transparent approach and adequately communicated in the area to limit the			

Impact pathway	Nature of potential impact/risk	Status[43]	Extent[44]	Duration[45]	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
												chances of people staying for longer period in hope of finding a job.(Section A)			
Employment opportunities	Employment opportunities and skills development	Positive	Regional	Medium-term	Substantial	Likely	Low	Moderate	Moderate	No	Yes	Implement a 'locals first' policy with regard to labour needs. This can be incorporated into a Workforce Recruitment Policy. The Workforce Recruitment Policy should include: -A clear definition of who is considered to be local residents; known as the Project Affected People (PAP). The purpose of demarcating the PAP is to develop a criterion of characteristics considered to identify a given job seeker as a PAP. Once this criterion is known; all subsequent job seekers can be screened against it in order to determine whether they receive preference for employment; -A database of local	High (positive)	2	Medium

Impact pathway	Nature of potential impact/risk	Status[43]	Extent[44]	Duration[45]	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
												residents and their relevant skills and experience; -The selection criteria for allocating jobs; -Reserve employment, where practically possible, for local residents; and -Should be contractually binding. Where possible, subcontract to local construction companies. Consultation with local authorities is essential so as to manage job creation expectations and ensure that all eligible workers in the primary study area are informed of the opportunities. Contracts ensuring that on-the-job training is included and enforced as a condition for the development of this			

Impact pathway	Nature of potential impact/risk	Status[43]	Extent[44]	Duration[45]	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
												project. To improve the chances of skills development during the construction phase, contractors are encouraged to provide learner-ships and encourage further knowledge sharing. To ensure that skills are adequately acquired, additional training programmes need to be held during the construction phase to prepare the identified community members to be employed at the next phase, i.e. the operational phase. Developers should be open to local recruitment processes and be willing to offer some skills transfer during this phase of the project to ensure the maximum utilisation local labour.			

Impact pathway	Nature of potential impact/risk	Status[43]	Extent[44]	Duration[45]	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
												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 and the associated electrical infrastructure.			
Impact on surrounding land owners associated with the presence of workers	The presence of workers presence of workers could increase the risk of stock theft, poaching, increased veld fires and damage to farm infrastructure	Negative	Local	Medium-term	Substantial	Likely	High	Low	Moderate	No	Yes	No fires should be allowed onsite. No construction workers, with the exception of security personnel, will be allowed to stay on the site overnight. A complaints register must be available on site at all time to any individual who may have a complaint. These complaints must be noted and suitable action taken to address the complaint.	Low	4	Medium

Impact pathway	Nature of potential impact/risk	Status[43]	Extent[44]	Duration[45]	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 movement of workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis; The EMPr must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. The project owner is responsible to compensate neighboring land owners for losses incurred, if losses occurred are proven to be due to the development of the WEF and associated electrical infrastructure.			
Project expenditure and new economic opportunities	Increased income via employment	Positive	Regional	Medium-term	Major	Very Likely	High	Low	High	No	Yes	Engage with local communities (Kleinzee and Komaggas) with respect to their possible involvement	High (Positive)	2	Medium

Impact pathway	Nature of potential impact/risk	Status[43]	Extent[44]	Duration[45]	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
	New economic opportunities											during construction in providing supporting services such as catering, temporary housing of workers, transportation, etc. The proponent must procure goods and services, as far as practically possible, from within the project area. Only if required goods and services are not affordably and readily available in the study area should the proponent seek to obtain it elsewhere. It is also suggested that regularly required goods and services (e.g. food and accommodation) be obtained from as large a selection of service providers as possible to ensure distribution of project benefits. (Section B).			

Impact pathway	Nature of potential impact/risk	Status[43]	Extent[44]	Duration[45]	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
OPERATIONAL PHASE															
Creation of long-term employment through operation and maintenance operations	Employment opportunities and skills development Alternative form of income	Positive	Regional	Long-term	Substantial	Likely	Low	Moderate	Moderate	No	Yes	Where possible, ensure that the local community members are prioritised for the allocation of the created jobs. Contracts ensuring that knowledge sharing and on-the-job training should be enforced as a condition for the development of the project.	High (Positive)	2	Medium
Project expenditure and long-term diversification of the economy	Increased income via employment New economic opportunities SED spending	Positive	Regional	Long-term	Outstanding	Likely	High	Low	High	No	Yes	The economic development plans to be developed must be prepared by socio-economic experts, to ensure that they can be effectively implemented and managed, bringing maximum benefit to the community. Support local businesses as far as possible. Liaise closely with the local municipality and other stakeholders involved in socio-economic	Very High (Positive)	1	Medium

Impact pathway	Nature of potential impact/risk	Status[43]	Extent[44]	Duration[45]	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
												development in order to ensure that any projects are integrated into wider strategies and plans with regard to socio-economic development. Proponent/project owner needs to establish a relationship with the local authorities such as the Nama Khoi LM and local community leaders to ensure that the SED initiatives that are implemented during the pre-operational stage are aligned with the relevant needs of the Kleinzee and Komaggas communities. The fair and transparent application of the Department of Energy's (DoE) requirements for local benefit enhancement will require extensive interactions and engagement with the local community and its representatives. The			

Impact pathway	Nature of potential impact/risk	Status[43]	Extent[44]	Duration[45]	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
												applicant should therefore ensure that adequate time and resources are devoted to these activities.			
Impact of the visibility, operation and audibility of the development	The visibility, operation and audibility of the development may affect the Sense of Place	Negative	Regional	Long-term	Slight	Not likely	High	Low	Very Low	No	Yes	The mitigation measures proposed by the visual, agricultural and noise specialists should be adhered to.	Very Low	5	Medium
DECOMMISSIONING PHASE															
Impact of the loss of project expenditure	Loss of Increased income via employment Loss of new economic opportunities Loss of SED spending	Negative	Regional	Long-term	Substantial	Likely	High	Low	Moderate	No	Yes	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.	Low	4	Medium
Loss of employment opportunities	Loss of employment	Negative	Regional	Long-term	Substantial	Likely	High	Low	Moderate	No	Yes	Contracts ensuring that knowledge sharing and on-the-job training should be enforced as a condition for	Very Low	5	Medium

Impact pathway	Nature of potential impact/risk	Status[43]	Extent[44]	Duration[45]	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 development of the project. This will ensure that all employees will have acquired a skills set that will potentially enable them to find other work at similar developments.			

Cumulative impacts

Impact pathway	Nature of potential impact/risk	Status[46]	Extent[47]	Duration[48]	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
SOCIO-ECONOMIC-Cumulative impacts															
Influx of people	Influx of people causes a disturbance in the existing social order Additional strain on municipal services	Negative	Regional	Long-term	Substantial	Likely	Low	Moderate	High	No	Yes	The specific mitigation measures listed under the operational phase (above) must be adhered to (marked as Section A)	Moderate	3	Medium
Project expenditure and new economic opportunities	Increased income via employment New economic opportunities	Positive	Regional	Long-term	Major	Likely	High	Low	High	No	Yes	The specific mitigation measures listed under the operational phase (above) must be adhered to (marked as Section B)	High (Positive)	2	Medium
Impact of the visibility, operation and audibility of the development	The visibility, operation and audibility of the development may affect the Sense of Place	Negative	Regional	Long-term	Moderate	Not likely	High	Low	Low	No	Yes	The mitigation measures proposed by the visual, agricultural and noise specialists should be adhered to.	Very Low	5	Medium

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

6.1.9 Noise

6.1.9.1 Findings of the Noise Impact Assessment

The Noise Impact Assessment was undertaken by Morne de Jager (2018) and is included as **Appendix O** to this report.

The report considered the ambient sound levels previously measured in the area, the author's expertise, as well as an output of sound propagation model (making use of the worst-case scenario in terms of the precautionary approach) to identify potential issues of concern.

The potential noise impact for the WEF was evaluated using a sound propagation model. Conceptual scenarios were developed for the construction and operational phases. With the modelled input data as used, this assessment indicated that:

- A potential noise impact of a **very low** significance (before mitigation) and very low significance (after mitigation) during the day for the construction phase of the WEF;
- A potential noise impact of a **low** significance (before and after mitigation) at night for the construction phase of the WEF;
- A potential noise impact of a **low** significance (before mitigation) and very low (after mitigation) for daytime construction traffic; and
- A potential noise impact of a **very low** significance (before and after mitigation) for the operation of the wind turbines at night; and

A potential noise impact of a **low** significance (before and after mitigation) for the decommissioning of the WEF and associated powerline.

No additional work or assessment is required or recommended. The developer should however investigate any reasonable and valid noise complaint if registered by a receptor staying within 2000 m from the location where construction or operational activities are taking place.

The potential noise impact for the WEF must again be evaluated should the layout be changed where any wind turbines are located closer than 1 000 m from a confirmed Noise Sensitive Development (NSD) or if the developer decides to use a different wind turbine that has a sound power emission level higher than the Acciona WTG used in this report (sound power emission level exceeding 108.4 dBA re 1 pW).

Impact statement by the specialist:

Considering the low significance of the noise impacts (with mitigation, inclusive of cumulative impacts) for the proposed Kap Vley WEF and associated infrastructure, there is no reason that the proposed Kap Vley WEF should not be authorised.

6.1.9.2 Impact Assessment:

It is estimated that construction will take approximately 12 - 18 months subject to the final design of the WEF, weather and ground conditions, including time for testing and commissioning. Furthermore, the operational life of the development would be up to 20 years. During operation of the development, the large majority of the WEF site will continue with agricultural use as it is currently. 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:

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

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

- **Decommissioning Phase**
  - Increase in ambient sound levels as a result of decommissioning activities during the day.
  - Increase in ambient sound levels as a result of decommissioning activities at night.

The proposed project will result in increased noise levels in the area, but the noise levels will be low and is unlikely to impact on the quality of living for the surrounding receptors.

Cumulative impacts

The introduction of the Kap Vley WEF however will not result in a cumulative noise effect as these facilities are further than 5 000 m from the turbines of the proposed Kap Vley WEF.

Table 6.11: Impact Assessment: Noise

Impact pathway	Nature of potential impact/risk	Status[49]	Extent[50]	Duration[51]	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
NOISE															
CONSTRUCTION PHASE-Direct impacts															
Noise pollution stemming from construction activities	Various construction activities taking place simultaneously during the day may increase ambient sound levels due to air-borne noises	Negative	Local	Short-term	Moderate	Improbable	High	Moderate	Very Low	No	Yes, but not required	Ensure equivalent A-weighted daytime noise levels below 52 dBA at potentially sensitive receptors. Ensure that maximum noise levels at potentially sensitive receptors be less than 65 dBA; Prevent the generation of disturbing or nuisance noises; Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive	Very low	5	High
Noise pollution stemming from construction activities	Various construction activities taking place simultaneously during the night may increase ambient sound levels due to air-	Negative	Local	Short-term	Moderate	Probable	High	Moderate	Very Low	No	Yes, but not required		Very low	5	High

[49] Status: Positive (+) ; Negative (-)
[50] Site; Local (<10 km); Regional (<100); National; International
[51] 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[49]	Extent[50]	Duration[51]	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
	borne noises											receptors; Ensuring compliance with the National Noise Control Regulations.			
OPERATIONAL PHASE-Direct impacts															
Noise pollution stemming from operation of WEF	Wind turbines operating simultaneously at night. Increases in ambient sound levels due to air-borne noises from the wind turbines	Negative	Regional	Long term	Moderate	Probable	High	N/A	Low	No	Yes, but required	Ensure that the change in ambient sound levels as experienced by Potentially Sensitive Receptor 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
DECOMMISSIONING PHASE-Direct impacts															
Noise pollution stemming from decommissioning of	Various decommissioning	Negative	Local	Short-term	Moderate	Improbable	High	N/A	Very Low	No	Yes, but required	Ensure that the change in ambient sound levels as	Very Low	5	High

Impact pathway	Nature of potential impact/risk	Status[49]	Extent[50]	Duration[51]	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
WEF	activities taking place simultaneously during the day may increase ambient sound levels due to air-borne noises											experienced by 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.			
	Various decommissioning activities taking place simultaneously at night may increase ambient sound levels due to air-borne noises	Negative	Local	Short term	Substantial	Probable	High	N/A	Low	Yes	Yes, but required		Low	4	High

6.1.10 Transportation

The Transportation Impact Assessment was undertaken by Mr. Christo Bredenhann of WSP Group Africa (Pty) Ltd (WSP). The study is included in **Appendix P** to this report.

6.1.10.1 Findings of the Transportation Impact Assessment

The site will be accessed off two existing local roads (unsurfaced) via the R355, a single carriageway 2-way surfaced road (1 lane per direction), with no surfaced shoulders. It is recommended that only the existing local roads be utilised for access during construction, operational and the decommissioning phase.

There is no need for public transport services or non-motorised transport infrastructure to serve the site for the construction and operational phase, except for the transport of staff.

The estimated peak trip generation of the facility will be 35 veh/hr in the weekday AM and PM peaks during the Construction and Decommissioning phases, and will be negligible for the operational phase.

The expected traffic increase on the internal and local access roads during the construction phase may result in deterioration of the road, as it is not designed for abnormal and heavy traffic volumes. The cost of maintaining and repairing this road during the Construction phase of the projects should be borne by the project owner.

It is not possible to determine the volume of traffic that will be generated during the decommissioning phase. It can however be expected that the volumes will be lower than during the construction phase, and the resultant traffic impact on the local access roads will be lower than during the Construction phase. Any damage to the unsurfaced roads caused by the decommissioning phase traffic should be repaired at the cost of the project owner.

The estimated total E80 loading on the surfaced road to the R355, the surfaced portion of the R355 to Springbok and National Road N7 for the duration of the construction period is negligible, and no mitigating measures are deemed necessary.

The transport route/s between the origin of the construction material and turbine components and the facility may be National, Provincial or Local roads; and each authority will be required to provide the necessary permits for the transportation of any oversized or abnormally heavy components.

The mitigating measures recommended are dust monitoring and control on all on-site and local unsurfaced roads.

Impact statement by the specialist

The EMPr for the Kap Vley WEF must include dust monitoring and mitigation measures for the on-site and unsurfaced local access roads, during the Construction and Decommissioning phase. This should be a condition for the EA of the facility, should it be granted.

No other traffic related conditions are required for the EA for the Kap Vley WEF, should it be granted.

It is the Professional Transportation Engineers' opinion that the proposed development should be authorised from a traffic and transportation impact point of view.

6.1.10.2 Impact Assessment

The potential transportation or traffic related issues identified during the EIA process include:

- **Construction, operational and decommissioning phases**
  - Noise, dust & exhaust pollution due to the increased vehicles trips on the internal on-site roads;
  - Noise, dust & exhaust pollution due to the increased vehicles trips on the local unsurfaced access roads;
  - Noise & exhaust pollution due to the increased vehicles trips on the local provincial road (R355); and
  - Noise & exhaust pollution due to the increased vehicles trips on the High-order (National) road network (N7).

- **Cumulative impacts**
  - Noise & exhaust pollution due to the increased vehicles trips on the local provincial road (R355); and
  - Noise & exhaust pollution due to the increased vehicles trips on the High-order (National) road network (N7).

Table 6.12: Impact Assessment: Transportation

Impact pathway	Nature of potential impact/risk	Status[52]	Extent[53]	Duration[54]	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
TRANSPORTATION															
CONSTRUCTION PHASE-Direct impacts															
Vehicle trips on-site	Noise, dust & exhaust pollution	Negative	Local	Medium-term	Slight	Very likely	High	N/a	Low	No	Noise – no Dust – yes Exhaust fumes - no	Dust suppression and maintenance of internal roads	Low	4	High
Additional trips on the local unsurfaced access roads	Noise, dust & exhaust pollution	Negative	Regional	Medium-term	Slight	Very likely	High	N/a	Low	No	Noise – no Dust – yes Exhaust fumes – no	Maintenance/repairs of local roads	Low	4	High
Additional trips on the R355	Noise & exhaust pollution	Negative	Regional	Medium-term	Slight	Very likely	High	N/a	Low	No	Noise – no Exhaust fumes - no	None	Low	4	High
Additional trips on the N7	Noise & exhaust pollution	Negative	Regional	Medium-term	Slight	Very likely	High	N/a	Low	No	Noise – no	None	Low	4	High

[52] Status: Positive (+) ; Negative (-)
[53] Site; Local (<10 km); Regional (<100); National; International
[54] 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[52]	Extent[53]	Duration[54]	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
											Exhaust fumes - no				
OPERATIONAL PHASE-Direct impacts															
Vehicle trips on-site	Noise, dust & exhaust pollution	Negative	Local	Long-term	Moderate	Very likely	High	N/a	Low	No	Noise – no Dust – yes Exhaust fumes - no	Dust suppression and maintenance of internal roads	Low	4	High
Additional trips on the local unsurfaced access roads	Noise, dust & exhaust pollution	Negative	Regional	Long-term	Moderate	Very likely	High	N/a	Low	No	Noise – no Dust – yes Exhaust fumes - no	Maintenance/repairs of local roads	Low	4	High
Additional trips on the R355	Noise & exhaust pollution	Negative	Regional	Long-term	Moderate	Very likely	High	N/a	Low	No	Noise – no Exhaust fumes - no	None	Low	4	High
Additional trips on the N7	Noise & exhaust pollution	Negative	Regional	Long-term	Moderate	Very likely	High	N/a	Low	No	Noise – no Exhaust fumes - no	None	Low	4	High
DECOMMISSIONING PHASE-Direct impacts															
Vehicle trips on-site	Noise, dust & exhaust pollution	Negative	Local	Short-term	Moderate	Very likely	High	N/a	Low	No	Noise – no Dust – yes	Dust suppression and maintenance of internal roads	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[52]	Extent[53]	Duration[54]	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
											Exhaust fumes – no				
Additional trips on the local unsurfaced access roads	Noise, dust & exhaust pollution	Negative	Regional	Short-term	Moderate	Very likely	High	N/a	Low	No	Noise – no Dust – yes Exhaust fumes – no	Maintenance/repairs of local roads	Low	4	High
Additional trips on the R355	Noise & exhaust pollution	Negative	Regional	Short-term	Moderate	Very likely	High	N/a	Low	No	Noise – no Exhaust fumes - no	None	Low	4	High
Additional trips on the N7	Noise & exhaust pollution	Negative	Regional	Short-term	Moderate	Very likely	High	N/a	Low	No	Noise – no Exhaust fumes - no	None	Low	4	High

Impact pathway	Nature of potential impact/risk	Status[55]	Extent[56]	Duration[57]	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
CUMULATIVE IMPACTS: TRANSPORTATION															
Additional trips on the R355	Noise & exhaust pollution	Negative	Regional	Long-term	Slight	Very likely	High	N/a	Low	No	Noise – no Exhaust fumes - no	None	Low	4	High
Additional trips on the N7	Noise & exhaust pollution	Negative	Regional	Long-term	Slight	Very likely	High	N/a	Low	No	Noise – no Exhaust fumes - no	None	Low	4	High

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

6.2 ADDITIONAL STUDIES COMMISSIONED BY JUWI

As previously indicated juwi commissioned two additional studies to inform the feasibility of the development of the proposed Kap Vley WEF. These studies and their key findings are briefly discussed below.

6.2.1 An Ecological Offset study

Information taken from the Ecological Offset Study (Appendix Q).

As mentioned above, juwi commissioned an Ecological Offset study by Simon Todd of Simon Todd Consulting.

The project site is located within a CBA as well as within an area variously recognised to be of high biodiversity value. The sensitivity of the site has been confirmed through extensive fieldwork at the site as part of the EIA. Recognising the sensitivity of the site, the developer has taken a pro-active approach to impact avoidance and mitigation at the site. This includes detailed habitat mapping at the site to inform the layout and reduce on-site impacts as far possible. While this has been very effective at reducing the impact of the development on plant species of concern as well as sensitive habitats, some residual impact remains due to the overall general sensitivity of the site as well as the status of the affected area as a CBA. As a result, some of the ecological impacts associated with the development have been assessed as being of moderate significance after mitigation. Based on these results, the ecological specialist has recommended that the developer should include an offset study as part of the development application. The purpose of the offset would be to provide an off-site mitigation of the residual impact of the development.

Juwi has thus commissioned this Ecological Offset study to coincide with the EIA process and inform the decision making process in line with the Draft National Offset Policy (Government Notice 276 of 2017). The inclusion of the Offset Study in the EIA process has, to date, been a voluntary pro-active step initiated by the developer and was not been requested by either DEA or DENC. However, given the sensitivity of the site, it was anticipated the development would potentially be fatally flawed without an offset and such a measure would likely have emerged as a need or requirement during the EIA process. This is in line with the 2014 EIA Regulations and offset guidelines which recommend that the need for an offset should be evaluated at the pre-application phase and the necessary steps taken to include the offset in the EIA process and provide opportunity for the issuing authority (DEA) and other stakeholders to comment on the proposed offset.

The Ecological Offset Study has the following broad aims:

- Provide an outline of the current framework for biodiversity offsets. A summary of the current Draft National Biodiversity Offset Policy is provided, highlighting the relevant sections as they pertain to the current development.
- Place the habitats present at the site in a regional context and identify features of the site that may make it of regional significance.
- Identify if and where similar habitat may occur on the coastal plain of Namaqualand.

- Explore identified potential offset areas in terms of the draft national offset guidelines and the regional conservation context to ensure that identified offset areas meet the like for like offset criterion, but also occur in an area where their long-term sustainability can be ensured.
- Evaluate the most appropriate type of offset to be developed in terms of land acquisition or stewardship and the recommended management authority.
- Identify any further actions and priorities required for taking the offset process forward.

1. Evaluation of Kap Vley and Need for an Offset

In terms of the requirements for an offset study, it is required to evaluate the adequacy of measures considered and adopted to avoid, minimize and rehabilitate potentially significant negative impacts on biodiversity. Any development must ensure that there is no residual impacts of very high significance that could lead to irreplaceable loss of biodiversity and/ or priority ecosystem services. In other words, an offset does not negate the need to reduce on-site impacts to an acceptable level. The manner in which the Kap Vley development as followed the mitigation hierarchy to reduce impacts as far as possible has been detailed in the preceding sections and is also summarised below. Significant and detailed avoidance has been implemented at the site and reducing impacts further is not likely to be possible without compromising the viability of the development. Consequently, the residual impacts cannot be further reduced through on-site mitigation and the offset is the remaining option within the mitigation hierarchy.

Impacts associated with the Kap Vley development have been assessed in the ecological specialist study for the EIA as being of moderate or low significance after mitigation. Such mitigation does not include the implementation of the offset. The purpose of the offset is to mitigate the residual moderate impacts to a low level. It is however important to note that the specialist ecological study considers the residual impacts on the site to be acceptable, which is a precondition for the implementation of an offset. The moderate impacts have been achieved through the detailed fine-scale mapping of the site, the walk-through of the footprint and the avoidance that the developer has implemented in response the detailed ecological work. This avoidance has been effective at reducing the impact of the development on key species and habitats to low levels. The limits of acceptable change associated with each mapped sensitivity category is provided in Table 6.13. None of the limits were exceeded by the development after the implementation of the avoidance through refining and adjusting the final development footprint. Aside from excluding all development from the no-go areas, development within the High sensitivity areas was reduced as much as possible although there will still be some impact to these areas that cannot be easily avoided. This is however less than 5 ha of the total 220 ha extent of this sensitivity class and as such, this loss is considered acceptable. The majority (60 ha) of the development footprint is located within areas considered to be Medium sensitivity with a lower extent in areas considered to be Medium High sensitivity (17.9ha).

Table 6.13. Limits of acceptable change that were applied in the EIA and the associated recommended offset ratios within each mapped sensitivity class. Recommended offset ratios for CBA and protected area expansion strategy focus areas are also provided.

Sensitivity	Description	Acceptable Loss	Recommended Offset Ratio
No Go Areas	These are considered critical areas for biodiversity pattern and process maintenance.	Zero.	Loss of habitat these areas cannot be adequately offset.
High	These are high value habitats with confirmed presence of significant populations of SCC	5%	1:30
Medium/High	High value habitats vulnerable to disturbance or with confirmed presence of SCC at low density	10%	1:20
Medium	Moderate value habitat that is locally restricted or not widely available.	25%	1:10
Medium/Low	Typical habitat of high availability with low abundance of SCC.	40%	Offset not required
Critical Biodiversity Areas	CBAs	5%	1:20
NC PAES	Protected Area expansion strategy target areas	5%	1:20

The primary residual impact which motivates for the offset is the moderate residual impact on CBAs and NCPAES areas. As the entire site is within CBAs and NCPAES focus area, some impact on these features cannot be avoided. However, as described above, the main biodiversity features of concern have been well-avoided and the main residual impact would be habitat loss within the CBA and some potential disruption of broad-scale ecological processes and gradients. Given the nature of the residual impact of the development, an offset is considered to be an appropriate off-site mitigation measure. However, this needs to cater to both the site level impacts on species as well as the broad-scale regional effects on processes.

In terms of offset options, this can include trading like for like habitat, trading up or other options. However, in the current case, it is clear that trading like for like is the preferred offset option. This is because the affected Sand Fynbos vegetation is a restricted vegetation type with a high abundance of species of conservation concern that warrants further protection. The offset could be used to contribute to meeting this need and is the most direct and appropriate form of mitigation in this regard. Trading up is not seen as a viable alternative as there are few options for trading up in the vicinity of the site and this is usually only used where the like for like criterion cannot be easily met.

2. Calculation of the required offset

Although the offset guidelines provide an indication of the appropriate offset ratios for development within areas of different conservation value, these are minimum recommended value and there is some discretion of the specialist to recommend higher values if appropriate. In terms of the different ecological sensitivity categories mapped at the site, the offset ratios which are deemed appropriate are listed above in Table 2. For the High sensitivity areas, an offset ratio of 1:30 has been recommended, while this deceases to 1:10 for the Medium sensitivity areas. The total required offset based only on the site sensitivity information is calculated at 1069ha. However, the required offset ratio for CBAs and protected area expansion target areas is higher than that for the lower sensitivity classes with the result

that the offset must be corrected to accommodate the CBA and NC-PAES status of the site. The recommended offset ratio for the CBAs/NC-PAES areas is 1:20. This results in a total recommended offset for the Kap Vley Wind Farm of 2580 ha. It is important to note that this is the extent of matching sensitivity habitat and not the required extent of the land portion/s to be acquired. In addition, this is a gross calculation of the total extent of the offset and does not provide an appropriate breakdown of how this should be distributed among the target habitats. Such a breakdown is provided in the next section of the study.

The 1:20 offset ratio within the CBA/NC-PAES areas was recommended as an appropriate offset ratio for these areas based on the ecological sensitivity of these areas as well as an evaluation of the resultant offset target and the ability of the offset to mitigate the impacts of the Kap Vley development on broad scale ecological processes. When applied back onto to the turbine locations as a validation, the offset is equivalent to a buffer of 600m around the turbines. At this distance, there are likely very few residual ecological impacts on fauna or flora and as such this offset is considered adequate.

3. Identification of Potential Offset Target Areas

There are several features of the broader Kap Vley and Sandberg area that warrants its' status as a CBA and NCPAES focus area. This includes the unique *Acacia erioloba* population on the plains towards Kommagas, the quartzitic outcrops along the ridges of the site and the extensive dune and sand plain fynbos habitats of the site. The species of conservation concern which have been identified at the site are largely associated with the areas of sand fynbos. In terms of the impact of the development, this is restricted largely to the areas of sand fynbos and quartzitic hills with a smaller area within Namaqualand Strandveld. There are two impacts that warrant offsetting, firstly there is the habitat loss within the CBA/NC-PAES area and then secondly there is the residual impact on plant species of conservation concern and their associated habitat. As the plant species of conservation concern are associated with sand fynbos, the offset should be determined based primarily on the presence of this habitat and especially the presence of the identified key species of conservation concern. However, the presence of Namaqualand Klipkoppe Shrubland is also seen as high desirable as this habitat is also considered generally sensitive and would be impacted by the development. Preferably, target areas should also accommodate some of the process-orientated features of the Kap Vley site such as the habitat heterogeneity of the site and the associated upland-lowland gradients evident at the site.

Currently the best available information on the distribution of Sand Fynbos in Namaqualand is the fine-scale mapping of Desmet et al. (2009). This indicates that the Kap Vley site is at the northern-most extent of Sand Fynbos and that all other mapped units are all to the south of the site. As a result, the offset target area will have to be located to the south of Kap Vley and no options to the north are being investigated as there are no known areas of sand fynbos further north.

Based on the habitat mapping at Kap Vley, it appears that the areas of Sand Fynbos immediately south of the site may not have the required SCC present as this area consists largely of the Sandveld Fynbos Mosaic habitat type. This habitat unit is characterised by a fine-scale mix of Strandveld and Sand Fynbos with Strandveld on the dune crests and slopes and Sand Fynbos in the low-lying dune slacks where moisture availability is higher. If the presence of Restio Fynbos and Dune Fynbos are taken as key indicators, then significant habitat does not occur until the area between Koingnaas and Hondeklip Bay. Previous experience in the area indicates that the species of conservation concern present at Kap Vley are also well represented in this area and as such represents a suitable offset target area based on the "like for like" criterion. A species list for these areas is included at the end of this document and confirms

the presence of the species of conservation concern in this area and provides some validation of these areas as viable offset target areas. Several of these areas are contiguous with the Namaqua National Park, which provides the opportunity for the offset to be incorporated into the National Park which would ensure the long-term sustainability of the offset.

4. Approach to the Implementation of the Offset

Before an offset can be considered, it must be demonstrated to have long-term viability ecologically, but also with regards to management responsibility for the site. An offset can take on a variety of different forms and does not necessarily have to include land purchase. However, in order to ensure the long-term sustainability of the offset and also to ensure that a suitable and capable management authority can take on the management commitment of the offset, the developer has chosen land purchase as the preferred offset type. Stewardship is another viable possibility in the area that could be considered if land purchase is not possible.

In order to ensure that the offset is located within appropriate offset receiving areas, the developer has engaged WWF-SA to facilitate the land purchase. As WWF-SA has an active land purchase programme in Namaqualand which works in collaboration with SANParks and DENC, this will ensure that the offset is located within identified target areas. The land would be purchased by WWF-SA on behalf of the client and management would be transferred to SANParks. Funds from the developer would be made available to manage the offset for the 20 year duration of the offset. However while this represents the preferred scenario for the developer, this requires the coincidence of the final offset area to be purchased with areas and habitats that SANParks are willing and able to include in the National Park. This may not be the case with the result that there is a risk that the offset may not be achieved if this is provided as the only viable scenario. As such, the possibility of another management authority for the offset must be considered. If the management of the offset is not transferred to SANParks then this would have be transferred to another entity such as an NGO active in the conservation sector or a new independent management authority could be started, in which case NC-DENC would be the responsible authority for ensuring compliance with the offset conditions.

Although the offset would only come into effect once the project is firstly authorised and secondly is selected as a preferred bidder under the REIPPP, once financial close of the project is achieved construction can commence within 6 months with the result that this can place significant pressure on the developer to conclude the offset. In order to expedite the process later on, it is recommended that the negotiation process with WWF and SANParks should not be stalled and contingent on receiving preferred bidder status. As such, this would allow the developer and WWF to undertake due diligence and secure conditional Sale Agreements at suitable price points before preferred bidder status is announced. These agreements would then be triggered at the commencement of construction at Kap Vley.

6.2.2 Wake Effect Analyis

A Wake Effect statement was conducted as requested by DEA in their comment letter on the Draft Scoping Report. juwi appointed DNV GL South Africa (Pty) Ltd (“DNV GL”) to qualitatively evaluate the potential wake impact of the Kap Vley wind farm on a proposed relatively nearby wind farm undergoing development by Eskom ("Eskom Project"). The full Wake Effect statement and the implications of this proposed project for this is attached as Appendix R.

The magnitude of the wake impact from one wind farm to a neighbouring wind farm is largely driven by the direction of the winds, the distance between the two projects and the atmospheric conditions such as turbulence intensity. Low ambient turbulence intensity tends to elevate wind farm wakes and generally increases the distance with which wakes persist.

The Eskom Project is located 16 km northwest of the closest proposed Kap Vley wind turbine at a bearing of approximately 300 degrees. It is noted that 31 of the 45 proposed Kap Vley wind turbines are 20 km or further from the closest outer boundary of the Eskom Project. DNV GL typically does not consider neighbouring wind farms that are in excess of 20 km away in the evaluation of external wake impact, as the wake impact tends to be negligible and the magnitude of the wake impact predicted by the models at this distance from the wind farm has a higher degree of uncertainty associated with it.

It is noted that the measured turbulence intensity at the top of the mast at 15 m/s is low, approximately 5%. This low ambient turbulence has the potential to increase the internal wake effects of the Kap Vley wind farm and also cause the wakes from the wind farm to persist for longer distances. However, without comprehensive modelling of the wake effect, it is impossible to determine the exact magnitude of this effect.

According to wind data provided by juwi at the location of the Kap Vley met mast, the predominant wind direction is 160 degrees. It is noted that the wind rose provided is fairly unidirectional, with very little time occurring where winds prevail from other direction sectors. It is further noted that the measured wind rose on-site is supported by two independent sources of long-term reference station data. This provides confidence that the wakes from Kap Vley wind farm will not interfere with the Eskom Project. It also provides confidence that although the low level of turbulence intensity may increase the chance of the wakes persisting, that because of the direction of the winds, the wake effects will still not impede on the Eskom Project.

Based on the location of the proposed wind farms, the wind rose and the distance of the projects from one another, DNV GL believes that wake impact of the Kap Vley wind farm on the neighbouring wind farm to be negligible.

Scoping and Environmental Impact Assessment for the proposed Kap Vley Wind Energy Facility near Kleinzee in the Northern Cape

UPDATED DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 7: Conclusions

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7. CONCLUSIONS AND RECOMMENDATIONS

This chapter contains the main conclusions and recommendations from the EIA process, provides the key findings of the specialist studies (i.e. outlines the most significant impacts identified, together with the key management actions required to avoid or mitigate the negative impacts or enhance positive benefits), an integrated summary of impacts that will influence decision-making by the CA (i.e. the DEA) and the associated management actions. In addition, this chapter also includes the EAP's opinion on whether the project should receive EA.

Please note that this report comprises the UPDATED DRAFT EIA REPORT that is being released for a 30-day commenting period. An initial Draft EIA Report was prepared and was released for a 30-day commenting period which extended to 17 May 2018.

Following the release of the initial Draft EIA Report, comments were received from the Department: Environment and Nature Conservation Northern Cape (DENC) which required substantial amendments to the DEIAR, in particular the Ecological Offset study (see letter from DENC dated 25 May 2018 included in Appendix E9 of this Updated Draft EIA Report). The CSIR subsequently submitted a notification to DEA dated 28 May 2018 in terms of Regulation 23 (1)(b) of the NEMA EIA Regulations, as amended to note that significant new information has come to light that was not contained in the DEIAR and EMPr that were consulted on during the initial public participation process contemplated in subregulation (1)(a) (see Appendix E7). The DEA was therefore notified that based on the new information the Final EIA Report will be submitted within 157 days from the date of the Acceptance of the Scoping Report (letter dated 12 February 2018 included in Appendix E5). This allows for an extension of 50 days to submit the Final EIA Report to DEA for decision-making. DEA acknowledged the notification for extension and granted extension in their letter dated 1 June 2018 (see Appendix E8). Following the 30-day commenting period, the comments received on the Updated Draft EIA Report and EMPr will be included in the Final EIA Report which will be submitted to DEA for decision-making.

The changes that were made in the Updated Draft EIA Report following the comments from DENC include *inter alia*:

1. The Terrestrial Ecological study was revised to address the comments from DENC and SANParks and is included in Appendix G of this report; and
2. The Ecological Offset Report was revised following comments received from DENC and SANParks and was submitted for peer review and sign-off by an accredited and recognized biodiversity offset specialist, Mark Botha. The revised Ecological Offset Report is included in Appendix Q and the review from Mark Botha is included in Annexure 1 of Appendix Q.

In addition to the changes mentioned above the Updated Draft EIA Report also includes the following:

1. Comments from SANPARKS on the DEIAR (letter dated 11 June 2018 included in Appendix D4), in particular on the Ecological Offset study;
2. An updated EMPr which includes a Heritage Maintenance Plan (HMP) as requested by SAHRA in their letter 24 May 2018 (Appendix D4); and
3. The Agenda and Notes from a meeting (Appendix E10 and E11 respectively) that was held with representatives from DENC, WWF, DEA (Biodiversity Unit), Simon Todd Consulting, juwi and CSIR to discuss the comments from DENC and to present the revised Ecological Offset report to DENC and DEA. Comments were invited to inform and determine the suitability and the way forward on the proposed offset approach.

7.1 SUMMARY OF IMPACT SIGNIFICANCE: MAIN IMPACTS AND KEY RECOMMENDATIONS

The 2014 NEMA EIA Regulations (as amended on 7 April 2017) define a significant impact as "*an impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence*".

Based on the definition above, this section provides a summary of significant impacts identified and assessed by the specialists in **Appendices G to P** of this Updated Draft EIA Report and summarised in Chapter 6 (as noted in Table 7-1 below).

Table 7-1: Specialist Studies and Statements

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN	Appendix to this EIAR
Specialists			
Simon Todd	Simon Todd Consulting	Ecology Impact Assessment (Terrestrial Ecology including fauna and flora)	Appendix G
		Ecological Offset study	Appendix Q
Mark Botha	Conservation Strategy Tactics and Insight	Review of the Ecological Offset Study	Appendix Q (Annexure 1)
Andrew Pearson and Anja Albertyn	ARCUS	Bird Impact Assessment	Appendix H
Jonathan Aronson		Bat Impact Assessment	Appendix I
Luanita Snyman van der Walt *External Reviewer:* Dr Liz Day	CSIR *External Reviewer:* Freshwater Consulting	Dry and Ephemeral Watercourses Impact Assessment	Appendix J
Bernard Oberholzer and Quinton Lawson	Bernard Oberholzer Landscape Architect and BOLA	Visual Impact Assessment	Appendix K
Dr. Jayson Orton	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)	Appendix L
John Pether	Private, sub-contracted by ASHA Consulting (Pty) Ltd	Desktop Palaeontological Impact Assessment	Appendix L
Johann Lanz	Private	Soils and Agricultural Potential Assessment	Appendix M
Surina Laurie *External Reviewer:* Elena Broughton	CSIR *External Reviewer:* Urban-Econ Development Economists	Socio-Economic Impact Assessment	Appendix N
Morné de Jager	Enviro-Acoustic Research	Noise Impact Assessment	Appendix O
Christo Bredenhann	WSP Group Africa (Pty) Ltd	Transportation Impact Assessment	Appendix P

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN	Appendix to this EIAR
Additional technical study			
Stefanie Bourne	DNV GL South Africa (Pty) Ltd	Wake Effect Analysis	Appendix R

The Dry and Ephemeral Watercourses Impact Assessment specialist study (included in Appendix J of this Draft EIAR) was subject to a peer review process by an external reviewer (Dr Liz Day, Freshwater Consulting), as requested by the DEA. This external review report is included as an appendix to the study. Please see Appendix J for the review letter and CV of the specialist attached. It must be noted that the recommendations for edits to be made to the study **have been made** post external review. Appendix J contains a sign-off letter that was provided by Freshwater Consulting to confirm that they accept the changes to the report and approve of the study.

The Socio-Economic Impact Assessment specialist study (included in Appendix N of this Updated Draft EIA Report) was subject to a peer review process by an external reviewer (Elena Broughton, Urban-Econ Development Economists), as requested by the DEA. This external review report is included as an appendix to the study. Please see Appendix N for the review letter and CV of the specialist attached. It must be noted that the recommendations for edits to be made to the study **have been made** post external review. Appendix N reflects how and where the edits requested by Urban-Econ Development Economists were addressed in the revised report. A sign-off letter was provided by the reviewer to confirm that they accept the changes to the report and approve of the study.

In addition to the specialist studies undertaken, an Ecology Offset Study (included in Appendix Q) was commissioned by the Project Applicant to determine an appropriate offset to reduce the impact of the proposed Kap Vley WEF on the plants and habitats of conservation concern. This report was prepared in accordance with the Draft National Biodiversity Offset Policy and not a standard specialist study in terms of Appendix 6 of the 2014 NEMA EIA Regulations. The Ecological Offset study was revised and externally reviewed by Mark Botha of Conservation Strategy Tactics and Insight, a recognised biodiversity offset expert, in response to a comment received from DENC on the Draft EIA Report. The review from Mark Botha is included in **Annexure 1 of Appendix Q**. Comments received from Mark Botha have been included in the revised Ecological Offset study. The basic recommendations of the study were supported by the reviewer and found to be soundly derived.

A Wake Effect statement was also commissioned by the Project Applicant to determine the impact of the proposed Kap Vley WEF on the adjacent Eskom Brazil WEF. This report is not a standard specialist study in terms of Appendix 6 of the 2014 NEMA EIA Regulations and takes the form of a technical statement confirming no potential impacts as required in the Scoping Acceptance by the DEA. The full Wake Effect statement can be found in **Appendix R.**

All the mitigation and management measures proposed by the specialists, including those additional impacts and management measures identified by the EAP, have been included in the EMPr (Part B of this Updated Draft EIA Report).

7.1.1 Terrestrial Ecological Impact Assessment

An revised Terrestrial Ecological Impact Assessment (Appendix G of this Updated Draft EIA Report) has been included in this Updated Draft EIA Report following comments received from DENC on the Draft EIA Report (see comment letter from DENC dated 25 May 2018 in Appendix E9). The study was also revised based on comments received from SANParks in their letter dated 11 June 2018. The Ecology study was undertaken to assess the potential impacts to ecological features present on site.

The Kap Vley site is considered to be a broadly sensitive environment due to the presence of numerous species and habitats of conservation concern. These have however been mapped in detail through onsite vegetation surveys undertaken during numerous site visits by the specialist in spring. Based on these maps effective avoidance has been implemented with regards to the layout of the proposed wind farm. As a result of this avoidance, on-site impacts on fauna and flora have been reduced to Low Significance after mitigation and are considered acceptable. However, impacts on CBAs and Protected Area Expansion Strategy Focus Areas cannot be mitigated to a low level and impacts are predicted to be of Moderate significance post-mitigation. Such residual impacts associated with the development can be reduced to an overall Low Significance through the implementation of a biodiversity offset which has been separately investigated and found to be a viable option. The Project Applicant has commissioned an Ecological Offset Study to determine an appropriate offset to reduce the potential negative impacts of the proposed Kap Vley WEF on the species and habitats of special concern (see Appendix Q). The Ecological Offset study was externally reviewed by Mark Botha (see review included in Annexure 1 of Appendix Q). The basic recommendations of the revised Ecological Offset study were supported by Mark Botha and found to be soundly derived.

Table 7-2 illustrates a summary of the total number of impacts identified in the Ecological Impact Assessment.

Table 7-2: Summary of Terrestrial Ecological Impacts

		Significance Before Mitigation				Significance After Mitigation			
	Total Impacts	**Very Low**	**Low**	**Moderate**	**High**	**Very Low**	**Low**	**Moderate**	**High**
Construction Phase – Direct Impacts	**2**	0	0	1	1	0	0	2	0
Operational Phase – Direct Impacts	**4**	0	0	4	0	0	3	1	0
Decommissioning Phase – Direct Impacts	**2**	0	0	0	2	0	2	0	0
Cumulative Impacts	**2**	0	0	2	0	0	1	1	0
TOTAL IMPACTS	**10**								

The following main mitigation measures were identified in the Ecological Impact Assessment specialist study and noted in the EMPr (Part B of the Updated Draft EIA Report):

Pre-Construction:

- Pre-construction walk-through and evaluation and possible plant rescue operations;
- Identification of intrusion of the proposed construction site and development footprint, into minor drainage lines (if any);
- Identification of laydown areas, roadways etc. on site and evaluation of affected points within site, particularly in respect of floral and faunal presence; and
- Compliance with all relevant permitting requirements (e.g. Northern Cape Conservation Act (if applicable).

Construction Phase:

- No development of turbines, roads of other infrastructure within no-go areas. All activity should be excluded from these areas.
- Preconstruction walk-through of the development footprint to further refine the layout and reduce impacts on SCC through micro-siting of the turbines and access roads;
- Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna;
- Avoidance of identified areas of high fauna 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;
- 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;
- All construction vehicles 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; and
- If any parts of the site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which should be directed downwards.

Operational Phase:

- Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan included in the EMPr (Part B of the EIA Report);
- All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk;
- Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project;
- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques;
- All cleared areas should be revegetated with indigenous perennial species from the local area;
- Avoid areas of high wind erosion vulnerability as much as possible;
- Use net barriers, geotextiles, active rehabilitation and other measures during and after construction to minimise sand movement at the site. This should be monitored on a regular basis by the ECO and rectified by the developer as quickly as possible;
- Alien management plan to be implemented during the operational phase of the development, which makes provision for regular alien clearing and monitoring;
- Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species;
- Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. Problem woody species such as *Acacia cyclops* are already present in the area and are likely to increase rapidly if not controlled;
- Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems;
- Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible;
- Open space management plan for the development, which makes provision for favourable management of the facility and the surrounding area for fauna;
- Limiting access to the site to staff and contractors only;
- Appropriate design of roads and other infrastructure where appropriate to minimise faunal impacts and allow fauna to pass through or underneath these features;
- No electrical fencing within 20 cm of the ground as tortoises become stuck against such fences and are electrocuted;
- If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs) as far as possible, which do not attract insects;

- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill;
- All vehicles accessing the site should adhere to a low speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises;
- 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 quartz patches or active dune fields; and
- Investigate the potential of implementing an offset to mitigate the residual impact on CBAs.

Decommissioning Phase:

- Revegetation of cleared areas with monitoring and follow-up to ensure that rehabilitation is successful. Success must be measured against a predefined benchmark in terms of cover and species richness. Monitoring and rehabilitation must continue until such time as the benchmark has been attained. It is suggested that 40% of the natural vegetation for the affected habitat type represents a useful goal for rehabilitation. No goal for species richness is required, but the species used must be from the local environment and perennial in nature. These will have to be matched to their respective habitats.

- All hard infrastructure should be removed and the footprint areas rehabilitated with locally-sourced perennial species;
- The use of net barriers, geotextiles, active rehabilitation and other measures after decommissioning to minimise sand movement and enhance revegetation at the site;
- Monitoring of rehabilitation success at the site for at least 5 years after decommissioning or until the rehabilitation benchmarks and criteria have been met.

- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques;
- Alien 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;
- Rehabilitation of disturbed areas that have been generated by decommsioning. Rehabilitation should restore ecological function to the affected areas, especially with regards to the return of vegetation cover to a predefined benchmark which is suggested as 40% of the natural of the vegetation cover for the habitat under consideration.

- ;
- Wherever excavation is necessary for decommissioning, topsoil should be set aside and replaced after decommissioning activities are complete to encourage natural regeneration of the local indigenous species;
- Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned;
- Regular monitoring for alien plants within the disturbed areas for at least five years after decommissioning or until alien invasives are no longer a problem at the site; and
- 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.

The **overall conclusion** of the Terrestrial Ecological Impact Assessment is that the proposed Kap Vley WEF, with the implementation of an offset is considered to have acceptable terrestrial ecological impacts and is therefore supported from a terrestrial ecological point of view.

7.1.2 Bird Impact Assessment

A Bird Impact Assessment (Appendix H) was conducted as part of the EIA process in order to identify and assess impacts associated with the construction and operation of the proposed project on the bird population and habitat in the project area.

A 12-month preconstruction bird monitoring programme was developed and undertaken by ARCUS in line with Best Practice Guidelines applicable at the time of the surveys (Jenkins et al. 2015). Furthermore, Bird Life South Africa (BLSA) recently released species specific Verreauxs' Eagle Guidelines (BLSA 2017b). These were considered in the design of the monitoring programme.

Six regional Red Data species (Taylor *et al*. 2015) have been recorded including three classified as Endangered (i.e. Black Harrier, Ludwig's Bustard and Martial Eagle), and three as Vulnerable (i.e. Verreaux's' Eagle, Lanner Falcon and Southern Black Korhaan). Of these, only Southern Black Korhaan was frequently recorded. The specialist noted that the Kap Vley WEF site has some of the lowest activity and occurrence of priority species and red data species experienced by the specialists after one year of pre-construction bird monitoring, relative to other project sites worked on in South Africa.

A dedicated search for cliff nests was conducted by the specialist and six cliff nest sites for unidentified Raptors, White-necked Raven and Verreauxs' Eagles were found. It must be noted that no nests were found closer than 6.8 km from the nearest proposed turbines. Therefore, the current recommended turbine exclusion buffers shown in Table 3.7 in Chapter 3, will have no impact on proposed layout of the Kap Vley WEF.

A sensitivity mapping exercise found that one turbine (WEA 14) is currently within a high sensitivity area and should be relocated approximately 120 m to the south or 125 m to the south east while turbine WEA 25 may protrude into a high sensitivity area and should be set back approximately 65 m north or 75 m north east to avoid this. These requirements have been included as mitigation measures, and if implemented should reduce the potential collision impacts.

The sensitivity layers identified by ARCUS (Figures 3.20 and 3.21 in Chapter 3) will be incorporated by juwi into the final WEF project layout submitted prior to construction, as part of the final construction layout.

Table 7-3 illustrates a summary of the total number of impacts identified in the Avifaunal (Bird) Assessment.

Table 7-3: Summary of Bird Impacts

		Significance Before Mitigation				Significance After Mitigation			
	Total Impacts	Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase Impacts (Direct)	2	0	2	0	0	0	2	0	0
Operational Phase Impacts (Direct)	3	0	2	0	1	0	2	1	0
Decommissioning Phase Impacts (Direct)	1	0	1	0	0	0	1	0	0
Cumulative Impacts	2	0	0	1	1	0	1	1	0
TOTAL IMPACTS	8								

As derived from Table 7.3 above, it is clear that all impacts were identified with an overall **low significance** with the implementation of mitigation measures. The impacts identified above are all rated with a negative status. The cumulative impact is considered to be **high** prior to the implementation of the required mitigation measures, but **moderate** following mitigation.

The following main mitigation measures were identified in the Avifaunal Impact Assessment:

Construction Phase:

- 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;
- ECO to oversee activities and ensure that the site specific construction environmental management plan (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;
- The construction Phase ECO, the on-site Environmental Manager, and the client's representative on site (e.g. the resident engineer) are to be trained to identify Red Data and priority bird species, as well as their nests. If any nests or breeding locations for this species are located, the avifaunal specialist is to be contacted for further instruction; and
- 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.

Operational Phase:

- Turbines must not be constructed within any High Sensitivity Zones. The turbine blade should not protrude into these areas, and therefore the bases should be constructed suitably far from these areas to prevent this. Based on the outcomes of the sensitivity mapping, turbine number WEA 14 is within such an area and should be relocated approximately 120 m to the south or 125 m to the south east so that the turbine base is no less than 80 m from the boundary of the high sensitivity

area. Turbine WEA 25 should also be set back approximately 65 m north or 75 m north east so that its blade tip does not encroach the high sensitivity area;

- 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 Arcus 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;
- Where feasible, construct minimum number of turbines required to meet project MW output;
- Operational monitoring in line with applicable guidelines; and
- Further operational mitigation measures to be researched, by appointed bird specialist, and the appropriate selected mitigation implemented, if post construction monitoring reveal high levels of impacts.

<u>Decommissioning Phase:</u>

- An EMP for decommissioning 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;
- 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; and
- Prior to decommissioning, an avifaunal specialist should conduct a site walkthrough, 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.

The **overall conclusion** of the Bird Impact Assessment is that the potential impacts on birds are not viewed as being of a significance so as to preclude development and it is the specialists' opinion that the project may proceed, subject to the implementation of all recommendations and mitigations referred to in the Bird Impact Assessment (Appendix H).

The following conditions applicable to avifauna (birds) should be included in the EA (if granted):

- All recommendations in the avifaunal (bird) specialist report are to be implemented;
- 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. The walkthrough must also cover the Grid Connection route;
- 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 applicable (i.e. at the start of operations at the wind farm) South African monitoring guidelines; and
- Develop and implement a 24 month post-construction bird activity monitoring program that mirrors the pre-construction monitoring surveys completed by Arcus 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.

7.1.3 Bat Impact Assessment

A Bat Impact Assessment (Appendix I) was conducted as part of the EIA process to identify and assess all potential impacts of the proposed development on bats and to provide recommended mitigation measures, monitoring requirements, and rehabilitation guidelines for all identified impacts.

A 12-month preconstruction bat monitoring programme was undertaken by ARCUS in line with South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction (Sowler *et al*. 2016). The bat monitoring data indicate that 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 to bats. A confirmed roost was located at a farmstead approximately 1,600 m to the nearest turbine. This roost has been buffered with a no go buffer of 1 km in which no turbines, or parts of a turbine, should be constructed. Other infrastructure, such as roads and powerlines, is permitted in this buffer. This buffer does not impact the current turbine layout and no adjustments to the proposed layout are required to accommodate the buffer.

The significance ratings for the majority of the impacts to bats posed by the development are predicted to be of low significance before mitigation and very low after mitigation, including those for cumulative impacts. Impacts related to bat mortality are predicted to be of high significance before mitigation but low after mitigation. However, cumulative impacts are predicted to be of moderate significance after mitigation.

At this stage, the mitigation measures are related to the design of the proposed Kap Vley WEF and associated powerline and avoiding the placement of turbines in areas that bats are most active based on the pre-construction monitoring data. This has been adhered to in the proposed layout (see Figure 3.28 in Chapter 3 of this Updated Draft EIA Report or Figure 1 in the Bat specialist report (Appendix I).) Bats were most often recorded in the lower lying areas of the site and were recorded less on ridges, where all turbines are proposed. Monitoring of bat activity and bat fatality during the operational phase of the WEF is needed to determine if any additional mitigation measures are needed.

Table 7.4 illustrates a summary of the total number of impacts identified in the Bat Impact Assessment.

Table 7-4: Summary of Bat Potential Impacts

		Significance Before Mitigation				Significance After Mitigation			
	Total Impacts	**Very Low**	**Low**	**Moderate**	**High**	**Very Low**	**Low**	**Moderate**	**High**
Construction Phase: Direct Impacts	**4**	4	0	0	0	4	0	0	0
Operational Phase: Direct Impacts	**5**	0	3	1	1	2	3	0	0
Decommissioning Phase: Direct Impacts	**1**	0	1	0	0	1	0	0	0
Cumulative Impacts	**10**	0	8	0	2	7	1	2	0
TOTAL IMPACTS	**20**								

All of the above impacts were rated with a negative status. Most impacts, apart from the cumulative impact, were assessed as having a **low significance before and very low significance after mitigation.**

The following main mitigation measures were identified in the Bat Impact Assessment:

Construction Phase:

- Avoid construction activities near roosts which include buildings, trees and rocky crevices. It is recommended that a bat specialist surveys the confirmed turbine and pylon locations and the locations of all other proposed site infrastructure for the presence of confirmed roosts before any construction activities commence;
- 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;
- It is recommended that a bat specialist surveys the confirmed turbine locations and the locations of all other site infrastructure, such as pylons, for the presence of occupied roosts among the potential roosts before any construction activities commence and once the preliminary design and layout of the site is complete;
- If occupied roosts are confirmed these should be addressed based on best practise guidance,
- A site-specific CEMP must be created, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of bat 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; and
- Limit the removal of vegetation as far as possible.

Operational Phase:

- 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 Kap Vley WEF, low lying areas should be avoided. This has been adhered to as all turbines are situated on the low ridges at the site, away from areas of higher bat activity and outside of no-go areas;
- Operational acoustic monitoring and carcass searches for bats must be performed, based on best practice, to monitor mortality and bat activity levels. Acoustic monitoring should include monitoring at height (from more than one location) and at ground level;
- 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;
- Bats must 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; and

- Use as little lighting as possible. Where lights need to be used, these should have low attractiveness for insects such as low pressure sodium and warm white LED lights.

Decommissioning Phase:

- Avoid decommissioning activities near roosts which include buildings, trees and rocky crevices; and
- Limit decommissioning activities to daylight hours.

The **overall conclusion** of the bat study is that the bat monitoring data presented suggest that the development of the proposed Kap Vley WEF and associated powerline can be achieved without unacceptable risks to bats.

7.1.4 Dry and Ephemeral Watercourses Impact Assessment

A Dry and Ephemeral Watercourses Assessment (Appendix J) was conducted as part of the EIA process using existing studies in the area in order to identify and assess all potential impacts of the proposed development on the watercourses and to provide recommended mitigation measures, monitoring requirements, and rehabilitation guidelines for all identified impacts. This study was externally reviewed and approved.

The clearance of land and vegetation could impact dry and ephemeral watercourses through increasing runoff and sedimentation in the surrounding ecosystems. However, this is not expected to be a significant concern given the limited rainfall of the arid region (< 100 mm Mean Annual Precipitation) to stimulate damaging overland flow.

Due to the arid climate and very limited rainfall, not many permanent watercourses exist within the landscape. Dry and ephemeral rivers, salt pans (depressions) and drainage lines were identified. The proposed WEF layout avoids these as far as possible in its initial design.

The impacts of physical disturbance to dry and ephemeral watercourses, altered drainage patters, increased runoff, erosion and sedimentation due to clearance of land and vegetation for the WEF are expected to be 'Low' to 'Very Low', with the effective implementation of the mitigation and management actions outlined in this study (Appendix J). Table 7-5 illustrates a summary of the total number of impacts identified in the Dry and Ephemeral Watercourses assessment.

Table 7-5: Summary of Dry and Ephemeral Watercourses Potential Impacts

		Significance Before Mitigation				Significance After Mitigation			
	Total Impacts	Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase: Direct Impacts	**2**	0	1	1	0	1	1	0	0
Operational Phase: Direct Impacts	**1**	0	0	1	0	0	1	0	0
Decommissioning Phase: Direct Impacts	**2**	0	1	1	0	1	1	0	0
Cumulative Impacts	**1**	0	0	1	0	0	1	0	0
TOTAL IMPACTS	**6**								

All of the above impacts were rated with a negative status. Most impacts were assessed as having a **moderate significance before and low after mitigation**.

The following main mitigation measures were identified in the Dry and Ephemeral Watercourses Assessment:

Construction Phase:

- As far as possible, avoid identified sensitive dry and ephemeral watercourses, drainage lines and associated buffers. (The current design already avoids the identified drainage lines);
- Ecology specialist/ ECO to confirm adequate avoidance of sensitive features;
- Minimise the footprint of cleared vegetation;
- Phased clearance of the area in order to reduce the amount and duration of bare soil exposure;
- Clear site only before a section is due to be constructed;
- Establish an effective record keeping system of all areas where soil is disturbed, to serve as basis for effective monitoring of rehabilitation process and success;
- Commence with restoration of disturbed, cleared land as soon as possible (e.g. non-permanent features such as the crane platforms and laydown and construction areas);
- Implement net barriers, active rehabilitation and other erosion control measures;
- Limit hard surfaces on site to reduce runoff;
- Clear site only before a section is due to be constructed; and
- Implement an effective system of storm water runoff control using bunds and ditches, where it is required (at points where water accumulation might occur).

Operational Phase:

- The storm water runoff system must effectively collect and safely disseminate any runoff water from all hardened surfaces and it must prevent any potential down slope erosion; and
- Undertake periodic site inspections, especially after rainfall events, to verify and inspect the effectiveness and integrity of the storm water runoff control system and to specifically record the occurrence of any erosion on site or downstream. Correct or improve the runoff control system in the event of any erosion occurring.

Decommissioning Phase:

- During decommissioning activities, avoid identified sensitive watercourses/aquatic features (ephemeral rivers, wetlands), major drainage lines and associated buffers as far as possible;
- Commence with restoration of disturbed, cleared land as soon as permanent structures have been removed; and
- Ecology specialist to monitor progress and success of rehabilitation.

The **overall conclusion** of the Dry and Ephemeral Watercourses Assessment is that the Kap Vley WEF (and 132 kV overhead powerline), from a dry and ephemeral watercourses perspective, may receive EA with adherence to the mitigation and management measures set out in specialist report (Appendix J).

7.1.5 Visual Impact Assessment

A Visual Impact Assessment specialist study was conducted (included in Appendix K) for the proposed construction of the Kap Vley WEF.

The most important receptors are the Komaggas settlement about 7 km to the north-east, the Houthoop Guest Farm about 21 km to the north-west and the Namaqualand National Park, about 14 km to the south of the proposed Kap Vley WEF. There are also a number of small farmsteads in the otherwise sparsely populated area. It was found that the potential visibility of the proposed WEF would be moderate to marginal for most of the receptors, and in some cases practically not visible.

The proposed wind turbines would be highly visible on the skyline of the low mountain range and seen over a long distance of the surrounding plain. However, the mountain range is a local feature within the district and the receptors are mostly at a considerable distance from the proposed WEF, resulting in a moderate significance without the implementation of mitigation measures and moderate-low with mitigation..

Table 7- 6 illustrates a summary of the total number of impacts identified in the Visual Impact Assessment.

Table 7-6: Summary of Visual Impacts

		Significance Before Mitigation					Significance After Mitigation				
	Total Impacts	Very Low	Low	Moderate	Moderate-Low	Moderate-High	Very Low	Low	Moderate	Moderate-Low	Moderate-High
Construction Phase: Direct Impacts	1	0	0	1	0	0	0	0	1	0	0
Operational Phase: Direct Impacts	3	0	0	2	0	1	0	0	0	2	1
Decommissioning Phase: Direct Impacts	1	0	1	0	0	0	0	1	0	0	0
Cumulative Impacts	1	0	0	1	0	0	0	0	1	0	0
TOTAL IMPACTS	6										

The majority of the impacts identified in the Visual Impact Assessment were rated with a negative status. Overall, as indicated in Table 7-6, the impacts identified in the Visual Impact Assessment are predicted to be of a **moderate** significance without the implementation of mitigation measures and moderate-**low** with mitigation.

The following main mitigation measures were identified in the Visual Impact Assessment specialist study:

Construction Operation and Decommissioning Phases:

Construction Phase Monitoring:

Ensure that visual management measures are included as part of the EMPr, monitored by an ECO, including siting of construction camp and stockpiles, dust suppression and litter control measures, as well as rehabilitation of borrow pits and haul roads, with regular reporting to an environmental management team.

Operation Phase Monitoring:

Ensure that visual mitigation measures are monitored by management on an on-going basis, including the control of signage, lighting and wastes on the site, with interim inspections by a delegated ECO.

Decommissioning Phase Monitoring:

Ensure that procedures for the removal of structures and stockpiles during decommissioning are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard, and signed off by the delegated authority.

General:

Adequate implementation of proposed mitigation measures and best practice to reduce visual impacts by the Kap Vley WEF.

The **overall conclusion** of the Visual Impact Assessment is that given the remoteness of the proposed Kap Vley WEF site, the sparsely populated area, the previous disturbance by diamond-mining, and the local scale of the project, no potential fatal flaws from a visual perspective are expected. However, the visual mitigations outlined in the Visual Assessment Report (included as Appendix K) should be included in the EA (should this be granted) and EMPr to minimise potential adverse visual impacts.

7.1.6 Heritage Impact Assessment (Archaeology and Cultural Landscape) and Desktop Palaeontology Assessment

A Heritage Impact Assessment was undertaken as part of the EIA process (included in Appendix L) to assess impacts on archaeology, palaeontology and the cultural landscape.

The Heritage Impact Assessment has shown that, although there are several types of heritage present in and around the study area, only two are of concern in that significant impacts are more likely to occur. Archaeological sites comprised only of scatters of stone artefacts are present in a number of areas close to the proposed layout and will require *in situ* conservation. Further survey of the final approved layout may well reveal further sites that will require excavation to mitigate the impacts to them. The landscape and its link with traditional land uses will also be impacted and it will be necessary to ensure that only minimal loss of land takes place within the Kamaggas farm area. The impacts to the cultural landscape are two-fold. First, there is the visual intrusion of wind turbines in an otherwise rural (or even largely natural) landscape and, second, there is the potential loss of land to traditional land uses (herding and collection of natural materials) to the people of Komaggas. The provision of electricity outweighs the cultural value of the landscape and, because only a very small proportion of the Kamaggas farm will be lost to traditional activities it is likely that this would still be outweighed by the provision of electricity. Furthermore, the municipality, on behalf of and in consultation with the community, has agreed to the facility being built if it receives authorisation.

A desktop Palaeontological Impact Assessment was undertaken as part of the EIA process (attached to the Heritage Impact Assessment in Appendix L) to provide an assessment of potential impacts on local palaeontology (i.e. fossil) within the proposed Kap Vley WEF area. This study concludes that due to the low palaeontological potential of the hillslope colluvia and aeolian sands the impact of the construction of the proposed WEF on fossil heritage is considered to be Low. Notwithstanding, the history of these vast tracts of sands, gravels and pedocretes of the Northern Cape is very poorly known, with very few fossils to rely on. Hence, though of low probability, any find will be of considerable importance.

Table 7-7 illustrates a summary of the total number of impacts identified in the HIA (including palaeontology).

Table 7-7: Summary of Heritage and Palaeontology Impacts

		Significance Before Mitigation				Significance After Mitigation			
	Total Impacts	Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase: Direct Impacts	4	1	1	2	0	3	0	1	0
Construction Phase: Indirect Impacts	3	2	1	0	0	3	0	0	0
Operational Phase: Direct Impacts	1	0	0	1	0	0	0	1	0
Decommissioning Phase: Direct Impacts	4	2	1	1	0	3	1	0	0
Decommissioning Phase: Indirect Impacts	3	2	1	0	0	3	0	0	0
Cumulative Impacts	4	3	0	1	0	3	0	1	0
TOTAL IMPACTS	19								

All the above impacts were rated with a negative status. Overall, the above impacts are predicted to be of a **very low significance** with the implementation of mitigation measures.

The following mitigation and monitoring requirements should be adhered to:

Mitigation requirements

- Archaeological sites to be avoided;
- Ensure that all works occur inside the approved development footprint;
- A walk-down survey of the final approved layout will need to be conducted prior to construction. Any sites found during this survey and that require mitigation would need to be mitigated well in advance (at least six months) of the commencement of construction in order to allow time in case there are further requirements that need to be met (for example radiocarbon dating or further work on any sites that revealed even more significant material than was evident from the surface);
- Reporting of chance finds (graves and palaeontological material); and
- Excavation and sampling of affected archaeological sites.

Monitoring requirements

Many archaeological and historical sites will be preserved *in situ* with the development being constructed in close proximity to them. These sites may need to be cordoned off during development in order to make them easily visible to the drivers of construction vehicles. The ECO should decide on site, taking into consideration the local topography and distance between sites and project footprint, which sites need to be cordoned off and which not. Nevertheless, the important sites have been identified as likely needing protection or not in Table 7.8. They should be cordoned off along the boundaries provided in the Heritage Impact Assessment report, since these already include buffer zones of approximately 30 m from the edge of the sites. The ECO should ensure that these sites are cordoned off in advance of the development commencing (the mitigation archaeologist could be called on to assist with this if needed) and regular (weekly) monitoring should be carried out by the ECO to ensure that the cordoned off areas remain free of disturbance. Should any disturbance become evident then it may be necessary to consult an archaeologist to decide whether the site has been badly compromised and whether excavations should be carried out to rescue any remaining *in situ* material.

Table 7.8: List of sites requiring protection.

Sites likely requiring cordoning off	Sites likely to be safe without any demarcation
KAP2017/001 (waypoint 1384)	KAP2017/006 (waypoint 1398)
KAP2017/002 (waypoints 1385-91)	KAP2017/008 (waypoint 1415)
KAP2017/003 (waypoint 1392)	KAP2017/009 (waypoint 1416; likely to be safe)
KAP2017/004 (waypoints 1393-94)	PAN2017/001 (waypoint 1376 – graveyard)
KAP2017/005 (waypoint 1395)	PAN2017/003 (waypoint 1378 – graveyard; already fenced)
GRW2017/001 (waypoint 1396)	PAN2017/002 (waypoint 1377)
KOM2017/001 (waypoint 1420)	PAN2017/004 (waypoint 1399)
	PAN2017/005 (waypoint 1413)

Furthermore, whenever the ECO is on site they should be aware of any potential heritage material that may still be undiscovered. These finds should be reported to the archaeologist or relevant Heritage Authorities (e.g. SAHRA).

The **overall conclusion** of the Heritage Impact Assessment is that because the impacts to heritage resources are manageable, it is recommended that the proposed Kap Vley WEF should be authorised.This should be subject to the following conditions which must be incorporated into the Environmental Authorisation (should it be granted):

- All significant archaeological sites identified must be protected from harm. Where necessary to effect this, sites should be cordoned off;
- The graveyards at PAN2017/001 (waypoint 1376) and PAN2017/003 (waypoint 1378) must be cordoned off as necessary, avoided and protected;
- The historical sites at PAN2017/002 (waypoint 1377), PAN2017/004 (waypoint 1399), PAN2017/005 (waypoint 1413) and KOM2017/001 (waypoint 1420) must be cordoned off if necessary, protected and avoided; and
- Roads must be designed in such a way as to minimise cut and fill operations in order to reduce landscape scarring.

7.1.7 Socio-Economic Impact Assessment

A Socio-Economic Impact Assessment (included in Appendix N) was conducted as part of the EIA Process to determine the potential social and economic impacts (both positive and negative) that may occur due to the development of the Kap Vley WEF. This study was externally reviewed and approved.

The study found that the two key towns that will be affected by the proposed Kap Vley WEF are Kleinzee and Komaggas. During the construction phase, it is anticipated that negative impacts may occur due to the influx of people and the presence of workers on site. Positive impacts during this phase may occur due to the employment opportunities that will be created and the project expenditure as part of the development of the WEF and associated electrical infrastructure. In terms of the economic opportunities, these are expected to be high (positive), should the recommended mitigation measures be implemented. The influx of people seeking employment opportunities will have a moderate negative impact, following mitigation. On a cumulative level, this impact is still considered to be a moderate negative impact.

During the operational phase, long term employment opportunities will be created and the IPP will have Social and Economic Development spend within the area. These are considered to be positive impacts and will have a high and very high, respectively, impact significance following mitigation. In terms of the negative impacts, the presence of the WEF may affect the Sense of Place. On a cumulative level, the impacts of project expenditure and the diversification of the local economy are considered to be of a high positive significance and the negative impact on the Sense of Place is considered to be very low.

It should be accepted that the development of the proposed project is likely to result in some form of negative social impact to the local community. However, such a negative impact needs to be weighed against the potential benefit likely to result from the same development. Given the overall moderate significance negative impact of the project, as compared to the overall moderate-high significance positive impact of the project; it can be concluded that the prospective socio-economic benefits of the proposed project outweighs the socio-economic losses/impacts.

Table 7-9 below illustrates a summary of the total number of impacts identified in the Socio-Economic Impact Assessment.

Table 7-9: Summary of Socio-Economic Impacts

		Significance Before Mitigation				Significance After Mitigation				
	Total Impacts	**Very Low**	**Low**	**Moderate**	**High**	**Very Low**	**Low**	**Moderate**	**High**	**Very High**
Construction Phase Impacts	**4**	0	0	1 1+	1 1+	1	0	1	2+	0
Operational Phase Impacts	**3**	1	0	1+	1+	1	0	0	1+	1+
Decommissioning Phase Impacts	**2**	0	0	2	0	1	1	0	0	0
Cumulative Impacts	**3**	0	1	0	1 1+	1	0	1	1+	0
TOTAL IMPACTS	**12(5+)**									

The following main mitigation measures were identified in the Socio-Economic Impact Assessment:

<u>Construction and Operational Phase:</u>

- Develop and implement a Workforce Recruitment Plan;
- Reserve employment, where practical, for local residents;
- Clearly define and agree upon the Project Affected People (PAP);
- Develop a database of PAP and their relevant skills and experience, or use an existing legitimate database of skills and expertise;
- Develop and implement a Stakeholder Engagement Plan;
- Delivery on the Economic Development Plan must be contractually binding on the proponent;
- Procure goods and services, where practical, within the study area;
- Obtain regularly required goods and services from as large a selection of local service providers as possible;
- Where possible, align the Economic Development Plan with Local Municipality's IDP;
- Initiate the education campaign among the local community (in partnership with the community members already active in the area) focusing on alcohol abuse, drug abuse, HIV/AIDS, Sexually Transmitted Diseases etc. prior the start of construction and maintaining these throughout the project's duration;
- The applicant and the contractor should implement an HIV/AIDS awareness programme for all workers at the outset of the construction phase;
- Arrangements must be made to enable workers from outside the area to return home over the weekends/at regular intervals. This would reduce the risk posed by non-local construction workers to local family structures and social networks;
- Introduce alcohol testing on a weekly basis for construction workers;

- Developing a Code of Conduct for all employees related to the project, which includes no tolerance of activities such as alcohol and drug abuse;
- Consultation with local authorities is essential so as to manage job creation expectations and ensure that all eligible workers in the primary study area are informed of the opportunities;
- Proponent/project owner needs to establish a relationship with the local authorities such as the Nama Khoi LM and local community leaders to ensure that the SED initiatives that are implemented during the pre-operational stage are aligned with the relevant needs of the Kleinzee and Komaggas communities;
- The fair and transparent application of the DoE 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;
- Contracts ensuring that on-the-job training is included and enforced as a condition for the development of this project; and
- The proponent must procure goods and services, as far as practically possible, from within the project area. Only if required goods and services are not affordably and readily available in the study area should the proponent seek to obtain it elsewhere. It is also suggested that regularly required goods and services (e.g. food and accommodation) be obtained from as large a selection of service providers as possible to ensure distribution of project benefits.

<u>Decommissioning Phase:</u>

- The proponent should comply with relevant South African labour legislation when retrenching employees;
- Project owner should also consider appropriate succession training of locally employed staff earmarked for retrenchment during decommissioning;
- All project infrastructures should be decommissioned appropriately and thoroughly to avoid misuse;
- Contracts ensuring that knowledge sharing and on-the-job training should be enforced as a condition for the development of the project. This will ensure that all employees will have acquired a skills set that will potentially enable them to find other work at similar developments; and
- 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.

The **overall conclusion** of the Socio-Economic Impact Assessment is that based on the current socio-economic context of the area and the impacts identified, it is the opinion of the specialist that the project can go ahead, provided that the mitigation measures proposed are adopted and adhered to by the EA holder.)

7.1.8 Noise Impact Assessment

A Noise Impact Assessment was conducted to assess the potential noise impacts generated during the construction, operational and decommissioning phases of the proposed development of the proposed project (Appendix O).

Table 7-10 below illustrates a summary of the total number of impacts identified in the Noise Impact Assessment.

Table 7-10: Summary of Noise Impacts

		Significance Before Mitigation				Significance After Mitigation			
	Total Impacts	Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase Impacts	**2**	2	0	0	0	2	0	0	0
Operational Phase Impacts	**1**	0	1	0	0	0	1	0	0
Decommissioning Phase Impacts	**2**	1	1	0	0	1	1	0	0
TOTAL IMPACTS	**5**								

The study concluded that no significant noise impacts will occur due to the proposed Kap Vley WEF. The overall impacts are rated as **low before and very low after mitigation.**

The following main mitigation measures were identified Noise Impact Assessment:

Construction, Operational and Decommissioning Phases:

- Ensure equivalent A-weighted daytime noise levels below 52 dBA at potentially sensitive receptors;
- Ensure that maximum noise levels at potentially sensitive receptors be less than 65 dBA;
- Prevent the generation of disturbing or nuisance noises;
- Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors; and
- Ensuring compliance with the National Noise Control Regulations.

The **overall conclusion** of the Noise Impact Assessment is that considering the low significance of the noise impacts (with mitigation, inclusive of cumulative impacts) for the proposed Kap Vley WEF and associated infrastructure, there is no reason that the proposed Kap Vley WEF should not be authorised.

7.1.9 Transportation Impact Assessment

A Transportation Impact Assessment was undertaken to show the amount of traffic that can be expected during the construction and operational phase of the proposed development of the proposed project (Appendix P).

Table 7-11 below illustrates a summary of the total number of impacts identified in the Transportation Impact Assessment.

Table 7-11: Summary of Transportation Impacts

		Significance Before Mitigation				Significance After Mitigation			
	Total Impacts	Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase Impacts	**4**	0	4	0	0	0	4	0	0
Operational Phase Impacts	**4**	0	4	0	0	0	4	0	0
Decommissioning Phase Impacts	**4**	0	4	0	0	0	4	0	0
Cumulative Impacts	**2**	0	2	0	0	0	2	0	0
TOTAL IMPACTS	**14**								

The noise, dust & exhaust pollution impacts identified associated with additional traffic on site, on the local, unsurfaced access road, the R55 were assessed to be of low significance before and after mitigation.

The following main mitigation measure was identified in the Transportation study:

Construction, Operational and Decommissioning Phases:

- Dust suppression and maintenance of internal roads.

The **overall conclusion** of the Transportation Impact Assessment is that the proposed development should be authorised from a traffic and transportation impact point of view.

The EMPr for the Kap Vley WEF must include dust monitoring and mitigation measures for the on-site and unsurfaced local access roads, during the Construction and Decommissioning phases. This should be a condition for the EA of the facility, should it be granted.

7.2 SUMMARY: COMPARATIVE ASSESSMENT OF POSITIVE AND NEGATIVE IMPACTS

Section 7.1 above provides a summary of the findings of the specialist studies (or statements) that were undertaken as part of this EIA Process. Table 7-12 below summarises the overall significance of these impacts following the implementation of the recommended mitigation and management measures. **From this table it can be seen that no negative impacts of high significance are anticipated to occur as a result of this project provided the stipulated management actions are implemented effectively.** The positive impacts generated by the project (as seen in the table below) are associated with the economic benefits from employment opportunities, and the additional source of income from the rental of the land for the construction and operation of the WEF.

Table 7-12: Comparative Assessment of Positive and Negative Direct and Indirect Impacts

Specialist Study	Overall Impact Significance Before Mitigation or Enhancement	Overall Impact Significance After Mitigation or Enhancement
Terrestrial Ecological Impact Assessment	Negative: Moderate	Negative: Low
Bird Impact Assessment	Negative: Low	Negative: Low
Bat Impact Assessment	Negative: Low	Negative: Very Low
Dry and Ephemeral Watercourses Impact Assessment	Negative: Moderate	Negative: Low
Visual Impact Assessment	Negative: Moderate	Negative: Moderate-Low
Heritage Impact Assessment: Archaeology/ Palaeontology /Cultural Landscape	Negative: Very Low	Negative: Very Low
Soils and Agricultural Potential Impact Assessment	Negative: Very Low	Negative: Very Low
Social-Economic Impact Assessment	Negative: Moderate	Negative: Moderate
	Positive: Moderate	Positive: High
Noise Impact Assessment	Negative: Very Low	Negative: Very Low
Transportation Impact Assessment	Negative: Low	Negative: Low

7.3 CONCLUSIONS AND RECOMMENDATIONS FROM THE REVISED ECOLOGICAL OFFSET REPORT

Following the release of the Draft EIA Report comments were received from DENC on the Ecological Offset study and the Ecology specialist study (comments dated 25 May 2018 included in Appendix E9). Comments were also received from SANParks (included in Appendix D4). Based on the comments received from DENC and SANParks, the Ecological Offset study was revised and was externally reviewed by a recognised biodiversity offset expert, Mark Botha of Conservation Strategy Tactics & Insight (see review included in Annexure 1 of Appendix Q). The comments received from Mark Botha have been included in the revised Ecological Offset Study which is attached as Appendix Q to this Updated Draft EIA Report. The basic recommendations of the revised Ecological Offset study were supported by Mark Botha and found to be soundly derived.

A meeting was held with DENC, WWF, DEA (Biodiversity unit), Simon Todd Consulting, juwi and CSIR to discuss the comments received from DENC and to present the revised Ecological Offset study and review from Mark Botha to DENC and DEA. SANParks was also invited to the meeting, but could unfortunately not attend, due to prior commitments. Comments were invited to inform and determine the suitability and way forward on the proposed offset approach. The agenda and meeting notes are included in Appendiix E10 and E11 respectively.

The final revised Ecological Offset study was informed by comments received from DENC in their commenting letter, dated 25 May 2018, comments from SANParks in their letter dated 11 June 2018 as well as comments from Ms Elsabe Swart from DENC at the meeting held on 12 June 2018. The said study was also informed by the recommendations from the review conducted by Mark Botha. DENC and DEA will also have the opportunity to comment on revised Ecological Offset Study which is included in this Updated Draft EIA Report that is hereby released for comment.

The section below contains the conclusions and recommendations from the revised Ecological Offset study (Appendix Q of this report):

The Kap Vley site falls within a CBA and NCPAES Focus Area. In addition, a number of plant species of conservation concern are confirmed present at the site. As a result of these features, potential impacts at the site are a concern, particularly residual impacts on CBAs and plant species of conservation concern. As offsets should not be used to compensate for significant impact on species or habitats of conservation concern, it is important to firstly assess whether or not the mitigation to be implemented at the site can reduce on-site impacts to an acceptable level. The final preferred layout that has been assessed in the EIA has been iteratively developed in response to the results of extensive fieldwork at the site to identify and map sensitive habitats and populations of species of conservation concern. As a result of this avoidance, on-site impacts have been reduced as far as possible and no local populations of plant species of conservation concern would be compromised or elevated to a higher threat level as a result of the development. As the entire site falls within a CBA, impacts on CBAs cannot be avoided and moderate residual impact on habitat loss and broad-scale ecological processes within the CBA is expected to occur. The residual impact on the CBA and plant species of conservation concern provide the motivation for the offset.

Given the nature of the residual impact of the development, an offset is considered to be an appropriate off-site mitigation measure. The calculation of the required offset was based on a 1:30 offset ratio for the high sensitivity parts of the site and a 1:20 ratio for the remainder of the site. The resulting calculation provides for a minimum offset target area of 2 580 ha. The existence and availability of suitable offset areas is an important criterion that must be demonstrated before an offset can be implemented. The presence of Sand Fynbos and in particular the dune and restio dominated habitats with the presence of the identified plant species of conservation concern are taken as key indicators of potentially suitable target offset areas. Such areas are present to the south of the site in the broad area

between Koingnaas and Hondeklip Bay and south of the Spoeg River. Previous experience in the area indicates that the species of conservation concern present at Kap Vley are also well represented in this area and as such these are valid offset target areas based on the "like for like" criterion. An analysis of the availability of these habitats in the local area indicates that the offset target habitats are sufficiently available in the area and that the targets can be achieved.

In terms of the implementation of the offset, the developer has engaged WWF-SA which has an active land purchase programme in Namaqualand and which works in collaboration with SANParks and NC-DENC. As such, any land purchase facilitated by WWF-SA would likely occur within identified priority and target areas that have the support of the national and provincial conservation bodies. Meetings to investigate the implementation of the offset have already been held with the developer, NC-DENC, WWF and SANParks. In the meetings, SANParks have indicated that a land management budget would be required for them to be able to take responsibility for the offset. In response to this need, the developer has committed to providing the appropriate funds to manage the offset area for the 20 year duration of the wind farm. This would ensure that the offset is protected in perpetuity and has long-term sustainability and an identified management authority. However, as no formal agreement with SANParks has been signed, alternative options for the management of the offset much remain on the table until such time as the offset target areas have been secured and a legally binding agreement with SANParks to take on the management of these areas has been signed.

This offset study is an assessment of the validity of an offset as a mitigation measure to account for residual impact at Kap Vley. It provides an analysis of the biodiversity attributes of the site and makes a recommendation with regards to the offset ratio and resultant extent of the required offset. It further identifies broad potential offset target areas that are known to contain the plant species of concern that have been identified at the Kap Vley site. In order to take the offset process forward, specific properties will have to be identified and evaluated in terms of their suitability as well as availability for purchase or other conservation commitment. While it is clear that suitable areas exist, their availability in terms of land tenure, land reform status, presence of valid prospecting or mining rights, or with other infrastructure or affected party interests will need to be investigated and may exclude many properties from contention.

The Kap Vley project has not yet been authorised and while this offset study forms part of the EIA process, exactly how the timing of the offset process should work in relation to the EIA process is not well clarified at this point due to the recent advent of offsets as an accepted mitigation alternative. Given the uncertainly of the REIPPP process, the development is not certain to go ahead with the result that the offset process cannot proceed to an implementation phase until such time as the project receives preferred bidder status as defined within the REIPPPP. As the obligations of the developer would only come into effect at the commencement of construction, this is several years away at best. There is thus a danger that the offset study may become too prescriptive if specific property details or offset type are "locked into" the offset and significant changes in land use occur in the intervening years within identified offset target areas.

The institutional and legal arrangements regarding the offset are in early stages of development and additional attention to this aspect will be required to ensure that a binding agreement between the developer, WWF, NC-DENC, SANParks and any other required parties can be drawn up prior to construction. This document is not seen as the appropriate place to further elucidate these requirements and it is suggested that an Offset Implementation Agreement which reduces the specifics of the offset requirements, roles and responsibilities, costs, timelines and penalties to writing is developed. This would come into effect once the project received preferred bidder status and the parties would then have to agree to which milestones would need to have been achieved before the commencement of construction. This will in effect dictate the required timelines and associated milestones associated with the implementation of the offset.

However, as there is not an Offset Implementation Agreement currently in place, measures need to be taken to ensure that the developer is locked into the offset and that this is effectively achieved. This would be facilitated through the stipulation of conditions in the Environmental Authorisation issued by DEA. Thereafter, it would be the responsibility of the implementing partners to ensure that the requirements of the agreement are met once the implementation agreement has been signed. The following minimum conditions are made in this regard and have been developed with input from Mark Botha through the course of his review of this document:

1. A biodiversity offset is required mitigation for this activity (Kap Vley Wind Farm). The offset must secure in perpetuity at least 1 125 ha of Sand Fynbos and 510 ha Klipkoppe Shrubland vegetation types and not be less than 2 580 ha in aggregate extent. The Sand Fynbos vegetation types should include intact and representative areas of the Dune Fynbos and Restio Fynbos habitat types as defined by the terrestrial ecological specialist study.

2. Offset sites need to be at least in as good or better condition compared to the impacted areas, and contain viable populations of the majority of impacted species. Ideally, Offset sites should be declared as a protected area under the Protected Areas Act, be adjacent to an existing protected area, or at a minimum facilitate ecological connectivity in the region.

3. Before construction of any component of the activity begins, the requisite outcomes and necessary arrangements for the implementation of the offset must be captured in an Offset Implementation Agreement with credible implementing partners, which agreement must be concluded and submitted to DENC for approval, which approval shall not be unreasonably withheld.

4. The agreement must at least set out the specific areas which will be secured, how they will be rehabilitated and protected in the long term, what financial provision has been made for the establishment and management of the offset for 30 years and what implications and penalties exist to ensure the performance of all parties in offset implementation.

7.4 CONSIDERATION OF ALTERNATIVES

The alternatives that were considered as part of the EIA Phase for the Kap Vley WEF are included in Chapter 5 of this EIA Report.

7.4.1 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 Kap Vley WEF. This alternative would result in no environmental impacts on the site or surrounding local area. 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 especially to the Kommagas local community as a landowner and SED beneficiary;
- The Namaqua National Park will not be enlarged through the proposed environmental offset associated with the development;
- No additional power will be generated or supplied through means of renewable energy resources by this project at this location. The proposed 300 MW facility (maximum generation capacity) is predicted to generate approximately 400 GWh per year which could power approximately 40 000 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 CO2 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. The local municipality's vulnerability to economic downturns will increase because of limited access to capital and the downscaling of mining in the area ;
- There will be no opportunity for additional employment in an area, where job creation is identified as a key priority. Approximately 323 employment opportunities will be created during the construction period and approximately 35 permanent employment opportunities 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:

- Agricultural land use will remain;
- No vegetation will be removed or disturbed during the development of the proposed Kap Vley WEF. No impact on the CBA 1 and 2 and NPAES;
- No biodiversity (fauna and flora) will be removed or disturbed during the development of these facilities (there will also not be a need to implement a biodiversity offset as no sensitive vegetation will be lost on site);
- No impact on plant SCC;
- No aquatic resources will be impacted upon during the construction of the WEF;
- No birds or bats (including priority and red data species) will be impacted upon-either through the loss of their habitat which can lead to displacement, mortalities due to collisions of birds and bats with wind turbines or mortality to bats caused by barotrauma;
- 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 visual impact associated with the construction phase or the presence and rotation of wind turbines during the operational phase of the proposed project;
- No noise impacts either during the construction phase or during the operational phase when wind turbines are rotating;
- No additional traffic generation during the construction of the proposed Kap Vley WEF; and
- No additional water use during the construction phase.

As discussed in Chapter 1 of this Updated Draft EIA Report, the purpose of the proposed Kap Vley WEF project is to feed electricity generated by a renewable energy resource into the national electricity grid. Many other socio-economic and environmental benefits will result from the development of this project such as development of renewable energy resources in the country and contribution to the increase of energy security, employment creation and local economic development (as noted above).

Hence, 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, nor will it generate an

alternative land-use income from the WEF. 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, or a reasonable and feasible alternative to be considered in this EIA process.**

7.4.2 Land-Use Alternative

All farm portions forming part of the project are zoned for agricultural land-use, and are mainly used for either commercial livestock grazing, communal use or subsistence farming.

The Soils and Agricultural Potential Impact Assessment (Appendix M) notes that the land on which the proposed project will be constructed is of low agricultural potential and is not suitable for cultivation. The choice of placement of the proposed Kap Vley WEF on the farms therefore has no agricultural impacts of significance. The flatter plains have a land capability classification, on the 8 category scale, of Class 7 - non-arable, low potential grazing land. The ridges are 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 rocky outcrops are further limitations. The grazing capacity on AGIS is classified as low as > 31 hectares per large stock unit. **Hence, agricultural land use is not a preferred,or a reasonable and feasible alternative to be considered in this EIA process** 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.

7.4.3 Technology Alternatives (Renewable Energy sources)

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 such as 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, is discussed in Section 5.1.3 of Chapter 5.

Since the alternative technologies considered were deemed not to be reasonable and feasible for the area and the site, no other renewable energy technologies alternatives were further assessed during the EIA Phase.

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

- The proposed Kap Vley WEF falls within the REDZ 8. The REDZs were recently gazetted on 16 February 2018 in Government Gazette No. 41445. The proposed project is therefore in line with the criteria of the SEA and located in an area of strategic importance for wind energy development;
- The site has a good wind resource based on WASA data and on-site measurements;
- Solar energy, a potential developable technology on site, would not be as economically viable compared to wind development at this location. Limitations include the topography of the site, fog in the morning which prohibits the absorption of sunlight and the scarcity of water in the area to wash the solar panels; and
- Government Gazette 39111 allocated a higher allocation target to wind energy compared to solar energy.

7.4.4 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 Kap Vley 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 feasible sites. During the screening phase of the project, juwi identified three potentially feasible sites. For these sites, a fatal flaw analysis considering the site selection factors was undertaken.

A summary of the screening exercise that led to the selection of the Kap Vley site as being the preferred site alternative is briefly outlined below (Table 7.13).

Table 7.13: Screening phase or fatal flaw analysis of feasible sites

FACTOR	Site 1 Kiap	Site 2 Brazil	Site 3 Kap Vley
Land Availability	✓	X	✓
No unacceptable environmental sensitivities on site	X	✓	✓
Suitable Wind speed Levels	✓	✓	✓
Acceptable maximum distance to and availability of the Grid	✓	✓	✓
Site Accessibility	✓	✓	✓
Topography	✓	✓	✓
Low Fire Risk	✓	✓	✓
Current Land Use	✓	✓	✓
Landowner Willingness	✓	X	✓

Based on the screening exercise undertaken the Kap Vley was chosen as the preferred site. Although the site is located in a CBA 1 and 2, it is deemed feasible as a biodiversity offset is being determined by the project applicant in consultation with WWF, SANPARKS, DENC and DEA to mitigate some of the potential negative impacts on the plant species and habitats of special concern on the Kap Vley WEF site (see section below). As such, the development, with the implementation of an offset is considered to have acceptable terrestrial ecological impacts and is therefore supported from a terrestrial ecological point of view.

Given the outcome of the site selection process and the fatal flaws identified on the other two sites, the **Kap Vley WEF site is the only reasonable and feasible site, and therefore the preferred site and no other site alternatives were considered further in the EIA process.**

7.4.5 Alternative locations of the Development Footprint

The preferred site extends approximately 75 572 ha, while only approximately 128 ha will be required for the proposed development of the Kap WEF. The development footprint within the site was determined through a screening assessment of the site by the specialist team and in consultation with the landowners to identify possible areas that should be avoided by the proposed development (i.e. exclusion zones). The preferred development footprint was further refined following the outcome of the impact assessment where sensitive features were identified and defined in the specialist studies undertaken (Appendices G to P). The current proposed development footprint of the proposed Kap Vley WEF is approximately 128 ha which comprises only 0.17 % of the available land on the affected farms.

Therefore, **no reasonable and feasible development footprint alternatives exist to be considered as part of this EIA process.**

7.4.6 Layout Alternatives

Layout alternatives for the project were determined following the input from the various specialists on the project team. 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. This area has since been significantly reduced through detailed technical planning to avoid environmentally sensitive areas as much as possible, while still retaining a technically and financially viable layout. The current layout is thus a culmination of extensive technical, economic and environmental planning.

Therefore, the findings of a range of specialist inputs have been used to inform the layout of the proposed facility within the preferred site and the current layout is thus the only reasonable and feasible one, and therefore the preferred layout with no further alternatives considered in the EIA process.

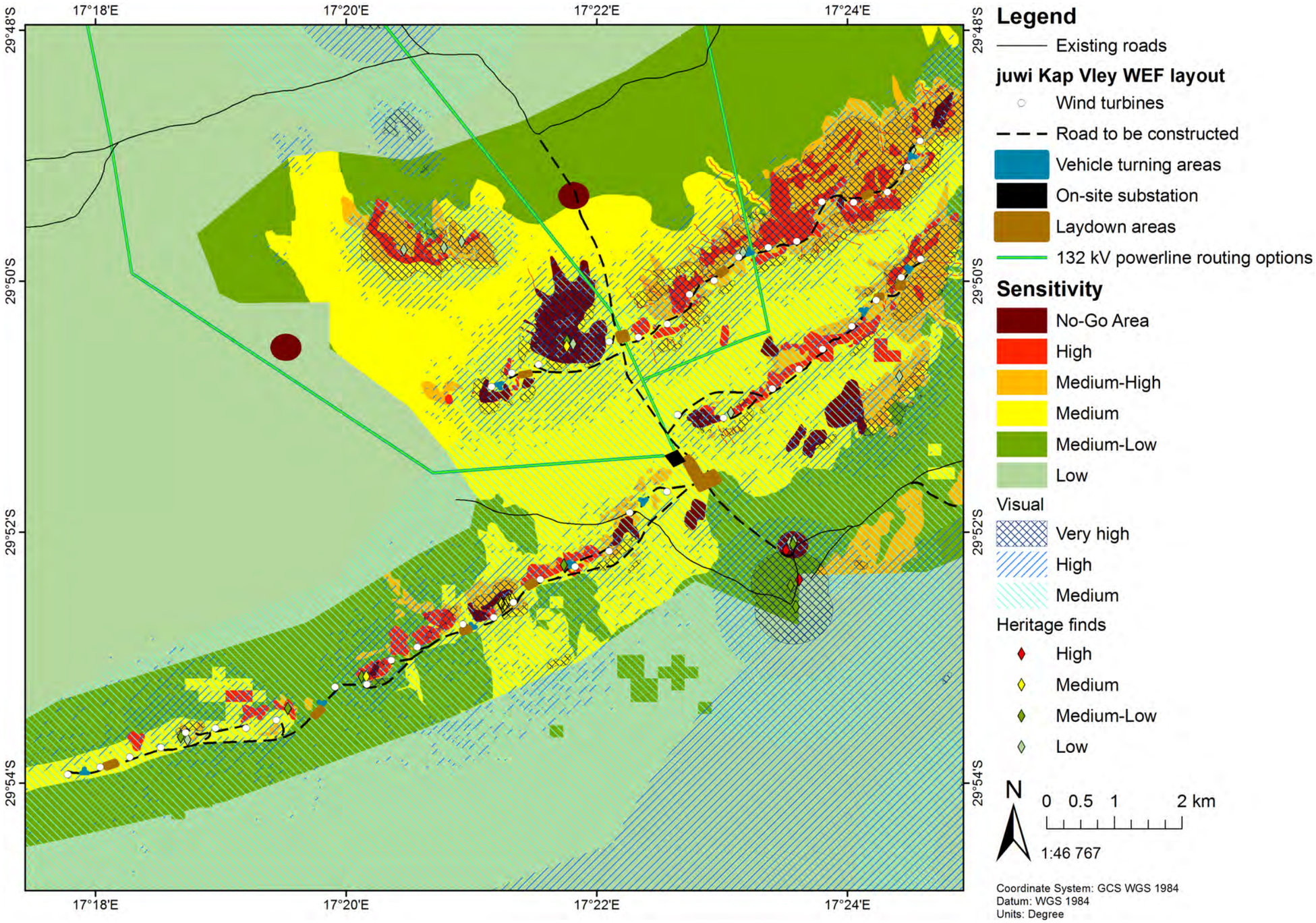

Figure 7-1: Site layout overlain onto an Environmental Sensitivity Map for the Proposed Kap Vley WEF

7.5 PERMITS AND LICENSES REQUIRED

The relevant legislation and guidelines pertinent to this project are included in section 4.2 of Chapter 4. Some of these are summarised below.

7.5.1 NEMA and 2014 NEMA EIA Regulations

Before clearing of the proposed site is initiated, an EA must be granted by the DEA in terms of the NEMA and associated 2014 NEMA EIA Regulations (as amended on 7 April 2017). This report has been compiled to provide the DEA with the information required in order to make an informed decision on whether to grant or reject EA.

7.5.2 Permit in terms of the National Forest 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. DAFF is authorised to issue licences for any removal, cutting, disturbance, damage to or destruction of any protected trees.

Two protected tree species have been observed at the site, *Aloe dichotoma* and *Acacia erioloba*. Although the numbers of affected individuals is low, a permit from DAFF would be required for any impacts to these species. This would be obtained at the preconstruction phase and the number of individuals affected clarified by a preconstruction walk-through of the final development footprint.

7.5.3 Permit in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009)

With regard to protected flora, the Northern Cape Nature Conservation Act includes a list of protected flora. Based on the fieldwork that has been conducted by Mr Simon Todd (the Ecologist on the project team) at the Kap Vley project area there are a number of endemic and plant SCC present on site. These species are *Aspalathus albens*, *Metalasia adunca, Muraltia obovate, Agathosma elata, Argyrolobium velutinum, Caesia sabulos, Lampranthus procumbens, Phyllobolus tenuiflorus and Leucospermum praemorsum*. 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 these listed species are found, the relevant permits should be obtained by the Project Applicant prior to their relocation or destruction. In addition, DENC should be consulted on whether a permit is required for the clearance of indigenous vegetation on site.

7.5.4 Permit in terms of the National Heritage Resources Act (Act 25 of 1999) (NHRA)

As noted in the Heritage Impact Assessment (Appendix L), the NHRA does not require the developer to obtain permits prior to construction. However, any archaeological mitigation work (i.e. test excavations, sampling etc.) that may be required (in the event of archaeological resources or graves of significance being found within the development footprint during construction) would need to be conducted under a permit issued to, and in the name of, the appointed archaeologist. The permit application process allows the heritage authorities to ensure that a suitably qualified and experienced archaeologist undertakes the work and that the proposed excavation/sampling methodology is acceptable.

In terms of palaeontology, where palaeontological mitigation is required in the event of any fossil material found on site during construction, the palaeontologist concerned with mitigation work would

need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection). All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies recently developed by SAHRA (2013).

7.5.5 NEMA: Notice of REDZ published in GG No. 41445 on 16 February 2018

The "Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa", identified eight REDZs that are of strategic importance for large scale wind and solar photovoltaic energy development, including the rollout of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy.

On 17 February 2016, Cabinet approved, amongst others, the REDZs contained in this Notice, which are of strategic importance for large scale wind and/or solar photovoltaic energy development and an integrated decision -making process for applications for environmental authorisation in terms of NEMA. Applications for environmental authorisation for large scale wind or solar photovoltaic energy facilities, when such facilities trigger activity 1 of Environmental Impact Assessment Regulations Listing Notice 2 of 2014 and any other listed and specified activities necessary for the realisation of such facilities, and where the entire proposed facility is to occur in such REDZs, must follow the basic assessment procedure contemplated in Regulation 19 and 20 of the Environmental Impact Assessment Regulations, 2014, in order to obtain environmental authorisation, as required in terms of the Act. The timeframe for decision-making as contained in the Environmental Impact Assessment Regulations, 2014 for purposes of the applications for environmental authorisation contemplated in this Notice is 57 days"

The proposed Kap Vley project site is located within REDZ 8, which supports the development of large scale wind and solar energy developments. The proposed project is therefore in line with the national planning vision for wind development in South Africa.

7.6 OVERALL EVALUATION OF IMPACTS BY THE EAP

Based on the findings of the specialist studies the proposed project is considered to have an **overall very low to low negative environmental impact and an overall high positive impact** (with the implementation of respective mitigation and enhancement measures).

The Kap Vley site is considered to be a broadly sensitive environment due to the presence of numerous species and habitats of conservation concern. These have however been mapped in detail through detailed vegetation surveys undertaken in numerous site visits by the ecology specialist in spring, and effective avoidance accordingly implemented with regards to the layout of the proposed wind farm. As a result of this avoidance, on-site impacts on fauna and flora have been reduced to Low Significance after mitigation and are considered acceptable. However, impacts on CBAs and Protected Area Expansion Strategy Expansion focus areas cannot be effectively mitigated and impacts of Moderate significance after on-site-mitigation impacts on these features are expected. This fulfils the basic requirements for an offset and, with the implementation of an offset, residual impacts associated with the development can be reduced to an overall Low Significance. The Project Applicant has commissioned an Ecological Offset Study to determine an appropriate offset to reduce the potential negative impacts of the proposed Kap Vley WEF on the species and habitats of special concern. Following the release of the Draft EIA Report comments were received from DENC on the Offset study and the Ecology specialist study (comments dated 25 May 2018 included in Appendix E9). Comments were also received from SANParks (in their letter dated 11 June 2018 (included in Appendix D4). Based on the comments received from DENC and SANParks, the Offset study was revised and was externally reviewed by a recognised biodiversity offset

expert, Mark Botha of Conservation Strategy Tactics & Insight (see review included in Annexure 1 of Appendix Q). The comments received from Mark Botha have been included in the revised Ecological Offset Study which is attached as Appendix Q to this Updated Draft EIA Report. The basic recommendations of the revised Ecological Offset study were supported by Mark Botha and found to be soundly derived.

As such, the development, with the implementation of an offset, is considered to have acceptable terrestrial ecological impacts and is therefore supported from a terrestrial ecological point of view.

The proposed Kap Vley WEF will not have significant impacts on Red Data bird and bat species. The site is not located in an IBA. It must be noted that no bird nests were found closer than 6.8 km from the nearest proposed turbines. A confirmed bat roost was located at a farmstead approximately 1,600 m to the nearest turbine. This roost has been buffered with a no go buffer of 1 km in which no turbines, or parts of a turbine, should be constructed. Other infrastructure, such as roads and powerlines, is permitted in this buffer. This buffer does not impact the current turbine layout and no adjustments to the proposed layout are required to accommodate the buffer. Therefore, the current recommended turbine exclusion buffers will have no impact on proposed layout of the Kap Vley WEF.

Drainage lines were identified on site, but the current layout avoids these features. The heritage resources identified on site are not of a high significance. The graves on site will be avoided as they are regarded as no-go areas. The layout of the Kap Vley WEF will avoid the sensitive ecological and heritage features identified by the respective specialists (where possible).

In accordance with the Guideline on Need and Desirability (GN 891 of 2014), this EIA considered the nature, scale and location of the development as well as the wise use of land (i.e. is this the right time and place for the development of this proposed project). When considering the timing of this project, the IRP2010 proposes to secure 17 800 MW of renewable energy capacity by 2030. As noted in the preceding chapters of this EIA Report, in August 2011, the DoE launched the REIPPPP and invited potential IPPs to submit proposals for the financing, construction, operation and maintenance of the first 3 725 MW of various renewable energy project (including solar and wind). In addition, the REDZs were recently gazetted and the proposed Kap Vley WEF falls within REDZ 8. The project is therefore aligned with Government's priority areas for the development of Renewable Energy Projects in SA.

On a provincial level, the Northern Cape Province is currently facing considerable constraints in the availability and stability of electricity supply. This is a consequence of South Africa's electricity generation and supply system being overstretched, and the reliance of the Northern Cape, as many other South African provinces, on the import of power to service its energy needs. The development of wind 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. On a municipal planning level, the proposed project does not go against any of the objectives set within the Development Plan (IDP) (2012/2017). The IDP's LED Strategy states that "Renewable energy has become a global priority and there is potential for both wind and solar power within the Nama Khoi Local Municipality." The proposed project will be in line with and will be supportive of the IDP's objective of creating more job opportunities. The proposed WEF will assist in local job creation during the construction and operation phases of the project. It should however be noted that employment during construction phase will be temporary. During the operational phase of the project (estimated to be more 20 years), long-term employment opportunities will be created. Employment opportunities in the Kleinzee area are limited following the closure of the De Beers mines. The creation of employment and local economic development in this area will therefore be a welcome injection to the area. The Kommagas local community will also derive benefit from the project as a landowner.

The locality of this project would not have a significant ("high") impact on any sensitive viewers (as determined in the Visual Impact Assessment included in Appendix K of this EIA Report). It will also have a very low significance negative impact on the current agricultural land use of the site.

Section 24 of the Constitutional Act states that "everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development". Based on this, this EIA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures and monitoring requirements. These measures will be undertaken to promote conservation by avoiding the sensitive environmental features present on site (as shown in Figure 7-1) and through appropriate monitoring and management plans included in the EMPr (Part B of the EIA Report).

The outcomes of this project therefore succeeds in meeting the environmental management objectives of protecting the ecologically sensitive areas and supporting sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development in the towns nearest to the project site. The findings of this EIA show that all natural resources will be used in a sustainable manner (i.e. this project is a renewable energy project and the majority of the negative site specific and cumulative environmental impacts are considered to be of low significance with mitigation measures implemented), while the benefits from the project will promote justifiable economic and social development.

In order to ensure the effective implementation of the mitigation and management actions, an updated EMPr has been compiled and is included in Part B of this Updated Draft EIA Report. The mitigation measures necessary to ensure that the project is planned, constructed, operated and decommissioned in an environmentally responsible manner are listed in this EMPr. The EMPr is a dynamic document that should be updated regularly and provide clear and implementable measures for the establishment and operation of the proposed Kap Vley WEF.

Taking into consideration the findings of the EIA process and given the national and provincial strategic requirements for renewable energy development and the location of the proposed Kap Vley WEF within a gazetted REDZ (REDZ 8), it is the opinion of the EAP that the project benefits outweigh the costs and that the project will make a positive contribution to steering South Africa on a pathway towards sustainable renewable energy development. Provided that the specified mitigation measures are applied effectively, it is recommended that the project receive EA in terms of the 2014 EIA Regulations (as amended on 7 April 2017) promulgated under the NEMA.

Scoping and Environmental Impact Assessment for the proposed Kap Vley Wind Energy Facility near Kleinzee in the Northern Cape

UPDATED DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 8: References

CONTENTS

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