RONDEKOP WIND FARM (PTY) LTD

Proposed Construction of the 325MW Rondekop Wind Energy Facility between Matjiesfontein and Sutherland, Northern Cape Province

Draft Environmental Impact Assessment Report

DEA Reference: 14/12/16/3/3/2/1115
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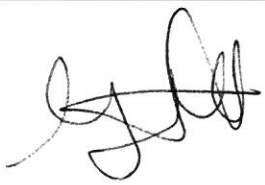
Signature:	
For:	SiVEST Environmental Division

Confidentiality Statement

KEY PROJECT INFORMATION

Table 1: Key Project Information

FARM DESCRIPTION	21 DIGIT SURVEYOR GENERAL CODE
Ashoek No 224	C07200000000022400000
Remainder of Bloem Fontein No 192	C07200000000019200000
Portion 1 of Bloem Fontein No 192	C07200000000019200001
Portion 1 of Lange Huis 174	C07200000000017400001
Remainder of Hout Hoek No 191	C07200000000019100000
Remainder of Roodeheuvel No 170	C07200000000017000000
Portion 1 of Roodeheuvel No 170	C07200000000017000001
Portion 1 of Urias Gat No 193	C07200000000019300001
Portion 2 of Urias Gat No 193	C07200000000019300002
Remainder of Vinke Kuil 171	C07200000000017100000
Remainder of Venters Kraal No 166	C07200000000016600000
Portion 1 of Venters Kraal No 166	C07200000000016600001
Portion 3 of Venters Kraal No 166	C07200000000016600003
Remainder of Wind Heuvel No 190	C07200000000019000000
Portion 1 of Wind Heuvel No 190	C07200000000019000001
Remainder of Zeekoegat No 169	C07200000000016900000
Remainder of Farm 220	C07200000000022000000
APPLICATION SITE	
CENTRE POINT COORDINATES	
POINT	**SOUTH**	**EAST**
Midpoint	S32° 44' 20.72"	E20° 17' 26.90"

Refer to **Appendix 9A** for the full list of coordinates.

PHOTOGRAPHS OF SITE:

Figure i: **General Characteristics of the study area**

The entire site is largely in a natural state, with the exception of some scattered farm buildings, narrow gravel roads, jeep tracks and fences. The vegetation is used primarily for livestock grazing and is affected to some degree by this usage. This natural pattern extends beyond the site in all directions and gives the general area a sense of being relatively unspoilt, remote and natural.

TYPE OF TECHNOLOGY: Wind Turbines.

STRUCTURE HEIGHT: The hub height of each turbine will be between 90 m and up to 140 m and its rotor diameter between 100 m and up to 180 m.

SURFACE AREA TO BE COVERED: The total area of the application site (DEA Reference-14/12/16/3/3/2/1115) is ~37 543.13 hectares (cadastral units). The total footprint of the wind farm will however be ~ 114 ha (of which ~38ha will be upgrading of existing roads). Surface areas to be covered are as follows:

- The area occupied by each wind turbine will be up to 0.45 hectares (90m x 50m) for each crane pad and ~0.07ha for each turbine foundation. The total area for all 48 turbines will be ~ 25ha, which includes the permanent compacted hardstanding laydown area (also known as a crane pad) for each wind turbine which will be required during construction and also for ongoing maintenance during operation of the WEF as well as the turbine foundation.
- Electrical transformers (690V/33kV) will be located adjacent to each turbine with a typical footprint of $4m^2$ (2m x 2m) but can be up to $100m^2$ (10m x 10m) at certain locations.
- Internal access roads up to 12 m wide, including structures for stormwater control would be required to access each turbine and the substation, with a total footprint of about 73 ha. Where possible, existing roads will be upgraded, a total of up to 38.6ha out of the above mentioned 73ha. Turns will have a radius of up to 50 m in order for abnormal loads (especially turbine blades) to access the various turbine positions.
- One 33/132kV onsite substation will be constructed with a total footprint of approximately 2.25 ha.

Temporary infrastructure on the site will include a construction camp (approximately 13ha) which includes an on-site concrete batching plant for use during the construction phase and for offices, administration, operations and maintenance buildings during the operational phase.

The final design details of the proposed WEF and associated infrastructure will become available during the detailed design phase of the project, after the project has entered into a power purchase agreement with an off taker or have been selected as a Preferred Bidder project under the Department of Energy's (DoE) Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

TURBINE DESIGN: The final design is not available but average specifications are presented below:

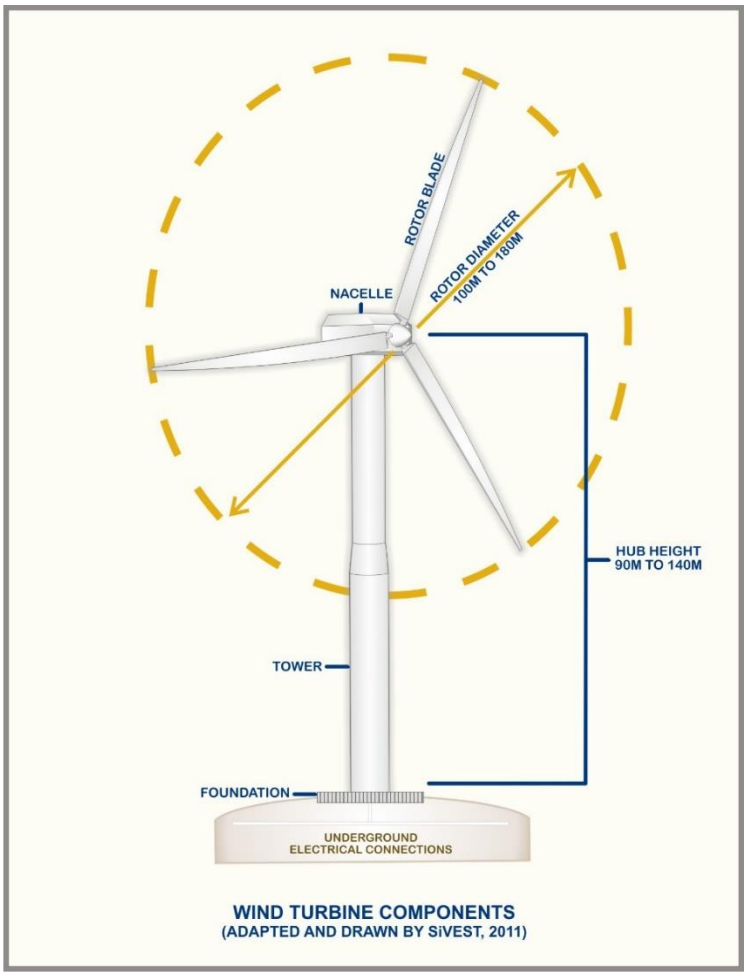


Figure ii: Example of a Wind Turbine with specifications as proposed by Rondekop Wind Farm (Pty) Ltd.

EXPORT CAPACITY: The project will have a maximum export capacity up to 325MW. The proposed wind farm will consist of up to 48 turbines, each with a generation capacity between 3 MW and *up to* 8MW.

Table 2: Technical Details

PROJECT	TECHNICAL DETAILS	
Rondekop Wind Energy Facility	Turbines	Up to 48 turbines (between 3MW and *up to* 8MW in nameplate capacity) Hub height: between 90 m and up to 140 m Rotor diameter: between 100 m and up to 180m Crane pad (90m x 50m) Foundation of 30m diameter and up to 5 m in depth Total footprint up to ~ 25 ha

PROJECT	TECHNICAL DETAILS	
	Access roads	Up to 12m wide Total footprint up to ~ 73,2 ha of which ~39 ha is upgrading existing roads Six (6) alternatives, 2 per ridge; preference for Three (3) access roads, 1 per ridge
	Substation	One (1) 33/132kV substation Total footprint ~2,25ha Six (6) alternatives
	Construction camp	One (1) construction camp for use during construction phase Offices and other buildings for use during operational phase ~ 13 ha Fences around construction camp will be ~ 6 m high Six (6) alternatives
	Electrical infrastructure	Electrical transformers (690V/33kV) adjacent to each turbine (typical footprint of 2 m x 2 m but can be up to 10 m x 10 m at certain locations) to step up the voltage to 33kV. Underground 33kV cabling between turbines buried along access roads, where feasible, with overhead 33kV lines grouping turbines to crossing valleys and ridges outside of the road footprints to get to the onsite 33/132kV substation.
	Masts	Up to 4 (the height will be the same as the final wind turbine hub height) wind measuring lattice masts

A3 Maps of all A4 maps included in the report are included in **Appendix 5**.

EXECUTIVE SUMMARY

Rondekop Wind Farm (Pty) Ltd (hereafter referred to as Rondekop Wind Farm) is proposing to construct a Wind Energy Facility (WEF) and associated infrastructure near Sutherland in the Northern Cape Province of South Africa (hereafter referred to as the 'proposed development') (**Figure**). The proposed development will consist of a 325MW maximum export capacity and if referred to as Rondekop Wind Energy Facility (Rondekop WEF). The overall objective of the proposed development is to generate electricity to feed into the National Grid.

In terms of the Environmental Impact Assessment (EIA) Regulations, which were published on 4 December 2014 as amended, various aspects of the intended development are considered listed activities which will have an impact on the environment and therefore require authorisation from the National Department of Environmental Affairs (DEA) prior to the commencement of such activities.

SiVEST SA (Pty) Ltd Environmental Division has been appointed by Rondekop Wind Farm as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for the proposed construction and operation of the WEF and associated infrastructure.

The proposed Rondekop WEF development is located partially within the Komsberg Renewable Energy Development Zone (REDZ 2), one (1) of the eight (8) REDZ formally gazetted[1] in South Africa indicating the procedure to be followed in applying for environmental authorisation (EA) for large scale solar and wind energy generation facilities. Considering that a portion of the proposed facility is located outside of the Komsberg REDZ, the Rondekop Wind Farm will be subject to a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended and EIA Regulations, 2014 (as amended).

The EIA for the proposed development will be conducted in accordance with the EIA Regulations, 2014 as amended promulgated in terms of Chapter 5 NEMA, 1998. All relevant legislation and guidelines (including Equator Principles) will be consulted during the EIA process and will be complied with at all times. The Scoping phase of the project has been completed and has been accepted by the DEA. The EIA phase of the project is currently in progress

[1] Formally gazetted on 16 February 2018 (government notice 114).

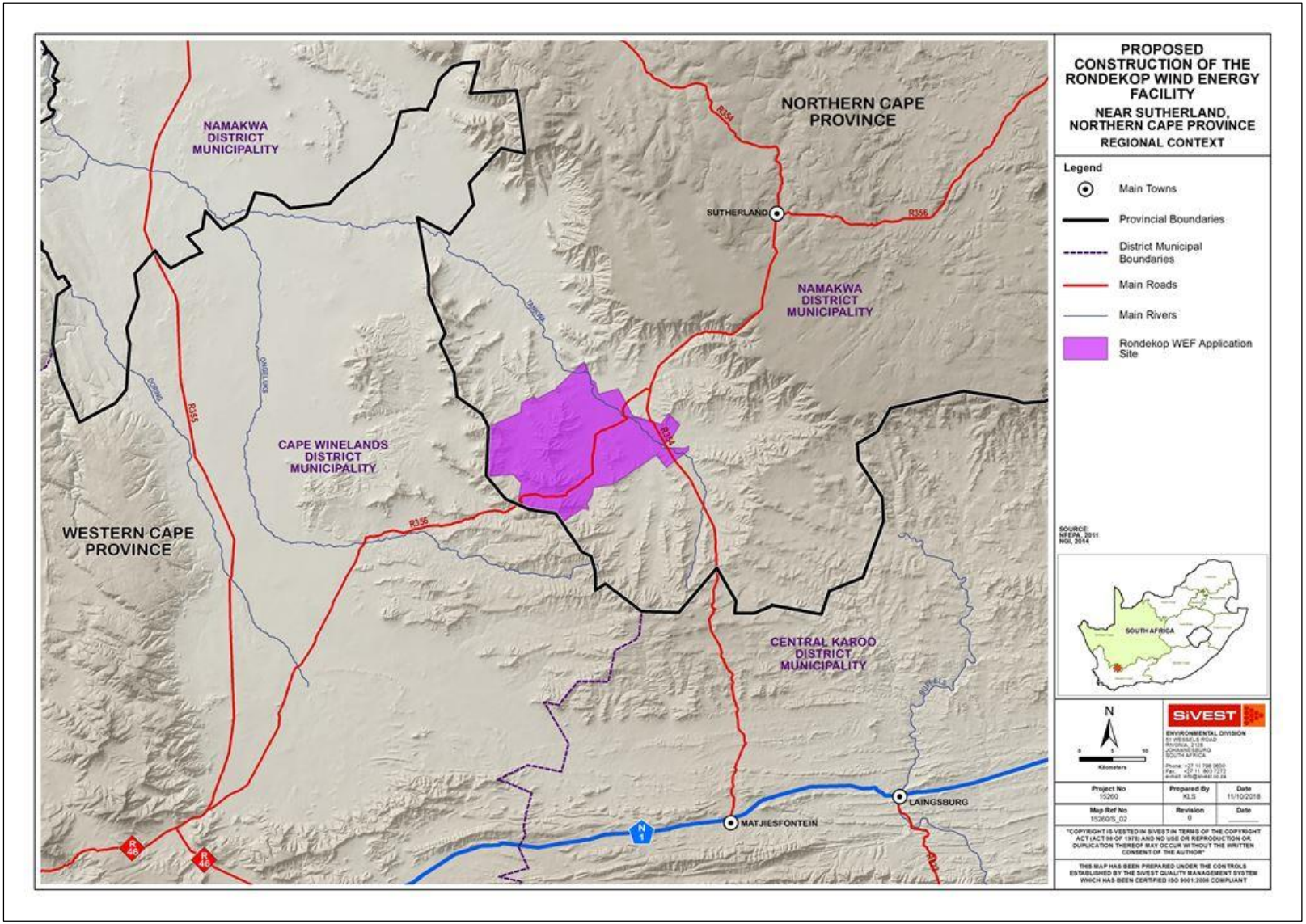


Figure iii: Rondekop WEF in the regional context

Table 3: Application site coordinates

APPLICATION SITE		
CENTRE POINT COORDINATES		
POINT	**SOUTH**	**EAST**
Midpoint	S32° 44' 20.72"	E20° 17' 26.90"

Refer to **Appendix 9A** for the full project coordinates.

As previously mentioned, the proposed Rondekop WEF would have a capacity of 325MW and would consist of up to 48 wind turbines (hub height of each turbine will be between 90 m and up to 140 m and its rotor diameter between 100 m and up to 180 m). The associated infrastructure would include, but is not limited to, access roads, one onsite 33/132kV substation and one on site construction camp. The total footprint of the proposed facility would be ~114 ha spread over 17 properties.

Various feasible layout alternatives were identified including access road alternatives, substation location alternatives and construction camp location alternatives (**Figure iv**). One location alternative and one technology alternative were considered. All alternatives were assessed against the no-go alternative i.e. *status quo*.

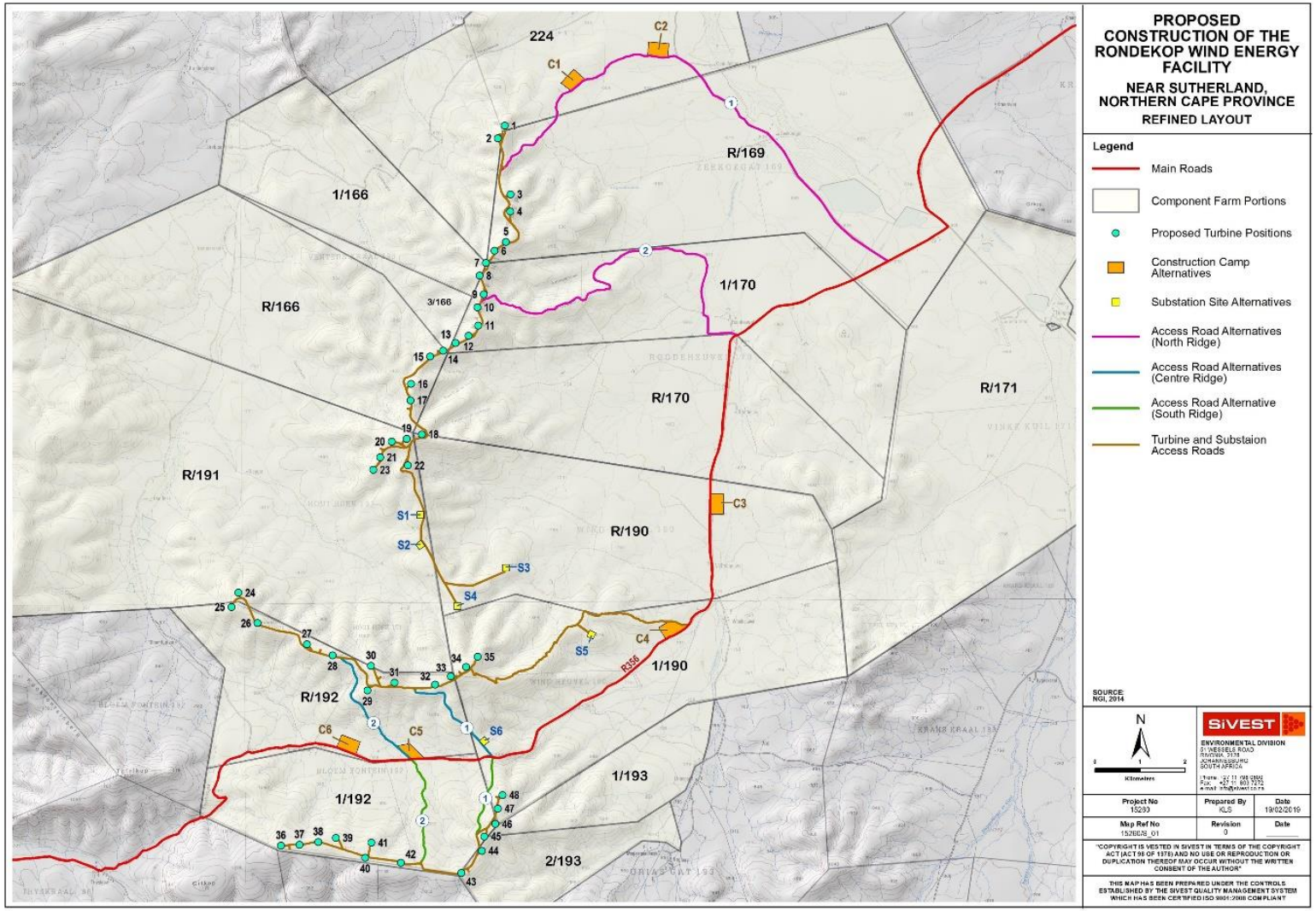


Figure iv: Rondekop WEF revised layout map

It is important to note that on the 14 November 2018 an application for EA along with the Draft Scoping Report (DSR) for the proposed Rondekop WEF were received by the DEA and a reference number was allocated to the proposed development (DEA reference 14/12/16/3/3/2/1115). The DSR was made available for a 30-day public review and comment from 14 November 2018 – 14 December 2018. The DSR was thereafter updated and the Final Scoping Report (FSR) was submitted to the DEA on 15th January 2019. After evaluating the FSR the DEA issued a letter, dated 19 January 2019, indicating that the documents complied with the minimum requirements of the EIA Regulations, 2014 and that SiVEST could proceed with the EIA process (i.e. Draft Environmental Impact Assessment Report (DEIAr) and Final Environmental Impact Assessment Report (FEIAr). A Copy of this acceptance letter can be found in **Appendix 4.**

The following assessments were conducted prior to and during the Scoping Phase to identify and assess the issues associated with the proposed development:

- Desktop Terrestrial Ecology Assessment;
- Aquatic Ecology Assessment;
- Agricultural and Soils Assessment;
- Noise Assessment;
- Visual Impact Assessment;
- Heritage Assessment (including Palaeontology, Archaeology & Cultural Landscape);
- Social Impact Assessment; and
- Traffic Impact Assessment.

The findings of the above-mentioned reports (excluding Terrestrial Ecology) indicated that no further assessment was required in the EIA phase, however as detailed in the Plan of Study the following specialist studies were undertaken to inform the DEIAr:

- Avifauna Assessment including a 12-month preconstruction avifauna assessment;
- Bat Assessment including a 12-month preconstruction bat assessment; and
- Terrestrial Ecology Assessment.

The above-mentioned studies were undertaken to inform the impact assessment to take place in the EIA phase of the proposed development. All specialist studies assessed the entire application site as well as specific impacts of the proposed turbine locations and associated infrastructure (access roads, internal roads, construction camp and substation locations) in detail.

The majority of the studies undertaken during the scoping phase were conducted at an EIA level and as such included ground truthing verification of the proposed development site. The avifauna and bat studies have each been undertaken over a 12-month period, while an intensive Terrestrial ecology study was undertaken to further identify and define environmental constraints within the proposed development footprint. Based on the findings of the Terrestrial, Avifauna and Bat specialist assessments, the initial proposed WEF layout and associated infrastructure that was presented in the DSR and FSR was refined to further avoid environmental sensitivities.

The proposed changes as a result of the Terrestrial Ecology, Avifauna and Bat Assessment are addressed below and changes depicted in **Figures v and vii** (Initial layout and initial sensitivity maps) and **Figures vi and viii** (refined layout and refined sensitivity maps) respectively:

Based on specialist studies conducted prior to and during the Scoping Phase, the Terrestrial Ecology, Avifauna and Bat assessments were continued into the EIA Phase and as such identified further sensitive features which lead to the following layout changes:

Turbine Changes:

- Turbine 16: This turbine was located on the top of the summit of the ridge. Based on the terrestrial ecology assessment rocky outcrops have been designated as sensitive and so have mountain summits. It was recommended to shift the position of this turbine approximately 40 m westwards of its current position. The crane pad must also not affect this outcrop and should be orientated in a similar fashion relative to the new position as it was to the old position. This change has been made please refer to **Figure** below for new position.
- Turbine 44 and 43: The bird and bat specialist found that these turbines were located within the 200m identified no-go areas. This change has been made please refer to **Figure vi** below for new position.

All other turbine locations were found to be acceptable.

Road Alignment changes:

- Turbine 25 access road to crane pad: The access road onto the crane pad area at Turbine 25 was very close to the edge of the mountain slope. Although there is not a significant rocky outcrop at this point, there is a moderate outcropping of rocks at this point. However, the biggest concern is to minimize the risk of downslope erosion from the road, which would put a greater area at risk of degradation than just the road surface itself. It was therefore proposed by the ecologist that the access road be shifted inwards slightly to provide a buffer to the edge of the mountain slope. This change has been made please refer to **Figure vi** below for new position.
- Turbine 27 access road: The internal access road running past Turbine 27 crossed a rocky ridge / outcrop at the following approximate location: 32°45'31.57"S, 20°15'47.52"E. It was recommended by the ecologist for this alignment should be shifted slightly to attempt to avoid this outcrop, or else to cross it at a less significant location. This change has been made please refer to **Figure vi** below for new position.
- Road between turbine 28 and 29: The internal access road running between Turbine 28 and Turbine 29 crossed a rocky ridge / outcrop at the following approximate location: 32°45'51.43"S, 20°16'39.56"E. It was recommended by the ecologist for this alignment to be shifted slightly to attempt to avoid this outcrop. This change has been made please refer to **Figure vi** below for new position.
- Road between turbine 29 and 31: The internal access road running between Turbine 29 and Turbine 31 crosses a rocky ridge / outcrop at the following approximate location: 32°45'51.43"S, 20°16'39.56"E. It was recommended by the ecologist for this alignment to be shifted slightly to

attempt to avoid this outcrop. This change has been made please refer to **Figure vi** below for new position.

- Access road north 1: This alignment was running parallel to and in and out of a drainage line. This alignment would have a large impact on this particular drainage line, which is avoidable by shifting the alignment slightly away from the drainage line and then crossing it perpendicularly at a single point. Adjusting this alignment would also improve the acceptability of Construction Camp Alternative 1. This change has been made please refer to **Figure vi** below for new position and construction camp.
- Access road north 2: This alignment is shown crossing a drainage line twice where it would be preferable to avoid the drainage line completely at this point, if technically possible. This alignment would have an impact on this particular drainage line, which is avoidable by shifting the alignment slightly away from the drainage line. This change has been made please refer to **Figure vi** below for new position.

Crane Pads

- Crane pad 29: The crane pad at Turbine 29 was located partially on the edge of a steep slope. It was recommended by the ecologist for this alignment to be rotated slightly to be located more completely on the top of the flatter area, as shown in **Figure v**. This change has been made please refer to **Figure** below for new position.
- Crane Pad 35: The crane pad at Turbine 35 was located partially on the edge of a steep slope with a minor rock outcrop. It was recommended by the ecologist for this alignment to be rotated slightly to be located more completely on the top of the flatter area, as shown in
- **Figure v.** This change has been made please refer to **Figure vi** below for new position.

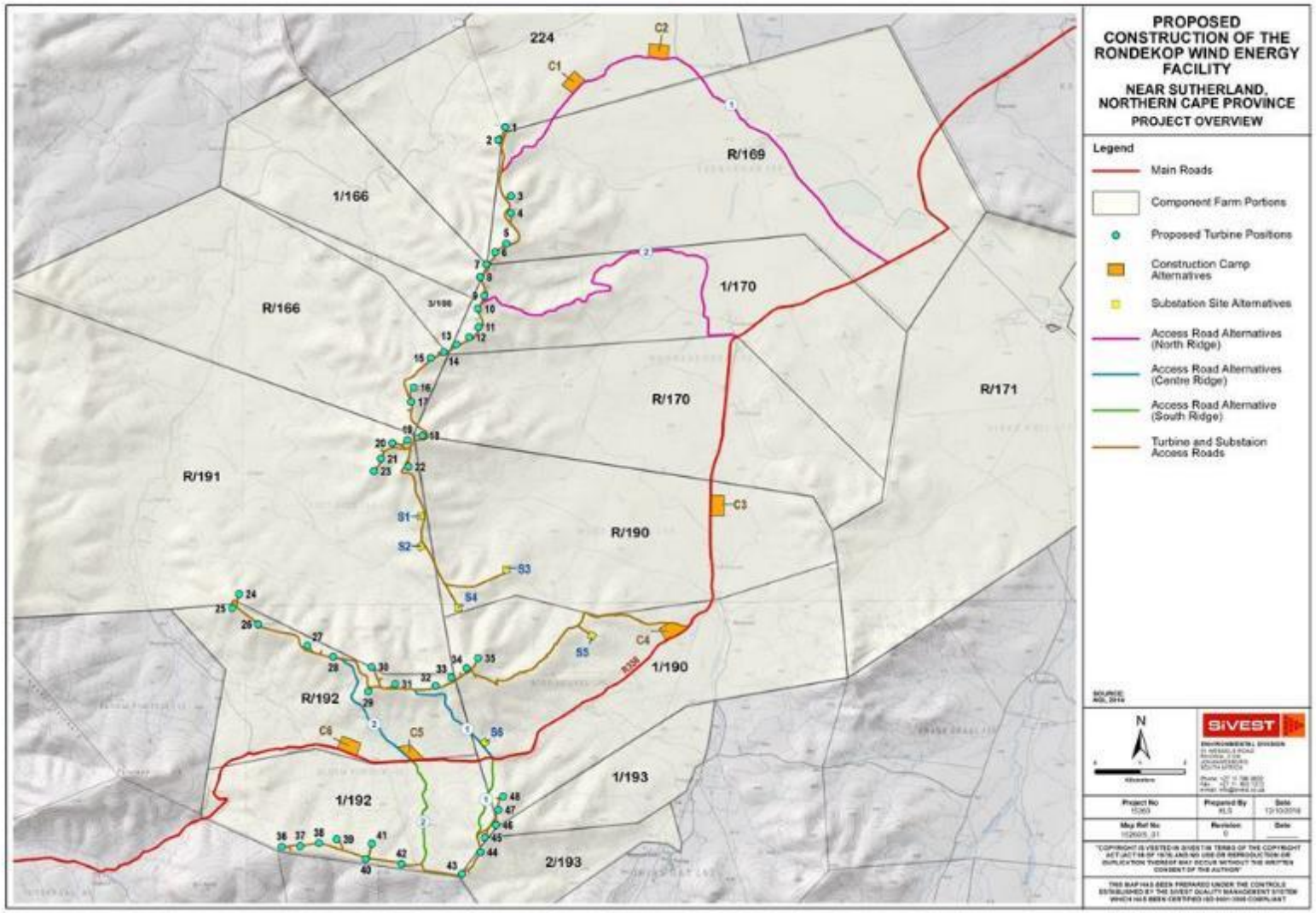


Figure v: Initial Layout Map

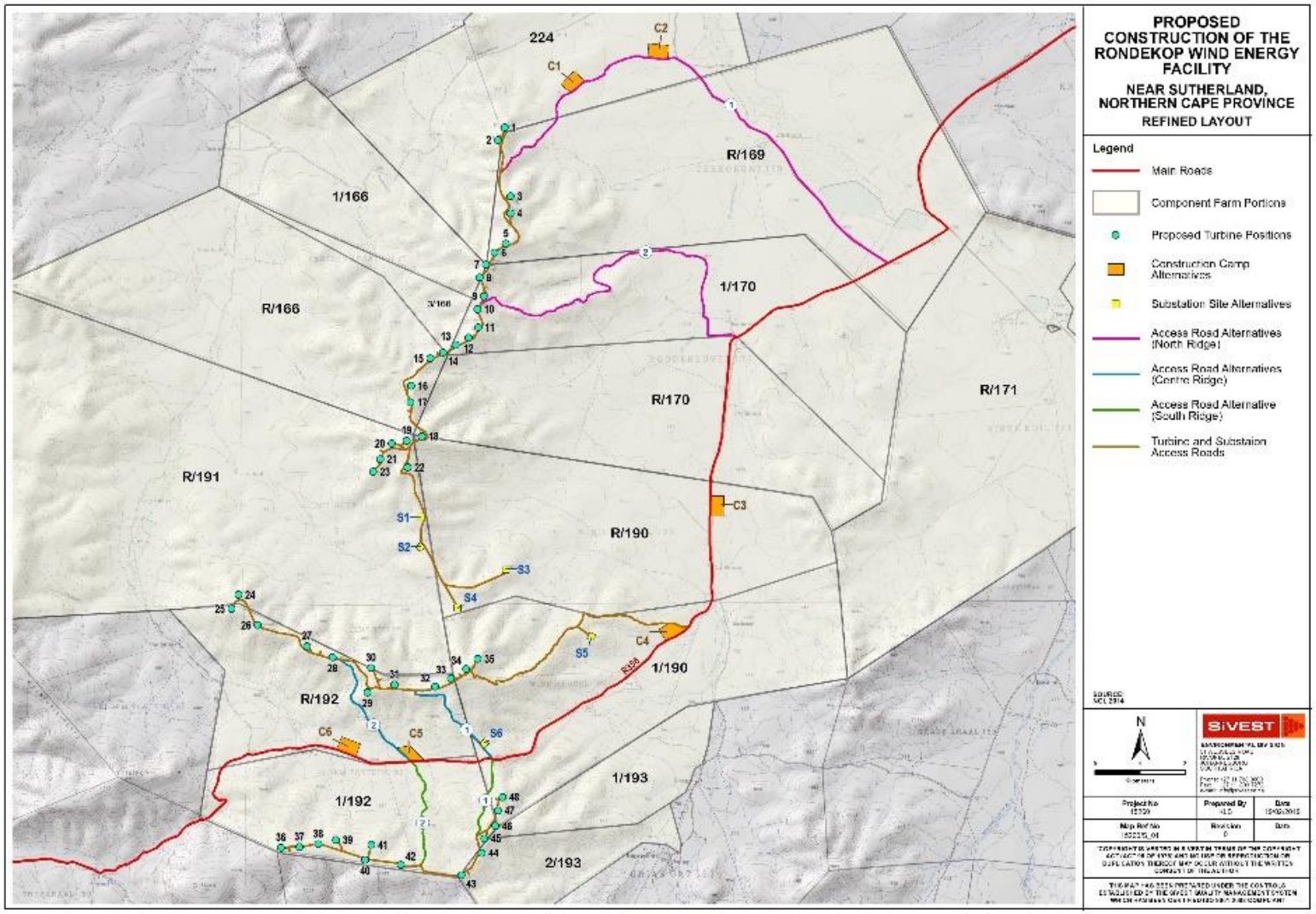


Figure vi: Refined Layout Map

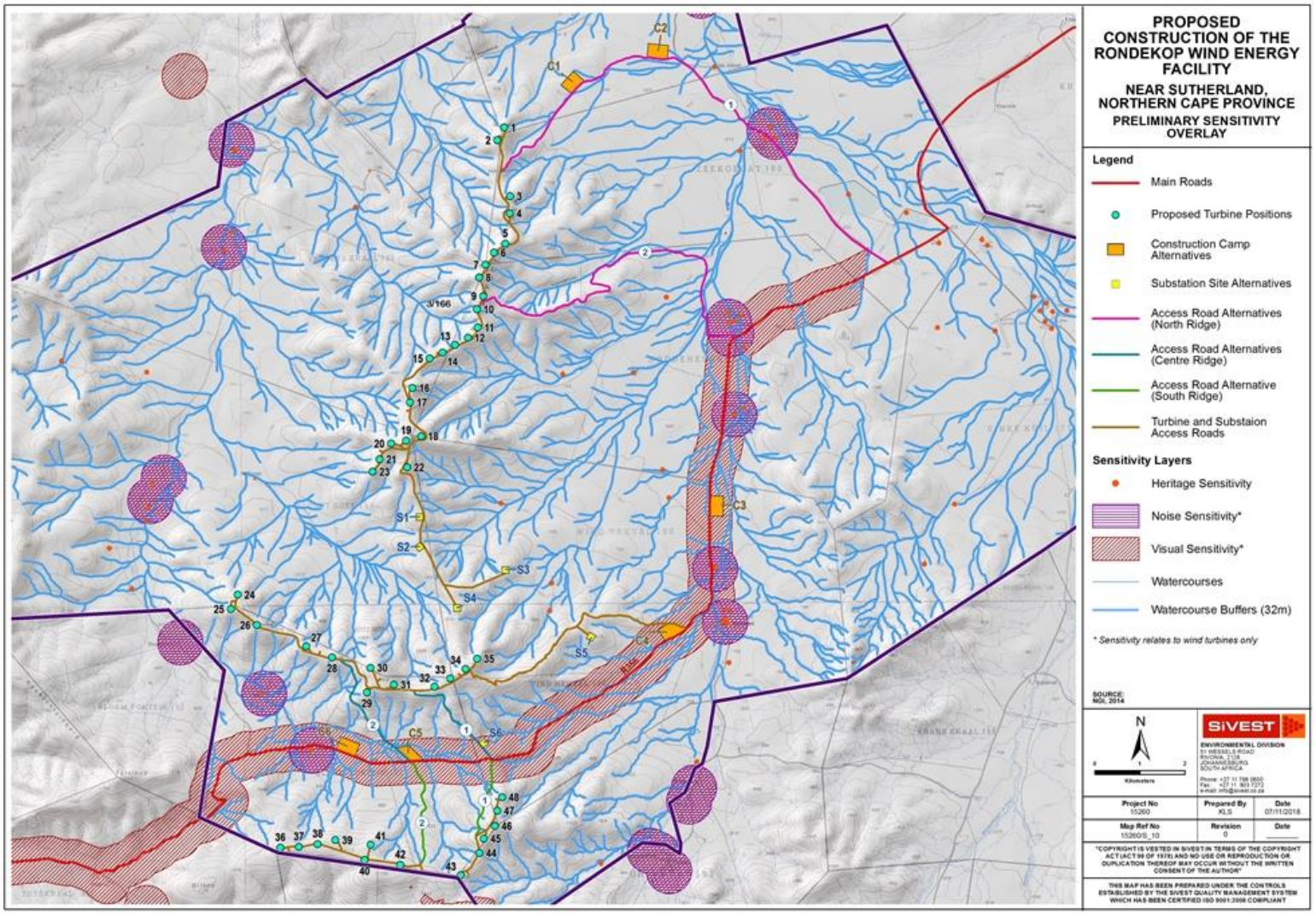


Figure vii: Initial Sensitivity Map

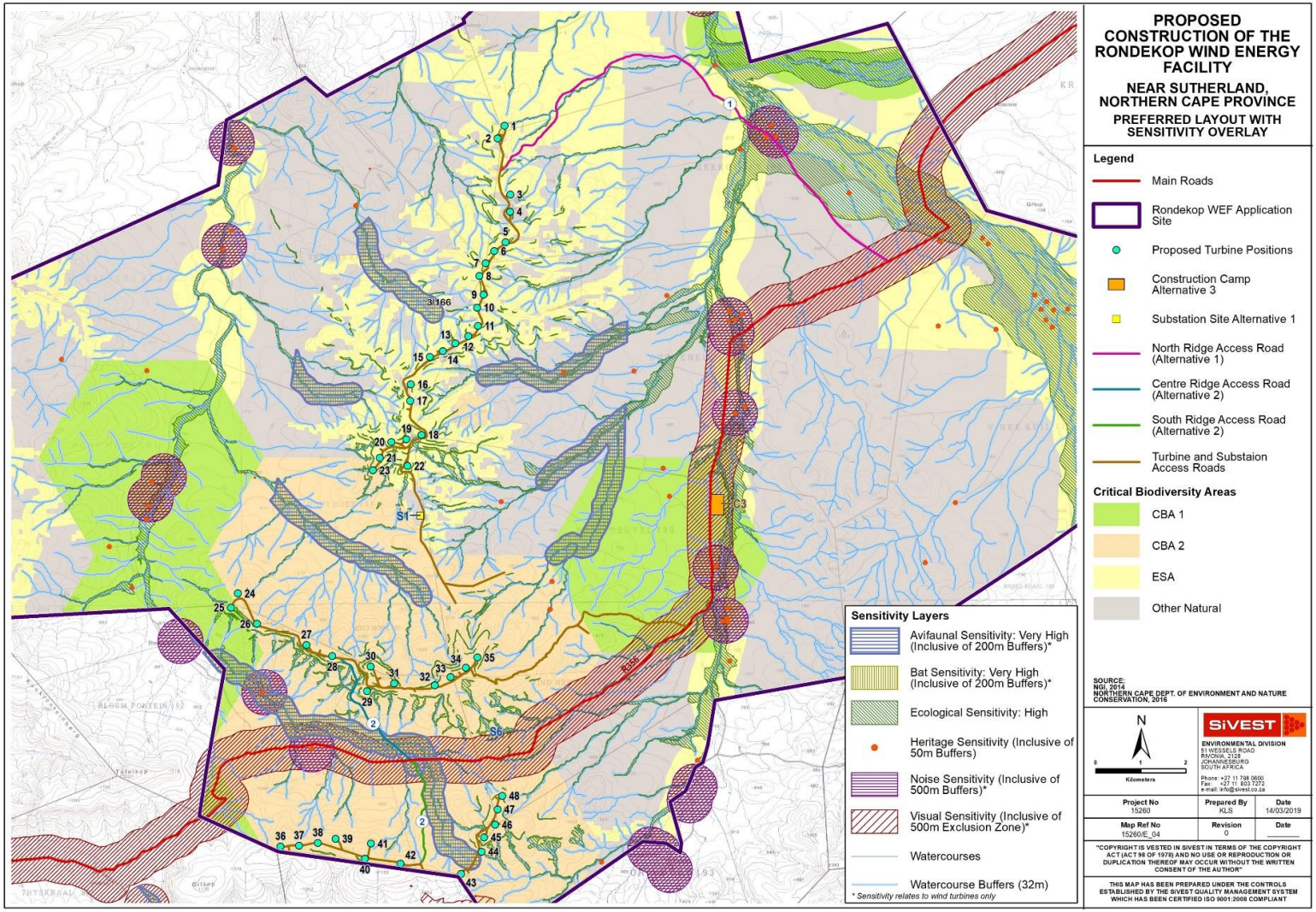


Figure viii: Refined Sensitivity Map

The list of proposed changes was disseminated to all remaining specialists for additional assessment and review of their original reports. Each specialist addressed the proposed changes in letters that are attached in **Appendix 6** with each corresponding Specialist Report. It must be mentioned that all specialists were in favour of the adjustments of the layout and found that no changes to their initial findings had occurred.

Based on the scoping studies conducted, a few potentially sensitive sites have been identified within the study area. These have informed the preliminary assessment of layout alternatives which are included in **Chapter 7** and have been further assessed during the EIA phase. The table below summarises the specialist findings of the Scoping Report and Draft Environmental Impact Report for the entire project. The site sensitivities are depicted in **Figure v** below the **Table iv**.

Table 4: Summary of Impacts

Specialist Studies	Summary of Impacts
Terrestrial Ecology	The following impacts have been identified: **Design Phase Impacts** *Direct impacts* Direct impacts include the following: • Loss and/or fragmentation of indigenous natural vegetation due to clearing. **Construction Phase Impacts** *Direct impacts* • Direct impacts include the following: • Loss and/or fragmentation of indigenous natural vegetation due to clearing; • Loss of individuals of plant species of conservation concern and/or protected plants; • Loss of faunal habitat and refugia; • Direct mortality of fauna due to machinery, construction and increased traffic; • Displacement and/or disturbance of fauna due to increased activity and noise levels; • Increased poaching and/or illegal collecting due to improved access to area; • Effects on physiological functioning of vegetation due to dust deposition; and • Impact on integrity of Critical Biodiversity Areas.

Specialist Studies	Summary of Impacts
	Indirect impacts Indirect impacts during the construction phase include the following: • Establishment and spread of alien invasive plants due to the clearing and disturbance of indigenous vegetation; • Changes to behavioural patterns of animals, including possible migration away or towards the project area; and • Increased runoff and erosion due to clearing of vegetation, construction of hard surfaces and compaction of surfaces, leading to changes in downslope areas. **Operational Phase Impacts** *Direct impacts* • Ongoing direct impacts will include the following: • Continued disturbance to natural habitats due to general operational activities and maintenance; and • Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with infrastructure. *Indirect impacts* These will include the following: • Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors; • Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape; and • Changes to behavioural patterns of animals, including possible migration away or towards the project area. **Decommissioning Phase Impacts** *Direct impacts* These will include the following: • Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites; • Direct mortality of fauna due to machinery, construction and increased traffic; • Displacement and/or disturbance of fauna due to increased activity and noise levels; and

Specialist Studies	Summary of Impacts
	Effects on physiological functioning of vegetation due to dust deposition. *Indirect impacts* These will occur due to renewed disturbance due to decommissioning activities, as follows: • Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors; • Changes to behavioural patterns of animals, including possible migration away or towards the project area. **Cumulative Impacts** These include the following: • Cumulative impacts on indigenous natural vegetation due to clearing; • Cumulative impacts on individuals of plant species of conservation concern and/or protected plants; • Cumulative impacts on ecological processes; • Cumulative impacts on fauna; • Cumulative impacts due to establishment and spread of alien invasive plant species; • Cumulative impacts due to loss of protected animals; and • Cumulative impacts on Critical Biodiversity Areas and conservation planning. Biodiversity patterns on site have been established to a high level of detail and with a high degree of confidence as it is based on two weeks of field surveys on site and a detailed desktop assessment, where after the following has been concluded: • No threatened plant or animal species are likely to be affected by the proposed project; • A number of plant species protected according to Provincial legislation will be affected, but these are all common and / or widespread species, none of which are of conservation concern. The presence of these species triggers a permit requirement, but does not affect rare or threatened species; • The vegetation types affected by the project are widespread and have been transformed overall to a small degree. They are therefore of low conservation concern. The amount of transformation due to the proposed project is small in absolute terms and also relative to the overall distribution of the regional vegetation;

Specialist Studies	Summary of Impacts
	• There are habitats on site that have been identified as being of higher sensitivity and value than the general vegetation, including rocky outcrops and riparian vegetation. These have all been mapped in detail and all attempts made to ensure that the project affects these areas to the smallest degree possible, including shifting infrastructure, where possible. Residual impacts on these areas of elevated sensitivity are small compared to the distribution of these on site. • The only matter of concern for the site is the presence of Critical Biodiversity Areas, mostly CBA2 Important areas, within which approximately half of the project falls. The CBAs include vegetation and floristic patterns that are virtually identical to parts of the site that are not included in the CBA. The total area affected by the project that falls within CBAs is relatively insignificant in comparison to the overall extent of the CBA. Nevertheless, mitigation measures have been proposed to minimise this potential loss of habitat as much as possible, including changes to the location of infrastructure to avoid sensitive sites. At the site-specific scale, some sensitivities have been identified, primarily related to natural habitat, but also to some individual (protected) species. Many of these can be minimised or avoided with the application of appropriate mitigation or management measures, including, in some cases, slight shifts of infrastructure positions. There will be residual impacts, primarily on natural habitat. Overall based on the vegetation found on the site and the detailed site assessment, the impact to this vegetation is considered low due to the presence of this vegetation on other ridges in the area. The amount of habitat that will be lost to the project is insignificant compared to the area in hectares of the regional vegetation type that occurs on site and over the entire geographical range of the vegetation type. In most cases, the exact location of important biodiversity features has been identified in the field at a high level of confidence and suggestions made to relocate proposed infrastructure to avoid these. From this perspective it is unlikely that the proposed project will have an unacceptable impact on the natural environment. Based on the analysis provided in this report, the conclusion is that the project should be authorised (inclusive of all project alternatives).
Avifauna	The pre-construction bird monitoring programme methodology implemented covered all four seasons for the bird community on the site, as recommended by the *Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa* (Jenkins *et al*., 2015), therefore providing a solid baseline for the establishment of the future assessments. Site visits confirmed the occurrence of a relatively high abundance of Accipitrid and Falcon species. The results have shown that both groups have a constant presence at the site throughout the year and spend a high proportion of their time and/or number of contacts

Specialist Studies	Summary of Impacts
	at rotor height in comparison with the other groups of species. It is also important to note that their activity was largely associated with the hillside and escarpment areas, where most of the potential collision risk movements were observed. A total of eight (8) species confirmed on site may be of special concern for having an unfavourable conservation status in South Africa: Black Harrier *Circus maurus*, Ludwig's Bustard *Neotis ludwigii*, Martial Eagle *Polemaetus bellicosus* – Endangered; Black Stork *Ciconia nigra*, Verreauxs' Eagle *Aquila verreauxii* – Vulnerable; Karoo Korhaan *Eupodotis vigorsii*, Maccoa Duck *Oxyura maccoa*, Greater Flamingo *Phoenicopterus roseus* – Near Threatened (Taylor *et al*., 2015). Sensitive areas identified at the proposed site considered the relevant aspects collected through the bird monitoring programme, including: relevant activity of sensitive species and associated potential for collision recorded in areas of hillsides and escarpments; particular association of passerine species and other relevant sensitive species to riverine thickets and water features; association of red-listed species with their potential breeding/roosting locations. This allowed for establishing avoidance areas (areas with very high sensitivity for birds). The main direct impacts identified to potentially occur are: increased habitat loss, increased fatalities due to collision with various project infrastructures, and increased disturbance/displacement effects. The overall significance of these impacts expected to occur during the construction, operation, and decommissioning phases, is expected to be medium before mitigation, and low after mitigation – as seen in the summary table below. Rondekop WEF is considered to be located in an area of medium sensitivity with some habitat features of very high sensitivity in terms of the bird community present. It is considered that the impacts can be minimised to the maximum extent possible, mostly through the avoidance of very high sensitive areas, and through mitigation measures within areas of medium sensitivity. Presently, the potential impacts to birds is not anticipated to be of a high significance, provided that the aforementioned avoidance/mitigation measures are followed. As such, no fatal flaws were identified for this project, and the project may be authorised from an avifaunal perspective, subject to the proposed mitigation measures listed below being followed.
Bats	12-month pre-construction monitoring programme was undertaken in accordance with the best practice pre-construction monitoring guidelines.

Specialist Studies	Summary of Impacts
	Results of the pre-construction bat monitoring indicate that the bat activity at the proposed Rondekop WEF area is in general low at ground and rotor level. One (1) species with confirmed occurrence is perceived as having a potential high risk of collision with wind turbines (according to Sowler *et al.,* 2017) due to their behaviour, i.e. *Tadarida aegyptiaca*. Three (3) other species with confirmed presence in the area raise concerns regarding their probability of fatalities, as they have a medium-high risk of collision with wind turbines: *Neoromicia capensis*, *Miniopterus fraterculus* and *Miniopterus natalensis*. Additionally, *Miniopterus natalensis* is a migrant species that can use air space at rotor level height during migration periods being prone to collision during these events. These are all "Near Threatened" or "Least Concern" species, according to the South African Red List (Friedmann & Daly, 2004b). Sensitive areas identified at the proposed site considered the presence of specific features and habitat that may have an increased bat activity, including: waterbodies, watercourse lines and associated riverine vegetation, which are important for bats, since they are likely to act as commuting routes, providing food resources, likely to be associated with higher bat activity. This allowed for establishing avoidance areas (areas with very high sensitivity for bats). The main direct impacts identified to potentially occur are: increased habitat loss, increased fatalities due to collision with turbine blades or barotrauma, and increased disturbance/displacement effects. The overall significance of these impacts expected to occur during the construction, operation, and decommissioning phases, is expected to be medium before mitigation, and low after mitigation. Rondekop WEF is considered to be located in an area of low sensitivity with some habitat features of very high sensitivity in terms of the bat community present. It is considered that the impacts can be minimised to the maximum extent possible, mostly through the avoidance of very high sensitive areas. Presently, the potential impacts to bats is not anticipated to be of a high significance, provided that the aforementioned avoidance/mitigation measures are followed. As such, no fatal flaws were identified for this project, and the project may be authorised from a bats perspective, subject to the proposed mitigation measures listed being followed.
Aquatic Ecology	The aquatic assessment of the proposed Rondekop WEF included the delineation of any natural waterbodies on the properties in question, as well as an assessment of the potential consequences of the proposed layout on the surrounding watercourses.

Specialist Studies	Summary of Impacts
	The report indicates the significant watercourses within the site and recommends that any activities within these areas or the 32 m buffer will require a Water Use License (WUL) (possible General Authorisation [GA]) under Section 21 c & i of the National Water Act (Act 36 of 1998). An assessment of the proposed layout for the Rondekop WEF found that the proposed activities would have the potential to create erosion and as such, the report includes recommended mitigation measures. Five (5) of the six (6) proposed access road alternatives are considered preferred as they either make use of existing roads and tracks or the overall impact with mitigation would be LOW. One wetland was found on Centre Ridge Road Alternative 1 by the Terrestrial Ecologist and thus this alternative 1 is no longer supported. Construction Camp Alternatives 2, 3 and 4 are considered to be preferred alternatives as they all avoid the watercourses and their respective buffers. Alternatives 1 and 5 however are rated as favourable alternatives since they will require minimal micro-siting to avoid watercourse buffer. All the proposed substation site alternatives are considered preferred as they all avoid the watercourses and their respective buffers. Overall, it was concluded that the proposed WEF would seemingly have limited impact on the aquatic environment as the proposed structures for the most part have either avoided the delineated watercourses, except for existing access roads that will make use of existing roads crossing watercourses. The use of any existing roads and upgrading thereof will further support this conclusion. One wetland was found within the site and no aquatic protected or species of special concern (flora) were observed during the site visit.
Agriculture and Soils	The agriculture and soils assessment concluded that all agricultural impacts of the proposed development are assessed as being of low significance. This is because of the limited agricultural potential of the proposed development site, which is a function of the climate, terrain and shallow soils and the fact that grazing can continue in tandem with the WEF. The fact that the footprint of

Specialist Studies	Summary of Impacts
	disturbance of the wind farm is limited to a very small proportion of the surface area also limits the agricultural impact. The study area has low agricultural sensitivity because of its low potential. No parts of the site need to be excluded from the proposed development and no buffers are required. Because of the low agricultural impacts and the agricultural uniformity of the site, the assessment found no material difference between the significance of impacts of any of the proposed alternatives. Therefore, from an agricultural impact perspective, there are no preferred alternatives, and all the proposed alternatives are acceptable.
Noise	The Noise Impact Assessment involved a literature review, desktop modelling and baseline monitoring of the ambient noise levels at the site. The results of the study indicate that the following conclusions can be drawn: • There will be a short-term increase in noise in the vicinity of the site during the construction phase as the ambient noise level will be exceeded by vehicle operations. • The area surrounding the construction sites will be affected for short periods of time in all directions, should numerous construction equipment be used simultaneously. • The number of construction vehicles that will be used in the project will add to the existing ambient levels and will most likely cause a disturbing noise for a limited time. The exact number of construction vehicles is not known at present. The duration of impact will however be short-term. • The day/night time SANS 10103:2008 noise limit of 45Db (A) will not be exceeded at any of the noise sensitive areas. • The night time guideline noise limit of 35dB(A) will in all likelihood not be exceeded at any of the noise sensitive areas except for NSA 15 and 16 above 5m/s windspeed, as wind noise masking will occur as the wind speed increases. Although these homesteads are only occupied for 3 – 4 Months of the year during winter when grazing is optimal. However, the assessment did not consider masking effect and considered a 125m hub height. A higher hub height and the masking effect of wind could reduce the noise impact. Therefore, the turbines may all be authorized. • The impact of low frequency noise and infra sound will be negligible and there is no evidence to suggest that adverse health effects will occur as the sound power levels generated in the low frequency range are not high enough to cause physiological effects. • All turbine positions met the 500 m setback distance from noise sensitive receptors.

Specialist Studies	Summary of Impacts
	• The cumulative impacts will not exceed the day/night time SANS 10103:2008 noise limit of 45dB(A). • The cumulative impacts will not exceed the night time SANS 10103:2008 noise limit of 35dB(A). The construction phase and operational phase will have a very low noise impact on the noise sensitive receptors. It was concluded that, provided that the mitigation measures presented in the noise specialist study are implemented effectively, the noise from the turbines at the identified noise sensitive areas is predicted to be less than the 35 dB(A) night limit and 45 dB(A) day/night limit for rural areas presented in SANS 10103:2008. This will be confirmed with onsite measurements at NSA 15 and 16 during the operational phase, as above 5m/s the turbine noise exceeds the night limit. The wind masking noise will however mitigate this impact. The overall noise impact with recommended mitigation is expected to be negative and of very low significance before and after mitigation.
Visual	A visual study was conducted to assess the magnitude and significance of the visual impacts associated with the development of the proposed Rondekop WEF. Overall the sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with rural elements. As such, WEF development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present in the study area. The area is not however typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. The proposed development will have a high level of impact on one (1) of these receptors and a medium level of impact on twelve (12) identified receptors. The assessment revealed that the proposed WEF will have an overall Low Negative visual impact during construction and an overall negative medium visual impact during operation, with relatively few mitigation measures available to reduce the visual impact. The associated WEF infrastructure would have a Low Negative visual impact during both the construction and operation phases. Although several renewable energy developments and infrastructure projects, either proposed or under construction, were identified within a 50 km radius of the Rondekop WEF, it was determined that only two of these would have any significant impact

Specialist Studies	Summary of Impacts
	on the landscape within the visual assessment zone. Both of these WEFs (Kudusberg WEF and Kareebosch WEF) are directly adjacent to the Rondekop WEF. It is anticipated that this concentration of facilities will alter the inherent sense of place and introduce an increasingly industrial character into a largely rural area. This will result in significant cumulative impacts, rated as negative medium during both construction and operation phases of the project. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. The impact should also be viewed in light of the project being proposed partially within a REDZ.
Heritage	Due to the nature of cultural remains, a systematic controlled-exclusive surface survey was conducted on foot and in a vehicle, over a period of four days by two archaeologists from PGS. The fieldwork was conducted on the 20th-24th September 2018. An additional site assessment was also conducted by a Palaeontologist from Banzai Environmental on the 1st – 3rd October 2018. The locations of five (5) individual heritage sites were identified during the field survey, all of them falling within the boundaries of the study area. **Archaeology** The archaeological resources identified within the proposed development site comprise a small number of Stone Age surface artefact scatters. These are primarily from the Later Stone Age (LSA), although Middle Stone Age (MSA) material was also identified. All these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered. Based on findings from a range of other heritage reports in the area, these types of sites are to be expected in this region. The remaining heritage features included buildings and stone walled structures that are likely the result of early European settlement in the area. Most of these features are likely over 60 years of age and for this reason are protected by current heritage law. Even though heritage features were detected within the development area, serious mitigation measures will not be required except for the implementation of a chance-finds protocol. However, if the development layout is altered, this position will need to be revaluated.

Specialist Studies	Summary of Impacts
	Paleontology The proposed Rondekop development site is underlain by the Abrahamskraal Formation (Adelaide Subgroup, lower Beaufort Group, of the Karoo Supergroup) and the Waterford Formation of the Ecca Group (Karoo Supergroup). According to the PalaeoMap on SAHRIS the Abrahamskraal and Waterford Formations have very high Palaeontological sensitivities while the Ecca has a moderate Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website). Access to all the locations of the proposed site proved to be difficult. However, as many as possible locations were investigated with no visible evidence of fossiliferous outcrops. For this reason, an overall low palaeontological sensitivity is allocated to the development footprint. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the Rondekop WEF development will be of a low significance in palaeontological terms. It is therefore considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction of the development may be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. The proposed development, as well as all alternatives have a similar geology and therefore there is no preferences on the grounds of palaeontological fossil heritage for any specific layout among the different options under consideration. **Cultural Landscape** The visual assessment completed by Gibb *et al* (2018) for the Rondekop WEF characterised the study area as a "typical of a Karoo or "platteland" landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa." They do however find that visual impacts on the cultural landscape would be reduced by the fact that the area is very remote and there are no significant tourism enterprises attracting visitors into the study area. In addition, the nearest major scenic route, the R354, is outside the 8km visual assessment zone and is not expected to experience any visual impacts from the proposed WEF. The cultural landscape in this area is therefore considered to be of low significance and the impacts on the cultural landscape of low significance.

Specialist Studies	Summary of Impacts
	General In the event that significant heritage resources are discovered during site clearance, construction activities must stop in the immediate vicinity of the find, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures. The overall impact of the WEF and its associated infrastructure, on the heritage resources identified during this report, is seen as low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised. There are no preferences in terms of the proposed layout alternatives as none of them will affect known heritage resources thus no mitigation measures will be required, except for the implementation of a chance-finds protocol. However, if the development layout is altered, this position will need to be revaluated.
Social Impact	A social impacts assessment was undertaken to consider the positive and negative impacts associated with the proposed development. The social impacts associated with the project were identified as follows; **Construction Phase Impacts** *Health and social wellbeing* • Annoyance, dust noise and shadow flicker • Increase in crime • Increased risk of HIV infections • Influx of construction workers • Hazard exposure. *Quality of the living environment* • Disruption of daily living patterns • Disruptions to social and community infrastructure • Transformation of the sense of place. *Economic* Job creation and skills development

Specialist Studies	Summary of Impacts
	Socio-economic stimulation. **Operational Phase Impacts** *Quality of the living environment* • Transformation of the sense of place. *Economic* • Job creation and skills development • Socio-economic stimulation. **Cumulative Impacts** *Health and social wellbeing* • Risk of HIV and AID; *Quality of the living environment* • Sense of place; • Service supplies and infrastructure *The Economy* • Job creation and skills development and • Socio-economic stimulation It was concluded that most of the impacts apply over the short term to the construction phase of the project. All of these impacts can be mitigated to within acceptable ranges and there are no fatal flaws associated with the construction of the project. Positive impacts can be enhanced. Although the project will be highly visible and is likely to change the sense of place of the area over the operational phase, it will also have significant benefits in respect of the supply of renewable energy into a grid system heavily reliant on coal powered

Specialist Studies	Summary of Impacts
	systems. In this sense the project forms part of a national effort to reduce South Africa's carbon emissions and thus carries with it a significant benefit. Considering the impacts identified, it is evident that the cumulative impacts associated with changes to the social environment of the region are more significant than those attached to the project. On a negative front there are two issues associated with developments in the region that are of most concern. The first of these issues is the change to the sense of place of an area that was once considered a pristine region of South Africa. The second is the potential, through an influx of labour and an increase in transportation to constructions sites, of the risk for the prevalence of HIV to rise in an area that has the lowest HIV prevalence rate in South Africa. It is important that the relevant authorities recognise these issues and find ways of mitigating them to ensure that they do not undermine the benefit that renewable energy projects bring, both to the region as well as to the country as a whole. From a Socio-Economic perspective the impacts associated with the proposed WEF are considered to be overall of medium significance with the negative impacts being are able to be mitigated to acceptable levels with the implementation of the recommended mitigation measures. The project fits well with the investment into renewable energy finding strong support in the National Development Plan and thus filtering down through other national, provincial and municipal legislation and documentation. The project is also quite likely to have a positive effect on the national and regional economy. There are no obvious fatal flaws associated with the proposed development at a social level. All the proposed layout alternatives appear to be acceptable, and there should be no problem with the proposed development proceeding with environmental authorisation. It is unlikely that any further assessment will be required from a Socio-economic perspective.
Traffic	A transport study assessed the potential impact of activities related to the delivery of the turbine components and associated supporting infrastructure to site, equipment and material and staff transportation for the construction and operation and decommissioning phases of the proposed Rondekop WEF.

Specialist Studies	Summary of Impacts
	It was determined that the main transport impacts will be during the construction and decommissioning phases of a WEF where the delivery of the infrastructure will generate significant traffic. The duration of these phases are short term i.e. the impact of the traffic on the surrounding road network is temporary and when the WEF is operational, do not add any significant traffic to the road network. The traffic impact on the surrounding network is therefore deemed low. Traffic generated by the construction activities of the WEF will however have a significant impact on the road infrastructure, albeit of a short-term nature. Additionally, the construction of the WEF will create dust and noise pollution that will have a low (short term) impact during the construction and decommissioning phases. Mitigation measures were proposed to minimize potential impacts. All access road alternatives are considered suitable. It should be noted that there is no preference between the construction camp and substation alternatives presented as these do not affect or have any impact on the traffic on the surrounding road network. In conclusion, it was stated that the development is supported from a transport perspective provided that the recommendations and mitigations contained in the report are adhered to.

These specialist studies were conducted to address the potential impacts relating to the proposed development. An impact assessment was conducted to ascertain the level of each identified impact, as well as mitigation measures which may be required. The potential positive and negative impacts associated with these studies have been evaluated and rated accordingly. The results of the specialist studies have indicated that preferred options contain no fatal flaws as a result of the proposed project. Additionally, the specialists comparatively assessed the alternatives as provided in **Figure and Figure** the results of the comparative assessment are summarised below in **Table 5.**

It must be noted that each of the three ridges require a separate access road (preferred roads listed below). As such, the preferred site layout is indicated in **Figure ix** below **Table v**. The preferred site layout in relation to the sensitive areas identified by the specialists is indicated in **Figure x.**

Table 5: **Summary of preferred layout alternatives**

ALTERNATIVE	ENVIRONMENTAL ASPECT										FATAL FLAW	Preferred
	Terrestrial Ecology	Aquatic Ecology	Visual	Bat	Birds	Social	Traffic	Noise	Agricultural and Soils	Heritage		
ACCESS ROADS ALTERNATIVES												
North Ridge Access Road Alternative 1	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	No preference	No preference	No preference	No preference	No	**YES**
North Ridge Access Road Alternative 2	Favourable	Preferred	Least preferred	Favourable	Favourable	Least preferred	No preference	No preference	No preference	No preference	No	No
Centre ridge Access Road Alternative 1	Least preferred	Least preferred	Preferred	Preferred	Preferred	Preferred	No preference	No preference	No preference	No preference	**Yes – Wetland**	No
Centre ridge Access Road Alternative 2	Preferred	Preferred	Favourable	Favourable	Least preferred	Favourable	No preference	No preference	No preference	No preference	No	**YES**
Southern ridge Access Road Alternative 1	Least preferred	Preferred	Favourable	Preferred	Preferred	Favourable	No preference	No preference	No preference	No preference	No	No
Southern ridge Access Road Alternative 2	Preferred	Preferred	Preferred	Favourable	Least preferred	Preferred	No preference	No preference	No preference	No preference	No	**YES**
CONSTRUCTION CAMP ALTERNATIVES												
Construction Camp Alternative 1	Favourable	Favourable	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No
Construction Camp Alternative 2	Preferred	Preferred	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No
Construction Camp Alternative 3	Favourable	Preferred	Preferred	No preference	No preference	Preferred	No preference	No preference	No preference	No preference	No	**YES**
Construction Camp Alternative 4	Least preferred	Preferred	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No

ALTERNATIVE	ENVIRONMENTAL ASPECT										FATAL FLAW	Preferred
	Terrestrial Ecology	Aquatic Ecology	Visual	Bat	Birds	Social	Traffic	Noise	Agricultural and Soils	Heritage		
Construction Camp Alternative 5	Least preferred	Favourable	Favourable	Least preferred	Least preferred	Favourable	No preference	No preference	No preference	No preference	No	No
Construction Camp Alternative 6	Favourable	Preferred	Favourable	Least preferred	Least preferred	Favourable	No preference	No preference	No preference	No preference	No	No
SUBSTATION ALTERNATIVES												
Substation Alternative 1	Preferred	Preferred	Favourable	Favourable	Favourable	Favourable	No preference	No preference	No preference	No preference	No	**YES**
Substation Alternative 2	Least preferred	Preferred	Favourable	Favourable	Favourable	Favourable	No preference	No preference	No preference	No preference	No	No
Substation Alternative 3	Least preferred	Preferred	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No
Substation Alternative 4	Least preferred	Preferred	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No
Substation Alternative 5	Favourable	Preferred	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No
Substation Alternative 6	Favourable	Preferred	Preferred	Preferred	Preferred	Preferred	No preference	No preference	No preference	No preference	No	No

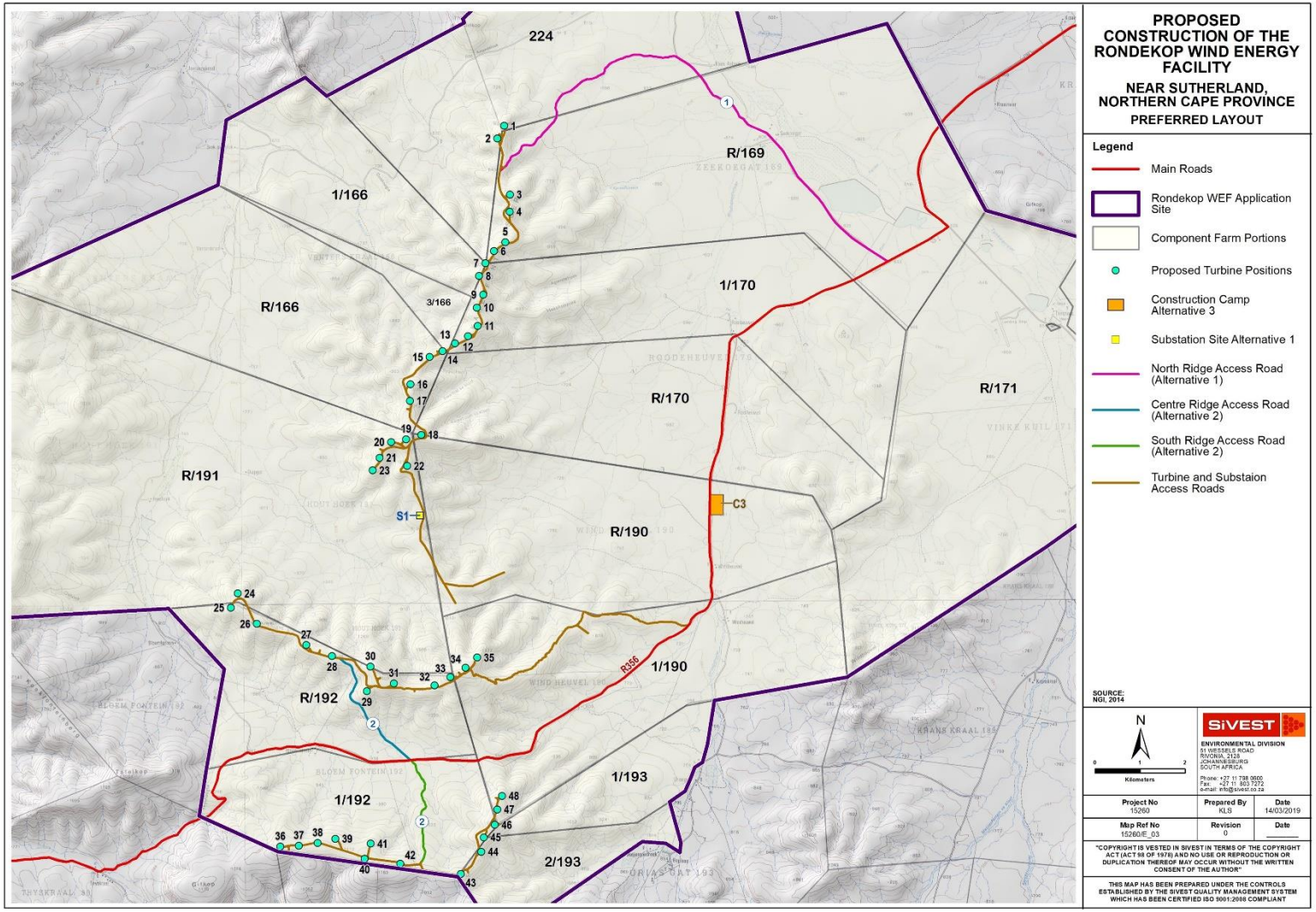


Figure ix: Preferred Layout Map

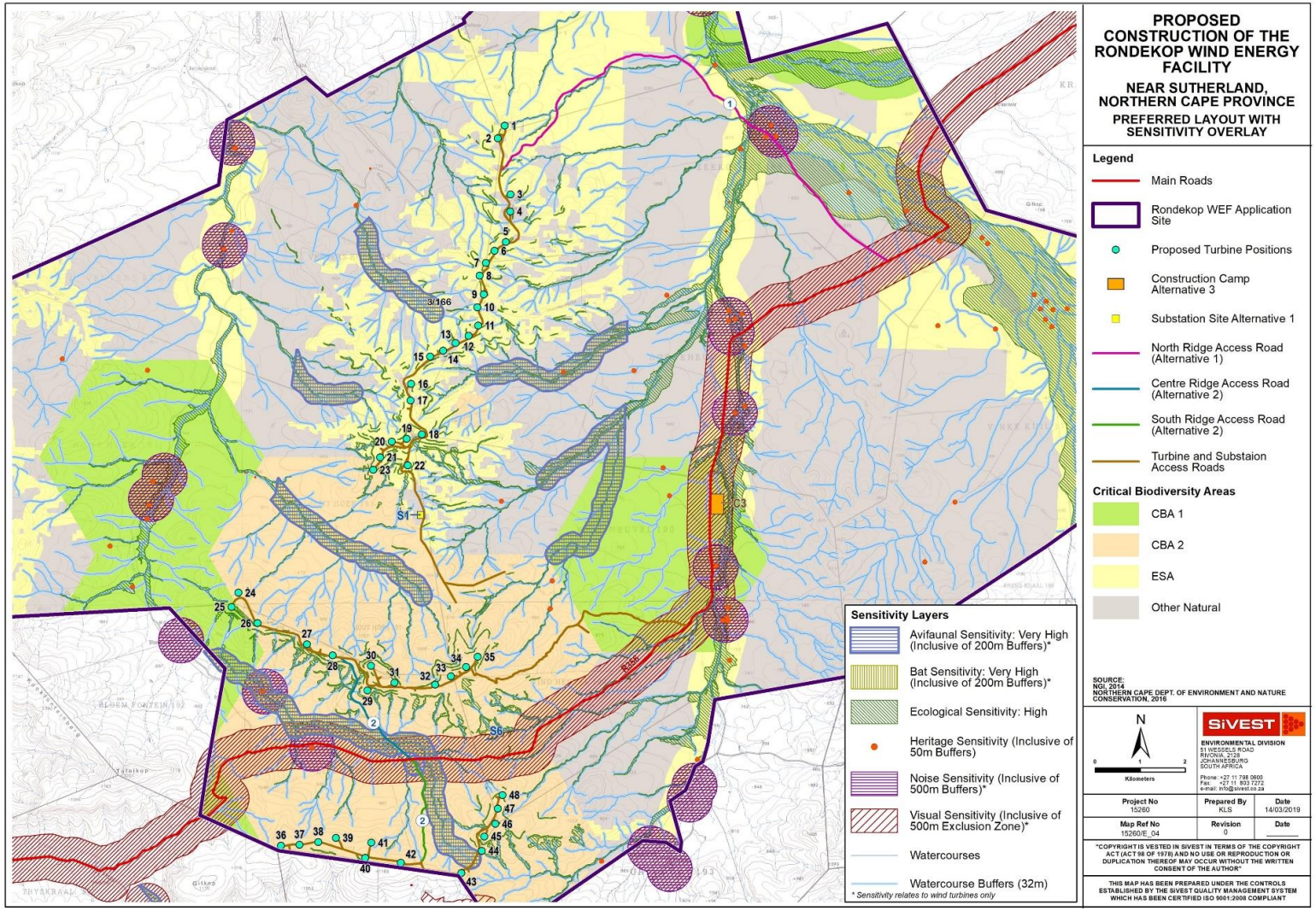


Figure x: Preferred Layout Map with refined sensitivity overlay

Based on the above, the following alternatives are preferred:

- **North Ridge Access Road Alternative 1**
- **Centre Ridge Access Alternative Road 2**
- **South Ridge Access Road Alternative 2**
- **Construction Camp Alternative 3**, although Construction camp 2 is favourable
- **Substation Alternative 1**

It must be noted that the specialist sensitivities and no-go areas (**Figure x)** have been incorporated into the layout design of the final layout. It should be noted that micro-siting will be required within the development area during the detailed design phase to avoid any additional sensitive features. This is to enable the avoidance of any unidentified features on site or any design constraints when the project reaches construction.

It is important to note that the preferred site layout provided above is only the EIA phase layout and therefore not the final layout for the proposed development.

It is the opinion of the EAP that the information and data provided in this DEIAr is sufficient to enable the DEA to consider all identified potentially significant impacts and to make an informed decision on the application. Furthermore, it is the opinion of the EAP that based on the findings of the EIA that the proposed development should be granted an EA and allowed to proceed provided the following conditions are adhered to:

- All feasible and practical mitigation measures recommended by the various specialists must be implemented.
- All micro siting of the turbines and associated infrastructure must be repositioned within the application site and must exclude all sensitive areas identified by the specialists as shown in **Figure iv**.
- Where applicable monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists.
- The final layout should be submitted to the DEA for approval prior to commencing with construction.
- Final EMPr **should be** approved by DEA prior to commencing with construction.

SiVEST, as the EAP, is therefore of the view that:

- **North Ridge Access Road Alternative 1** is preferred from a terrestrial and aquatic ecology, visual, avifauna, bat and social perspective. The other specialists have no preferences.
- **Centre Ridge Access Alternative Road 2** is preferred from a terrestrial and aquatic ecology perspective as there is a permanent wetland located on Alternative 1 deeming it fatally flawed. This alternative is considered favourable from a visual, bat and social perspective. Apart from the avifaunal specialist, the other specialists have no preferences. It is considered least preferred from an avifaunal point of view but is acceptable for development, as long as appropriate mitigation measures are put in place, such as only building roads to cross sensitive areas perpendicularly.

- **South Ridge Access Road Alternative 2** is preferred from a terrestrial and aquatic ecology, visual and social perspective. This alternative is considered favourable from a bat perspective. It is considered least preferred from an avifaunal point of view but is acceptable for development, as long as appropriate mitigation measures are put in place, such as only building roads to cross sensitive areas perpendicularly. The other specialists have no preferences.
- **Construction Camp Alternative 3** is preferred from an aquatic, visual and social perspective. Furthermore, this alternative is considered favourbale from an ecology perspective and not flawed by any other specialist. This is also the closest to all the development ridges therefore providing easy access to all the ridges to get the WEF components to their destination and thus is preferred from a technical perspective
- **Substation Alternative 1** is preferred from and aquatic and terrestrial ecology perspective. It is also in the centre of the proposed development project. The more central the substation is in the site the less electrical losses are incurred. Thus, this alternative is preferred from a technical perspective. The new revised 48 turbine layout has been deemed to be preferred when compared to the originally proposed layout in the FSR, based on assessments undertaken by the specialists. A cumulative impact assessments of similar developments in the area was undertaken by the specialists. Based on their findings the cumulative impacts associated with the proposed development will be low.Through the implementation of mitigation measures, together with adequate compliance monitoring, auditing and enforcement thereof by the appointed ECO as well as competent authority, the potential detrimental impacts associated with the proposed project can be mitigated to acceptable levels and the project can therefore proceed.

The date on which the activity will commence cannot be determined at this stage as they are based on the timeframes dictated by the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bid windows. The date of the next round of bid submissions has not yet been announced. The construction of the Rondekop WEF and associated infrastructure is dependent on being selected as a preferred bidder or entering into an offtake agreement with a different energy consumer. The project will therefore require an environmental authorisation of at least 10 years.

It is trusted that the DEIAr provides adequate information to the I&APs to provide input and for the competent authority to make an informed decision regarding the proposed project.

Way forward

The project is in the EIA Phase and the DEIR was sent out for comment on the 20th of March 2019 until 24th April 2019.

All I&APs are invited to register as I&APs in order to be kept informed throughout the process. I&APs can do so by contacting SiVEST Environmental Division:

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Glossary of Terms

Alluvial: Resulting from the action of rivers, whereby sedimentary deposits are laid down in river channels, floodplains, lakes, depressions etc.

Biodiversity: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

Cultural Significance: This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Cumulative Impact: In relation to an activity, cumulative impact means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Equator Principles: A financial industry benchmark for determining, assessing and managing social & environmental risk in project financing.

Environmental Impact Assessment: In relation to an application, to which Scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application.

Environmental Impact Report: In-depth assessment of impacts associated with a proposed development. This forms the second phase of an Environmental Impact Assessment and follows on from the Scoping Report.

Environmental Management Programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures which must be implemented by several responsible parties throughout the duration of the proposed project.

Heritage Significance Grades:
a) Grade I: Heritage resources with qualities so exceptional that they are of special national significance;
(b) Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and
(c) Grade III: Other heritage resources worthy of conservation.

Heritage Resources: This means any place or object of cultural significance. See also archaeological resources above.

Historical Period: Since the arrival of the white settlers - c. AD 1840 - in this part of the country

Kilovolt (kV): a unit of electric potential equal to a thousand volts (a volt being the standard unit of electric potential. It is defined as the amount of electrical potential between two points on a conductor carrying a current of one ampere while one watt of power is dissipated between the two points).

Precipitation: Any form of water, such as rain, snow, sleet, or hail that falls to the earth's surface.

Red Data Species: All those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.

Riparian: The area of land adjacent to a stream or river that is influenced by stream induced or related processes.

Scoping Report: An “issues-based” report which forms the first phase of an Environmental Impact Assessment process.

Stone Age: The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.
Early Stone Age 2 000 000 - 150 000 Before Present
Middle Stone Age 150 000 - 30 000 BP
Late Stone Age 30 000 - until c. AD 200

List of Abbreviations

AAA	- Astronomy Advantaged Area
AP	- Action Plan
ATNS	- Air Traffic and Navigation Services Company Limited
AIA	- Archaeological Impact Assessment
BA	- Basic Assessment
BID	- Background Information Document
CARA	- Conservation of Agricultural Resources Act
CBA	- Critical Biodiversity Area
DEA	- Department of Environmental Affairs
DDD	- Data Deficient
DDT	- Taxonomically uncertain
DM	- District Municipality
DEIAr	- Draft Environmental Impact Assessment Report
DSR	- Draft Scoping Report
DoE	- Department of Energy
DM	- District Municipality
DWS	- Department of Water and Sanitation
EAP	- Environmental Assessment Practitioner
ECA	- Environmental Conservation Act No 73 of 1989
ECO	- Environmental Control Officer
ED	- Economic Development
EHS	- Environmental, Health, and Safety
EIA	- Environmental Impact Assessment
EIR	- Environmental Impact Report
EMPr	- Environmental Management Programme
EMI	- Electromagnetic Interference
EP	- Equator Principles
ERA	- The Electricity Regulation Act No. 4 of 2006
ESA	- Ecological Support Area
EAS	- Early Stone Ages
ESMP	- Environmental and Social Management Plan
ESMS	- Environmental and Social Management System
FEIAr	- Final Environmental Impact Assessment Report
FSR	- Final Scoping Report
EHS	- Environmental, Health, and Safety
GDP	- Gross Domestic Product
GHG	- Green House Gases
GIS	- Geographic Information System
GW	- Gigawatts
HIA	- Heritage Impact Assessment
I&AP(s)	- Interested and Affected Parties
IBA(s)	- Important Bird Area(s)
IDP	- Integrated Development Plan
IEP	- Integrated Energy Plan

IFC	- International Finance Corporation
IPP(s)	- Independent Power Producers
IRP	- Integrated Resource Plan
IUCN	- International Union for the Conservation of Nature and Natural Resources
kV	- Kilo Volt
LM	- Local Municipality
LED	- Local Economic Development
LSA	- Later Stone Age
MSA	- Middle Stone Age
MW	- Megawatt
NC DENC	- Northern Cape Department of Environment and Nature Conservation
NC PGDS	- Northern Cape Provincial Growth and Development Strategy
NEA	- The National Energy Act No. 34 of 2008
NEMA	- National Environmental Management Act No. 107 of 1998
NEMBA	- National Environmental Management: Biodiversity Act No. 10 of 2004
NFA	- The National Forest Act No. 84 of 1998
NHRA	- National Heritage Resources Act No. 25 of 1999
NWA	- National Water Act No. 36 of 1998
NEMAA	- National Environmental Management: Air Quality Act of 2004
NPAES	- National Parks Area Expansion Strategy
NRTA	- The National Road Traffic Act No. 93 of 1996
OHSA	- Occupational Health and Safety Act No. 85 of 1993
PoS	- Plan of Study
PM	- Public Meeting
PPA	- Power Purchase Agreement
PPP	- Public Participation Process
PV	- Photovoltaic
REDZ2	- Renewable Energy Development Zone – Komsberg
REIPPPP	- Renewable Energy Independent Power Producer Procurement Programme
RE	- Renewable Energy
RFI	- Radio Frequency Interference
SA	- South Africa
SAHRA	- South African Heritage Resources Agency
SALT	- Southern African Large Telescope
SANBI	- South African National Biodiversity Institute
SDF	- Spatial Development Framework
SKA	- Square Kilometre Array
SPVs	- Special Purpose Vehicles
TL	- Terrain Loss
WETFEPA	- Wetland Freshwater Priority Areas
WEF	- Wind Energy Facility
WMA	- Water Management Area
WTG	- Wind Turbine Generator

1 INTRODUCTION

Rondekop Wind Farm (Pty) Ltd (hereafter referred to as Rondekop) is proposing to construct a Wind Energy Facility (WEF) of up to 325 megawatt (MW) 45km south-west from Sutherland in the Karoo Hoogland Local Municipality, which falls within the Namakwa District Municipality in the Northern Cape Province of South Africa **(Table 1**).

SiVEST Environmental Division have been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for the proposed construction of the Rondekop Wind Energy Facility (Rondekop WEF) and associated infrastructure.

The proposed facility is located partially within the Komsberg Renewable Energy Development Zone (REDZ 2), one of the eight REDZ formally gazetted[2] in South Africa for the purpose of development of solar and wind energy generation facilities. Considering that a portion of the proposed facility is located outside of the Komsberg REDZ, the Rondekop WEF is subject to a full EIA process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended, EIA Regulations 2014 (as amended).

The Rondekop WEF, which will have an energy generation capacity (at 132kV point of utility connection) of up to 325 megawatt (MW) will include the following:

- Up to 48 wind turbines, each ranging between 3MW and up to 8MW energy generation capacity;
- Electrical transformers (690V/33kV) adjacent to each turbine;
- One 33/132kV onsite substation (33kV lines and yard assessed in this EIA while the 132kV line and substation yard will be assessed in a separate Basic Assessment process);
- Underground 33kV cabling between turbines to get to the onsite 33/132kV substation;
- Overhead 33kV lines;
- Internal access roads;
- Structures for stormwater control for each turbine and the substation;
- Up to 4 wind measuring lattice masts;
- Fenced construction camp and batching plant that will become consequent offices during operation; and
- Temporary infrastructure to obtain water from available local sources/ new or existing boreholes including a potential temporary above ground pipeline (approximately 35cm diameter) to feed water to the on-site batching plant. Water will potentially be stored in temporary water storage tanks. The necessary approvals from the DWS will be applied for separately.

The proposed development requires Environmental Authorisation (EA) from the Department of Environmental Affairs (DEA). However, the provincial authority will also be consulted (i.e. Northern Cape Department of Environment and Nature Conservation (NC DENC). The EIA for the proposed

[2] Formally gazetted on 16 February 2018 (government notices 113 and 114).

development will be conducted in terms of the EIA Regulations promulgated in terms of Chapter 5 National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), which came into effect on the 8th of December 2014, as amended. In terms of these regulations, a full EIA is required for the proposed development. All relevant legislations and guidelines (including Equator Principles) will be consulted during the EIA process and will be complied with at all times.

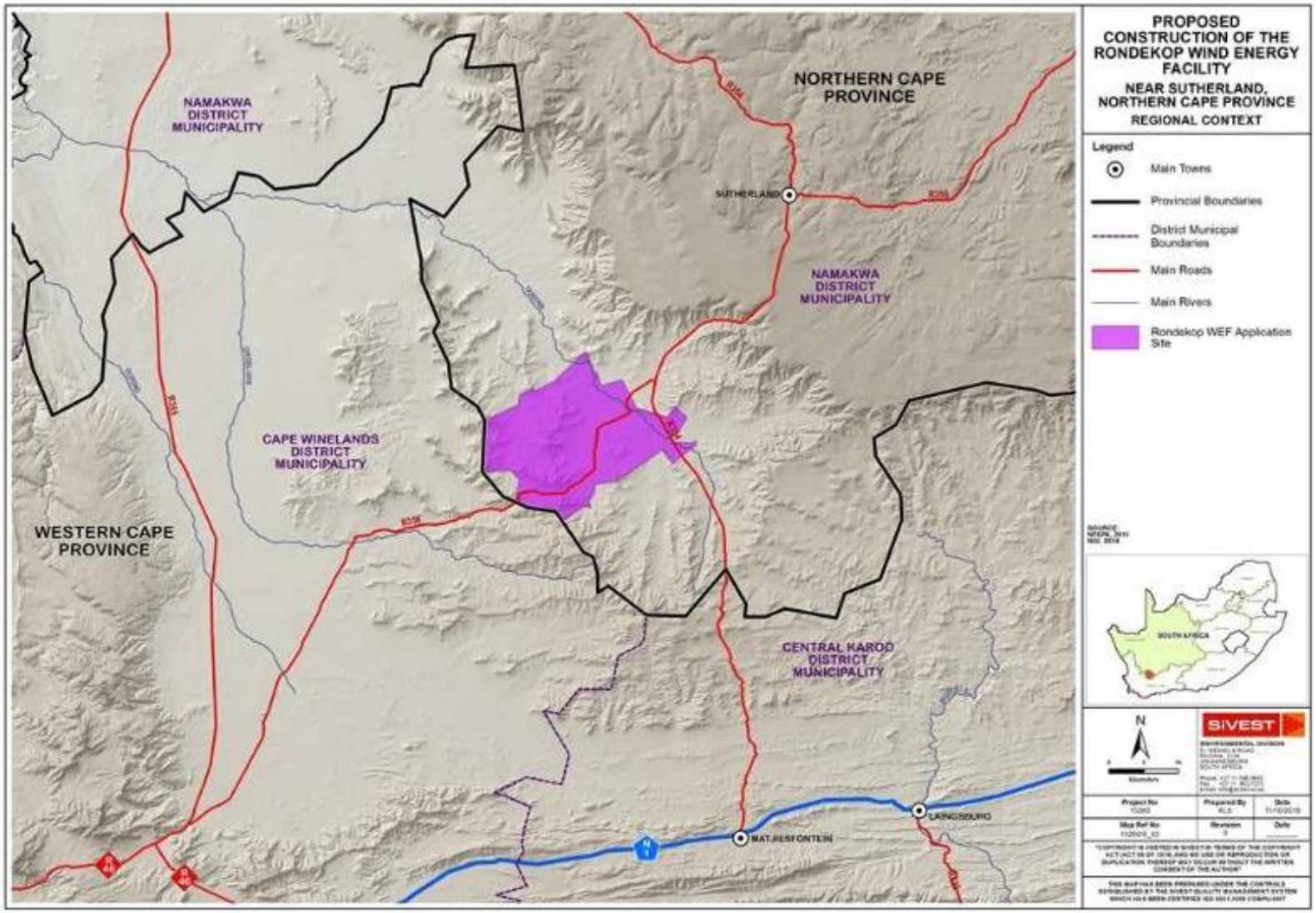

Figure 1: Rondekop WEF in the regional context.

1.1 Draft Environmental Impact Report Structure

This Draft Environmental Impact Report (DEIR) is structured as follows:

Table 6: Structure of Report

Section	Title	Description
1	Introduction	Provides background to the proposed wind energy facility project and the environmental impact process
2	Assumptions And Limitations	Elaborates on the assumptions and limitations pertaining to the EIA process for the proposed development.
3	Project Need And Desirability	Provides explanation to the need and desirability of the proposed development by highlighting issues such as security of power supply; the appropriateness of the selected site; local employment as well as the regional and local income profile
4	Technical Description	Gives detailed technical descriptions of the proposed wind farm as well as the alternatives involved.
5	Description Of The Receiving Environment	Provides a description of the region in which the proposed development is intended to be located. Although the Section provides a broad overview of the region, it is also specific to the application. It contains descriptions of the site and the specialist studies conducted during the scoping and EIA phases are also summarised.
6	Environmental Impact Assessment	Presents a rating of each environmental issue before and after mitigation measures.
7	Cumulative Impact Assessment	Identifies potential cumulative impacts per environmental issue (specialist study).
8	Public Participation Process	Describes the Public Participation Process (PPP) undertaken during the EIA Phase and tables issues and concerns raised by Interested and Affected Parties (I&APs).
9	Environmental Sensitivities	Identifies Environmental Sensitivities from the specialists that have a bearing on the proposed wind farm
10	Layout Alternatives	Identifies recommendations from the specialists that have a bearing on the layout alternatives as well as proposed mitigation measures
11	Environmental Monitoring And Auditing	Provides a description of the environmental monitoring and auditing process to be undertaken for the proposed wind farm.
12	Compliance With Equator Principles	Presents a checklist that ensures that the report has been compiled according to the requirements of the World Bank Standards and Equator Principles.
13	Conclusions And Recommendations	Summarises the findings and recommendations per specialist study and provides the overall conclusion.
14	Way Forward	Outlines the processes to follow submission of DEIr
15	References	Lists references indicated in the Draft Environmental Impact Assessment report

1.2 Objectives of the EIA Process

Appendix 3 of the NEMA EIA Regulations, 2014 (as amended) state that the objective of the EIA Process is to:

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted scoping report;
(c) identify the location of the development footprint within the approved site as contemplated in the accepted scoping report 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;
(d) determine the –
    (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    (ii) degree to which these impacts –
        (aa) can be reversed;
        (bb) may cause irreplaceable loss of resources, and
        (cc) can be avoided, managed or mitigated;
(e) identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;
(f) identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;
(g) identify suitable measures to avoid, manage or mitigate identified impacts; and
(h) identify residual risks that need to be managed and monitored.

An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application The content requirements for a Environmental Impact Assessment Report (as provided in Appendix 3 of the EIA Regulations 2014 as amended), as well as details of which section of the report fulfils these requirements, are shown in **Table 7** below.

Table 7: **Content requirements for an EIA Report**

Content Requirements	Applicable Section
(a) details of- (i). the EAP who prepared the report; and (ii). the expertise of the EAP, including a *curriculum vitae;*	Details of the EAP and full project team are included in **Section 1.5**. The expertise (including curriculum vitae) of the EAP and full project team are including in **Appendix 2**.
(b) the location of the development footprint of the activity on the approved site as	The location (including 21 digit Surveyor General codes) of the proposed project is detailed on

Content Requirements	Applicable Section
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;	page *iii* of the report, as well as in **section 4.2** on page 90
(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;	A map of the regional locality is shown in **section 5.1** on page 115, and the site locality is shown in section 5.2 on page 117. Additionally, all project maps are included in **Appendix 5**. Coordinates are shown on page *iii* of the report, as well as in **section 5.2** on page 117. Additionally, all coordinates are included in **Appendix 8A**.
(d) a description of the scope of the proposed activity, including- (i). all listed and specified activities triggered; (ii). a description of the associated structures and infrastructure related to the development;	The listed and specified activities triggered as per NEMA are detailed in **Section 1.6.3.** The technical project description is included in **section 4** on page 32. This includes a description of activities to be undertaken, including associated structures and infrastructure.
(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	A description of all legal requirements and guidelines is provided in **Sections 1.6** and **1.7.** This includes key legal and administrative requirements as well as key development strategies and guidelines.
(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 development footprint within the approved site as contemplated in the accepted scoping report;	The need and desirability of the proposed project is discussed in **section 3** on page 66.
(g) motivation for the preferred development footprint within the approved site as	The motivation for the preferred development footprint of the proposed project is discussed in **section 8** on page 324.

Content Requirements	Applicable Section
contemplated in the accepted scoping report;	
(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including: (i). details of the development footprint 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 development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v). the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— a. can be reversed; b. may cause irreplaceable loss of resources; and c. can be avoided, managed or mitigated; (vi). the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; (vii). positive and negative impacts that the proposed activity and alternatives will have on the	A description of the alternatives considered in terms of the Regulations is included in **section 4.3** on page 96. An assessment of layout alternatives is included in **section 9**. The public participation process followed is detailed in **section 8**. Additionally, all public participation documents are included in **Appendix 7**. This includes a summary of issues raised by I&AP's, and the responses to their comments. A full description of the environmental attributes within the application site is included in **section 5**. The impacts, risks and mitigation associated with each alternative are assessed in **section 6.2**. The methodology used in identifying the impacts and risks associated with each alternative is included in **section 6.1**. The positive and negative impacts, along with the proposed mitigation measures related to the proposed activity will have on the environment are discussed in **section 6.2**. The outcome of the site selection matrix is included in **section 3.4**. A concluding statement indicating the preferred alternatives is contained in **sections 9.1**

Content Requirements	Applicable Section
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). if no alternative development footprints for the activity were investigated, the motivation for not considering such; and; (x). a concluding statement indicating the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;	
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including— (i). a description of all environmental issues and risks that were identified during the environmental impact assessment process; and; (ii). an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	The process undertaken to assess the impacts as well as the assessment of impacts by each specialist are shown in **Section 6.1.** Each environmental issue and risk are tabulated in **section 6.2** and an assessment of the significance of each issue before and after mitigation measures is included.
(j) an assessment of each identified potentially significant impact and risk, including— (i). cumulative impacts; (ii). the nature, significance and consequences of the impact and risk; (iii). the extent and duration of the impact and risk;	The impact rating system contained in **Section 6.1.2** details the methodology for determining the significance of an impact. This includes the points (j) (i to vii) of **Appendix 3.** The assessment of each risk identified by the specialists is contained in **Section 6.2**.

Content Requirements	Applicable Section
(iv). the probability of the impact and risk occurring; (v). the degree to which the impact and risk can be reversed; (vi). the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii). the degree to which the impact and risk can be mitigated	
(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	All relevant specialist findings are included in **Section 5**, with all recommended mitigation measures detailed in **Section 6**. The mitigation measures have been incorporated into the EMPr which is contained in **Appendix 8**. The tabulated summary of key specialist findings and recommendations is included in **Section 13.1** and in the executive summary.
(l) an environmental impact statement which contains— (i). a summary of the key findings of the environmental impact assessment: (ii). a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and (iii). a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	The summary of key findings are found in **Section 13.1.** The high quality maps showing the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers can be found in **Appendix 5.** The summary of the positive and negative impacts and risks of the proposed activity and identified alternatives can be found in **section 8**.
(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	The recommended mitigation measures associated with each impact are included in **section 8**, and overall specialist recommendations and mitigation measures are included in **Section 6 and 7**. These measures are contained in the EMPr which can be found in **Appendix 8.**

Content Requirements	Applicable Section
(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	The final proposed alternatives are included in **Section 10**, including a comparative assessment by the specialists.
(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Any aspects identified by specialists or the EAP that should be included as conditions of the authorisation are identified in **Section 13** and in the executive summary.
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	All assumptions and limitations are highlighted in **Section 2.**
(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	A reasoned opinion as to whether the proposed activity should be authorised, and, any conditions that should be made in respect of that authorisation can be found in **Section 15** and in the executive summary.
(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;	The period required for the environmental authorisation, as well as the date on which the activity and post construction monitoring will be concluded is addressed in **Section 13.1**.
(s) an undertaking under oath or affirmation by the EAP in relation to (i). the correctness of the information provided in the reports; (ii). the inclusion of comments and inputs from stakeholders and I&APs; (iii). the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv). any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	The EAP affirmation is included in **Appendix 3**.

Content Requirements	Applicable Section
(t) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	If applicable, details of any financial provisions for the management of negative environmental impacts are included in **Section 12, Section 13** and the executive summary.
(u) an indication of any deviation from the approved scoping report, including the plan of study, including– (i). any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii). a motivation for the deviation;	Indication and motivations of deviations can be found in **Section 1** and **4**
(v) any specific information that may be required by the competent authority; and	Noted. As part of the letter of acceptance for the FSR the DEA detailed specific information requirements. These requirements are tabulated in **Section 1.3,** along with an explanation of how the requirements are met. All correspondence from the DEA is included in **Appendix 4**.
(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.	Noted. All requirements in terms of section 24(4)(a) and (b) of the Act have been met in this report.

1.3 Specialist Studies

Specialist studies have been conducted in terms of the stipulations contained within **Appendix 6** of the 2014 NEMA EIA regulations.

The following specialist studies have been conducted to assess the proposed development, the preferred and only location alternative as well as all other project alternatives:

- Terrestrial Ecology Assessment;
- Avifauna Assessment (including 12-month pre-construction monitoring);
- Bat Assessment (including 12-month pre-construction monitoring);
- Aquatic Ecology Assessment;
- Agricultural and Soils Assessment;
- Noise Assessment;
- Visual Impact Assessment;
- Heritage Assessment (including Palaeontology, Archaeology & Cultural Landscape);
- Socio-Economic Impact Assessment; and
- Traffic Impact Assessment.

These studies were undertaken to inform the impact assessment to take place in the EIA phase of the proposed development as the specialists assessed the entire application site and focussed on specific impacts of the proposed WEF infrastructure in detail. The environmental impact assessments undertaken by the various specialist is dealt with in more detail below in **Section 5 and 6.**

1.4 Decision-Making Authority Consultation

The National Department of Environmental Affairs (DEA) is the competent authority on this project. As such, an application for Environmental Authorisation (EA) for the proposed development was submitted to DEA on the 14th of November 2018. The proof of payment for application fee, details of the EAP and declaration of Independence, declaration signed by the Applicant, the project schedule, details of landowners, landowner consents, and locality map formed part of the application form. This DSR was submitted to the DEA on the same day that the application was submitted. The DEA Acknowledgement was received for both the Application and DSR on 19 November 2018 (see **Appendix 4** for a copy of the letter). The DEA reference number for the proposed development is 14/12/16/3/3/2/1115. The DEA provided comments on the DSR on the 7th of December 2018. The FSR addressed the comments made by the DEA in the DSR comment letter (see **Appendix 4**). The FSR along with a plan of study for the EIA phase was submitted to the DEA for decision making on 15 January 2019. The DEA accepted the FSR and plan of study for the EIA phase on the 29th January 2019 (see **Appendix 4**). The comments from the DEA regarding requirements to be incorporated in the DEIAr are discussed in detail below in **Table** .

Table 8: Compliance with the DEA requirements on the EIA phase detailed in the FSR Acceptance letter

Additional Information Required by the DEA	Notes / Comments
a) It is noted that the application does not include Activity 14 of GN R. 983. (as amended by GN R. 327), for the development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. This Department draw to your attention that it is the onus of the EAP/Applicant to ensure that all applicable listed activities are applied for and are included in the application form for environmental authorisation as this activity can be potentially triggered by the proposed facility.	The EAP and the Applicant have verified that the minimum thresholds outlined in Activity 14 of GN R. 983. (as amended by GN R. 327) will not be triggered by the proposed development.
b) Please note that the activity description for Activity 15 of GN R. 985 (as amended by GN R. 325) must be amended to include the correct footprint to be cleared for this proposed facility.	The activity description for Activity 15 of GN R. 985 (as amended by GN R. 325) is the correct footprint to be cleared for this proposed facility **(Section 1.6.3)**

Additional Information Required by the DEA	Notes / Comments
c) The EIAr must provide an assessment of the impacts and mitigation measures for each of the listed activities applied for.	The DEIAr provides and assessment of all impacts in **Section 6** and **7** of this report. **Section 6** and **7** as well as the EMPR (**Appendix 8**) also include proposed mitigation measures for all the potential identified impacts as well as for the listed activities applied for. The relevant listed activities applied for are detailed in **Section 1.6.3** and **Table 11** of the DEIAr.
d) The listed activities in the EIAr and the application form must be the same and correct.	The listed activities are the same and correct in both the EIAr (**Table 11**) and Application form. Only the applicable activities to the proposed development have been applied for and included in the EIR and the application form.
e) Further note that, if Activity 14 of GN R. 983. (as amended by GN R. 327), is triggered, an amended application form for environmental authorisation must be submitted with the draft EIAr.	Noted. The EAP and the Applicant have verified that the minimum thresholds outlined in Activity 14 of GN R. 983. (as amended by GN R. 327) will not be triggered and as such do not need to be applied for.
f) The EIAr must provide the technical details for the proposed facility in a table format as well as their description and/or dimensions	The project description can be found in **Section 1**. The description and dimensions can be found in **Sections 4.1** and **Table 17.**
g) The EIAr must provide the four comer coordinate points for the proposed development site (note that if the site has numerous bend points, at each bend point coordinates must be provided) as well as the start, middle and end point of all linear activities.	The co-ordinates for the proposed development site are provided in **Section 4.1, Table 16**
h) The EIAr must provide the following: - Clear indication of the envisioned area for the proposed wind energy facility; i.e. placing of wind turbines and all associated infrastructure should be mapped at an appropriate scale. - Clear description of all associated infrastructure. This description must include, but not limited to the following: • Power lines; • Internal roads infrastructure;	Please refer to Figures 15 and 16 in **Section 5** for inclusive of all WEF infrastructure. Figure 7 provides a generic example of a wind turbine. Please note that a separate BA will be undertaken for the associated power line to connect the proposed Rondekop Wind farm to the national grid.

Additional Information Required by the DEA	Notes / Comments
• All supporting on site infrastructure such as laydown area, guard house and control room etc. • All necessary details regarding all possible locations and sizes of the proposed satellite substation and the main substation.	
i) Under legal requirements and guidelines, please ensure to consider the National or Provincial Ridge policy as the proposed facility will infringe or will take place on ridges.	Noted, there are no Ridge Policies in place for the Northern Cape.
j) The EIAr must also include a comments and response report in accordance with Appendix 2 h (iii) of the EIA Regulations, 2014 as amended.	All issues raised and comments received during the circulation of the DSR from registered I&APs and organs of state which have jurisdiction in respect of the proposed activity were addressed in the FSR and included in the DEIR and the C&RR (**Appendix 7E**). Proof of correspondence with the various stakeholders have been included in the DEIR (**Appendix 7D**). Attempts were made to contact all stakeholders who did not comment on the DSR and is detailed in Table 83. Proof of this follow-up was included in the FSR and DEIR as well as **Appendix 7I**. The Public Participation Process has been conducted in accordance with Regulation 39, 40, 41, 42,43 & 44 of the EIA Regulations 2014 (as amended. (**Appendix 7**).
k) A comments and Response trail report (C&R) must be submitted with the draft and the final EIAr. The C&R report must be a separate document from the main report and the format must be in the table format. It must clearly indicate the name of the Stakeholder. Date of comments, Comments and EAPs response.	Noted. All issues raised and comments received during the circulation of the DSR from registered I&APs and organs of state which have jurisdiction in respect of the proposed activity were addressed in the FSR and included in the DEIR and the C&RR (**Appendix 7E**). Proof of correspondence with the various stakeholders have been included in the DEIR (**Appendix 7D**). Attempts were made to contact all stakeholders who did not comment on the DSR **Table 137.** Proof of this follow-up is included in the FSR and DEIR as well as **Appendix 7I**. The Public Participation Process has been conducted in accordance with Regulation

Additional Information Required by the DEA	Notes / Comments
	39, 40, 41, 42, 43 & 44 of the EIA Regulations 2014 (as amended. (**Appendix 7**). Please note that the C&RR will be updated with further comments received during the DEIAr 30-day public consultation period and will be provided in the FEIAr.
l) Please note that you must refrain from summarising comments made by registered Interested and Affected Parties (I&APs) and an original comment from I&APs must be attached within all reports.	All comments received from I&Aps have not been summarised and have been copied verbatim. All proof of correspondence can be found in **Appendix 7**.
m) The EIAr must include the detail inclusive of the Public Participation Process in accordance with Regulation 41 of the EIA Regulations.	Detailed Public Participation Process in accordance with Regulation 41 of the EIA Regulations can be found in **Section 8**. In terms of Regulation 41 (2) The EAP conducting the public participation process has taken all relevant guidelines applicable to public participation as contemplated in section 24J of the Act and has given notice to all potential interested and affected parties of the proposed application which is subjected to public participation by— (a) Fixing notice boards for the public in conspicuous and accessible places (see **Appendix 7A**) containing all details as specified in Sub regulations 3 and 4. (b) giving written notice can be found in **Appendices 7B**, in any of the manners provided for in section 47D of the Act, to— i. the occupiers of the site, persons in control of the site on which the activity is to be undertaken, and to any alternative site where the activity is to be undertaken ii. owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;

Additional Information Required by the DEA	Notes / Comments
	iii. the municipal councilor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area; iv. the municipality which has jurisdiction in the area; v. any organ of state having jurisdiction in respect of any aspect of the activity; and vi. any other party as required by the competent authority; (c) placing an advertisement in (**Appendix 7C**)— i. one local newspaper; (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken (**Appendix 7C**). 41 (6) The EAP has ensured (a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and (**Appendices 7D, E H, I, J**) (b) participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application(**Appendix 7E**)

Additional Information Required by the DEA	Notes / Comments
n) Details of the future plans for the site and infrastructure after decommissioning in 20- 30 years and the possibility of upgrading the proposed infrastructure to more advanced technologies.	The future plans for the proposed development are dealt with in Section 5 of the DEIAr as well as in Section **5.4** of the Draft EMPr. At the end of the operational phase of the proposed WEF, the WEF may be decommissioned, or repowered (redesigned and refitted to operate for a longer period). The aim of the decommissioning phase would be to return the site to its original pre-construction condition. In the unlikely event that decommissioning is required (i.e. the facility becomes outdated or the land is required for other purpose), the decommissioning phase will be undertaken in line with the EMPR and the site will be rehabilitated to its original pre-construction condition. All the components of the wind turbines are considered to be reusable or recyclable. In the event of the Rondekop WEF being decommissioned the components will be reused, recycled or disposed of in accordance with the relevant regulatory requirements, the turbines may also be traded or sold as there is an active second-hand market for wind turbines or in the event that sale is not possible then the turbines may be used as scrap metal. It must be noted that the decommissioning phase of the proposed development will also create skilled and unskilled employment opportunities.
o) It is vital that, the relevant authorities are continuously involved throughout the EIAr process as the development property possibly falls within geographically designated areas in terms of GN R. 985, as amended. In addition, a graphical representation of the proposed development within the respective geographical areas must be provided.	The geographical location of the proposed development can be found in Figures 1 in **Section 1** and Figure 5 in Section 5 as well as **Appendix 5**. All relevant authorities have been consulted continuously throughout the process. Their involvement is documented in **Section 7.4** and in the Comments and Response Report (**Appendix 7E**). A list of all the Organs of State (Oos) that have been contacted throughout the EIA process can be found in **Appendix 7 I**.

Additional Information Required by the DEA	Notes / Comments
p) Please note that you must in terms of Appendix 2 (2) (1) (e) of the EIA Regulations 2014, as amended, considers the National Environmental Management Biodiversity Act (NEMBA), 2004 (Act No. 10 of 2004) since the final SR indicates that there are Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs") on site.	A description of the applicable policies and legislation for the proposed developed is dealt with in detail in **Section 1.1** of the DEIAr. Key development strategies and guidelines are discussed in detail in **section 1.2.** The DEIAr has taken into consideration NEMA, 2004. Furthermore, the Terrestrial Ecology report in **Appendix 6H** and **Section 5.2.1** and Section 7.1 deal with the impacts of the proposed development on CBA's and ESA's. A map of the CBA and ESA's overlain with the WEF infrastructure can be found in **Section 4.2.**
q) The ecological assessment must take into consideration and use comments from the DENC, SKA and Birdlife SA during the EIAr process.	To date no comments on the ecology assessment have been received from DENC, Birdlife, the SKA. However, DENC, Birdlife and the SKA will be provided with a 30-day comment period to comment on the DEIAr. All comments received will inform any further iterations of the ecology impact assessment report, if required.
r) The South African Astronomy Observatory, SKA and Birdlife SA must be thoroughly engaged and their comments included as part of the EIAr.	The South African Astronomy Observatory responded to the DSR on the 21st November 2018. No comments have been received from SKA or Birdlife SA to date. They will be provided with an opportunity to review and comment of the DEIAr. Please refer to **Table 137** for the follow ups made to OoS.
s) The Bat and Avifaunal specialist assessments must assess and make recommendations for definite measurements for the preferred hub heights and rotor diameter.	The Bat and Avifaunal specialist assessments have assessed and made recommendations for the preferred hub heights (90 m up to 140 m) and rotor diameter (100m up to 180m). The Bat and Avifaunal specialist assessments have been dealt with in section 6.8 and Section 6.9 respectively. The Bird and Bat Final Monitoring Reports as well as Full Impact Assessment reports can be found in **appendix 6C and D** respectively. In addition, specialist recommendations are detailed in **Section 10** of the DEIAr.
t) It is indicated in the final SC report that the Avifauna assessment and the Bird and Bat Monitoring will form part of the draft EIAr to be submitted.	12 Months of monitoring has been conducted as per the latest guidelines. The monitoring reports are included in **Appendix 6**

Additional Information Required by the DEA	Notes / Comments
Please note that the 12 months Bird and Bat Monitoring must be conducted in terms of the latest guidelines. Further note that the Bird and Bat Monitoring to be submitted as part of the EIAr must always include the updated requirements for 12 months Bird and Bat Monitoring. A copy of the latest guidelines can be found on the Bird life South Africa's and SABAAP's website.	
u) It is further noted that the following studies are not considered for the proposed development: Freshwater Ecology and Geohydrology Impact Assessment. A detailed motivation is required for not considering such studies and must be included in the draft EIAr or alternatively these two studies must also be undertaken as part of the EIAr.	According to the Aquatic specialist: *"Based on the state and habitat type (ephemeral / flashy systems) rivers present on the Rondekop site, these upper catchment areas would not contain long term habitat that could support fish and invertebrates within the project footprint, i.e. suitable habitat is only found downstream, which isa significant distance from the facility. In summary, no permanent habitats suitable for the occurrence of fish and invertebrates were found within the development footprint. Additionally, coupled to this fact is that in the >100 renewable projects assessment undertaken by various specialist to date, which includes 17 projects in construction, no detrimental long-term impacts on the aquatic environment have been noted. Thus an assessment of aquatic invertebrates and fish is not conducted for these Karroo ecosystems"*. A copy of this response from the Aquatic Specialist can be found in **Appendix 6 B** Addendum Letter.
v) The final EIAr must include information on services required on the site such as sewage, refuse removal, water and electricity. Who will supply these services and has an agreement and confirmation of capacity been obtained? Proof of these agreements must be provided.	**Section 4.2** confirms that no provision of services such as water, sewage, waster generation and electricity would be required from the municipality as it would be outsourced to contractors. Further mitigation measures regarding these services are detailed in the EMPr in **Appendix 8**
w) It is noted that a detailed description of the need and desirability of the proposed development is included in the final SR. Please note that the need and desirability to be submitted with the EIAr must also indicate if	A detailed description of the need and desirability of the proposed activity has been provided in the DEIAr is included in **Section 3**, and in the discussion of alternatives in **Section 4.3**. A cumulative assessment of

Additional Information Required by the DEA	Notes / Comments
the proposed development is needed in the region; if the current proposed location is desirable for the proposed activity compared to other sites and must take into account cumulative impacts of the proposed development in the area.	impacts has been undertaken by all the appointed specialists and is included in their specialist reports in **Appendix 6**. Furthermore, an assessment of the cumulative impacts is included in the DEIAr in **section 7**.
x) Since there are other similar facilities within a 30km radius of the proposed development site, all specialist studies in the PoSEIA which are incorporated as part of the SR must also assess the facility in terms of potential cumulative impacts. The cumulative impact assessment for all identified and assessed impacts must 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. • Detailed process flow and proof must be provided, to indicate how the specialist's • recommendations, mitigation measures and conclusions from the various developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project. • Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology approved with the acceptance of the scoping report. • The cumulative impact 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.	All facilities within a 50km radius has been assessed as part of the cumulative assessment (**Section 7)**. Please see each specialist assessments attached in **Appendix 6** for an assessment of the cumulative impacts. All projects within a 50 km of the proposed Rondekop WEF site are shown in **Figure 48** and their current application phases is shown in **Table 106**. Furthermore, the cumulative impact significance rating also informed the need and desirability of the proposed development. It is also important to note that the proposed project site is located partially within REDZ 2 (Komsberg REDZ), 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. The findings of the specialist studies undertaken within this EIA provide an assessment of both the benefits and potential negative impacts anticipated as a result of the proposed Rondekop Wind Farm. The findings conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding.

Additional Information Required by the DEA	Notes / Comments
y) Please note that information on location of renewable energy developments can be accessed from https://www.environment.gov.za/mapsgraphics.	Noted. Information on location of renewable energy developments has been accessed from https://www.environment.gov.za/mapsgraphics. All projects within a 50 km of the proposed Rondekop WEF site are shown in Figure 41 and their current application phases is shown in Table 92.
z) A copy of the preliminary site layout map inclusive of the coordinates of the facility in Degree. Minutes and Seconds (DDMMSS). All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible e.g. roads. The preliminary layout map must indicate the following: • Wind turbine positions and its associated infrastructure; • Permanent laydown area footprint; • Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible); • Wetlands, drainage lines, rivers, stream and water crossing of roads and cables indicating the type of bridging structures that will be used; • The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected by the facility and its associated infrastructure; • Substation(s) and/or transformer(s) sites including their entire footprint; • Connection routes (including pylon positions) to the distribution/transmission network; • All existing infrastructure on the site, especially roads; • • Buffer areas; • • Buildings, including accommodation; and • • All"no-go" areas.	The refined Site layout map (**Figure 52**), regional context map (**Figure 53**) and a map combining All available biodiversity information has been used in the finalisation of the layout map (**Figure 54**). The Scoping level initial site layout maps can be found in **Appendix 5**. Existing infrastructure will be used as far as possible e.g. roads. The preliminary layout map indicates the following: • Wind turbine positions and its associated infrastructure; • Permanent laydown area footprint; • Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible); • Wetlands, drainage lines, rivers, stream and water crossing of roads and cables indicating the type of bridging structures that will be used; • The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected by the facility and its associated infrastructure; • Substation(s) and/or transformer(s) sites including their entire footprint; • Connection routes (including pylon positions) to the distribution/transmission network; • All existing infrastructure on the site, especially roads;

Additional Information Required by the DEA	Notes / Comments
	• Buffer areas; • Buildings, including accommodation; and • All"no-go" areas. All are included in the DEIR (**Sections 6 and 7**, **Appendix 8**). Kindly note that the following can only be provided once the detailed design has been undertaken which information can be submitted to the DEA along with the final layout for approval: • Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible); • Wetlands, drainage lines, rivers, stream and water crossing of roads and cables indicating the type of bridging structures that will be used. • Pylon positions
aa) An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.	The initial and refined site layout maps, regional context map and the initial and refined map combining the layout overlaid on the environmental sensitivities is included in the DEIR (**Section 10, Appendix 5**).
bb) A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.	The initial and refined site layout maps, regional context map and the initial and refined map combining the layout overlaid on the environmental sensitivities is included in the DEIR (**Section 10, Appendix 5**).
cc) A shapefile of the preferred development layout/footprint must be submitted to this Department. The shapefile must be created using the Hartebeesthoek 94 Datum and the data should be in Decimal Degree	A zipped shapefile and meta data (as per the specifications of DEA requirements) of the preferred development layout/footprint has been

Additional Information Required by the DEA	Notes / Comments
Format using the WGS 84 Spheroid. The shapefile must include at a minimum the following extensions i.e. shp; .shx; .dbf; .prj; and, .xml (Metadata file}. If specific symbology was assigned to the file, then the avl and/or the .lyr file must also be included. Data must be mapped at a scale of 1:10 000 {please specify if an alternative scale was used). The metadata must include a description of the base data used for digitizing. The shapefile must be submitted in a zip file using the EIA application reference number as the title. The shape file must be submitted to: **Postal Address:** **Department of Environmental Affairs** **Private Bag X447** **Pretoria** **0001** **Physical address:** **Environment House** **4 73 Steve Bike Road** **Pretoria** **For Attention:** **Muhammad Essop** **Integrated Environmental Authorisations** **Strategic Infrastructure Developments**	submitted to DEA in electronic format in conjunction with the submission of this DEIAr.
dd) The Environmental Management Programme (EMPr) to be submitted as part of the EIAr must include the following: • All recommendations and mitigation measures recorded in the EIAr and the specialist studies conducted.	Noted. The EMPr can be found in **Appendix 8.** The EMPr complies with the National Environmental Management Act, 1998 (Act No. 107 of 1998) and Environmental Impact Regulations (2017) Content of Environmental

Additional Information Required by the DEA	Notes / Comments
• A final site layout map with clear legend. • Measures as dictated by the final site layout map and micro-siting. • An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process. • A map combining the final layout map superimposed (overlain) on the environmental sensitivity map. • An alien invasive management plan to be implemented during construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken. • A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site and be implemented prior to commencement of the construction phase. • A post construction avifauna monitoring plan to be implemented during the operational phase of the facility. This plan must be compiled by an avifauna I specialist familiar with the site and the plan must adhere to Birdlife's most recent avifauna! guideline. • A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats. • An open space management plan to be implemented during the construction and operation of the facility. • A traffic management plan for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow	Management Programmes (Appendix 4) and can be found Table i in the EMPr **(Appendix 8).** • The EMPr has records of all recommendations and mitigation measures from specialist studies conducted and recorded in the EIAr (**Section 5o f this report**). • A refined site Layout Map can be found in **Section 4.2, Figure 14**. • The Final Layout has been dictated by Specialist micro-siting as indicated in their reports in **Appendix 6.** • The final layout map superimposed with the sensitivity map can be found • All plans have been addressed in the EMPr at a generic level and will need to be refined prior to construction to be site specific (**Appendix 8**), including but not limited to an alien invasive management plan, plant rescue and protection plan, post construction avifauna monitoring plan, re-vegetation and habitat rehabilitation plan, open space management plan, open space management plan, traffic management plan, transportation plan for the transport of components, storm water management plan, fire management plan, erosion management plan, plan for effective monitoring system to detect any leakage or spillage of all hazardous substances, measures to protect hydrological features and archaeological sites.

Additional Information Required by the DEA	Notes / Comments
would not be adversely impacted. This plan must include measures to minimize impacts on local commuters e.g. limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated bum-up areas so as not to disturb existing retai: and commercial operations. • A transportation plan for the transport of components, main assembly cranes and other large pieces of equipment. • A storm water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off. • A fire management plan to be implemented during the construction and operation of the facility. • An erosion management plan for monitoring and rehabilitating erosion events associated with the facility. Appropriate erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion. • An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems. • Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive	

Additional Information Required by the DEA	Notes / Comments
areas from construction impacts including the direct or indirect spillage of pollutants. • Measures to protect archaeological sites, artefacts, paleontological fossils or graves from construction and operational impacts.	
The EAP must provide detailed motivation if any of the above requirements is not required by the proposed development and not included in the EMPr.	Noted.
Please ensure that all the relevant Listing Notice activities are applied for, that the Listing Notice activities applied for are specific and that they can be linked to the development activity or infrastructure in the project description.	The DEIAr provides and assessment of all impacts in **Section 6 and 7** of this report. **Section 5** as well as the EMPR (**Appendix 8**) also include proposed mitigation measures for all the potential identified impacts as well as for the listed activities applied for. The relevant listed activities applied for are detailed in **Section 2.1.3** and Table 5 of the DEIAr.
You are hereby reminded that should the EIAr fail to comply with the requirements of this acceptance letter. The proposed WEF development will be refused in terms of the EIA Regulations 2014, as amended.	The EAP is satisfied that the DEIAr complies with the requirements of the comments letter from the Department on the FSR dated 29 January 2019.
The applicant is hereby reminded to comply with the requirements of Regulation 45 with regard to the time period allowed for complying with the requirements of the Regulations, and Regulations 43 and 44 with regard to the allowance of a comment period for interested and affected parties on all reports submitted to the competent authority for decision-making. The reports referred to are listed in Regulation 43 (1).	The legislated timeframes prescribed in the NEMA EIA Regulations, 2014, as amended, will be adhered to in order to ensure that the application will not lapse. The proposed project will not proceed without an Environmental Authorisation being granted
Furthermore, it must be reiterated that, should an application for Environmental Authorisation be subject to the provisions of Chapter II, Section 38 of the National Heritage Resources Act, Act 25 of 1999, then this Department will not be able to make nor issue a decision in terms of your application for Environmental Authorisation pending a letter from the pertinent heritage authority categorically stating that the application fulfils the requirements of the relevant heritage resources authority as described in Chapter II, Section 38(8) of the National	The application for EA is subject to the provisions of Chapter II, Section 38 of the National Heritage Resources Act, Act 25 of 1999 and a Heritage Impact Assessment has been undertaken to identify possible heritage resources and finds that may occur in the proposed development area. The Specialist report which has been uploaded to SAHRA for comment can be found in **Appendix 6.** SAHRA commented on the 19th December 2018. The DEIR has been uploaded to SAHRA for comment.

Additional Information Required by the DEA	Notes / Comments
Heritage Resources Act, Act 25 of 1999. Comments from SAHRA and/or the provincial department of heritage must be provided in the EIAr.	
You are requested to submit an electronic copy (in the form of a USB) and one (1) hard copy (colour) of the EIAr to the Department. Please note that you are reminded to comply with Regulation 23(1) of the EIA Regulations, 2014, as amended.	A hard copy in colour and an electronic copy (on a USB) of the DEIAr were submitted to the Department.on the 19 March 2019.
Please also find attached information that must be used in the preparation of the EIAr. This will enable the Department to speedily review the EIAr and make a decision on the application.	The information requested by the DEA has been incorporated in the compilation of the DEIAr.
You are hereby reminded of Section 24F of the National Environmental Management Act, Act No 107 of 1998, as amended, which stipulates that no activity may commence prior to an Environmental Authorisation being granted by the Department.	The proposed project will not proceed without an Environmental Authorisation being granted
Annexure A A1. General Site information	General site information can be found in **Section 5.**
A2. Sample of technical details for the proposed facility	Technical details for the proposed facility can be found in **Section 5**
A3. Site maps and GIS information	Site Maps can be found in **Section 1** and **Appendix 5**. All shape files can be found in a zipped file along with meta data submitted to the DEA only (as per the specifications of DEA requirements) in electronic format in conjunction with the submission of this DEIAr.
A4. Regional map and GIS information	Regional Maps can be found in **Appendix 5** and shape files can be found in a zipped file along with meta data submitted to the DEA only (as per the specifications of DEA requirements) in electronic format in conjunction with the submission of this DEIAr.

Additional Information Required by the DEA	Notes / Comments
A5. Important Stakeholders	Important Stakeholders can be found in **Section 7.9** in Table 26.
B. Agriculture Study requirements	According to the Agriculture and Soil Specialist: *DEA has commented on the above Agricultural Impact Study by cutting and pasting their standardised requirements for an agricultural study. The need to fulfill these requirements has already been addressed in the submitted agriculture study, as the following excerpts from the report show:* *Section 2. The terms of reference for the study fulfills the requirements for a soils and agricultural study as described in the National Department of Agriculture's document, Regulations for the evaluation and review of applications pertaining to renewable energy on agricultural land, dated September 2011. The study applies an appropriate level of detail for the agricultural suitability and soil variation on site, which, because it is justified (see section 3.1), is less than the standardised level of detail stipulated in the above regulations.* *Note: DEA's requirements for an agricultural study are taken directly from this document, but use an older version of the document and not the most recent version, which was updated in 2011.* *Section 3.1. The area in which the development is proposed is of extremely low land capability and severely limited by climatic moisture availability. It is also within a REDZ where assessment has already been done as part of the SEA for the REDZ. A field investigation was not therefore considered necessary.*

Additional Information Required by the DEA	Notes / Comments
	The level of soil mapping detail in the above DAFF requirements (see Section 2) is appropriate for arable land only. It is not appropriate for this site. Detailed soil mapping has little relevance to an assessment of agricultural potential in this environment, where the agricultural limitations are overwhelmingly climatic, soil conditions are generally poor, and cultivation potential is non-existent. In such an environment, even where soils suitable for cultivation may occur, they cannot be cultivated because of the aridity constraints. Conducting a soil assessment at the stipulated level of detail would be very time consuming and would add absolutely no value to the assessment. *The level of assessment used is considered entirely adequate for a thorough assessment of all the agricultural impacts of the proposed development.* *As the above shows, DEA's standardised requirements for an agricultural study are inappropriate for the site of the proposed Rondekop Wind Energy Facility, and have not therefore been adhered to in the Agricultural and Soils Impact Assessment. The study has nevertheless thoroughly assessed.* A copy of this response from the Soil and Agricultural Specialist can be found in **Appendix 6 A** Addendum Letter.
C. Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007)	The said Act is not relevant to this project as the study area does not fall within the ambit of the Square Kilometre Array - South Africa.

1.5 Expertise of Environmental Assessment Practitioner

SiVEST has considerable experience in the undertaking of EIAs. Staff and specialists who have worked on this project and contributed to the compilation of this DEAIr are detailed in Table 9 below.

Table 9: Project Team

Name	Organisation	Role
Andrea Gibb	SiVEST	Project Coordinator, EAP and Visual Reviewer
Liandra Scott-Shaw	SiVEST	Environmental Consultant
Hlengiwe Ntuli	SiVEST	Public Participation Consultant
Shivani Naidoo*	SiVEST	Environmental Consultant
Stephan Jacobs	SiVEST	Environmental Consultant
David Hoare	David Hoare Consulting	Terrestrial Ecology
Kerry Schwartz	SiVEST	GIS, Mapping and Visual
Miguel Mascarenhas	Bioinsight	Birds & Bats
Brian Colloty	EnviroSci (Pty) Ltd	Aquatic Ecology
Johann Lanz	Private	Agriculture & Soils
Dr Brett Williams	Safetech	Noise Impact
Scott Masson / Chris Dalgliesh	SRK Consulting	Visual Peer Reviewer
Wouter Fourie / Ilan Smeyatsky	PGS Heritage	Heritage, Archaeology & Cultural Landscape
Elize Butler	Banzai Environmental for PGS Heritage	Palaeontology
Neville Bews	Dr Neville Bews & Associates	Socio-Economic
Iris Wink/ Adrian Johnson	JG Afrika	Traffic Impact Assessment

** No longer employed by SiVEST*

As per the requirements of the NEMA (2014, as amended), the details and level of expertise of the persons who prepared the DEIAr are provided in **Table 10** below. The EAP Declaration of Independence is contained in **Appendix 3**.

Table 10: Expertise of the EAP

Environmental Practitioner	Andrea Gibb
Contact Details	andreag@sivest.co.za
Qualifications	BSc Landscape Architecture and BSc (Hons) Environmental Management
Professional Affiliations	IAIA (International Association for Impact Assessment)
Expertise	Andrea has 11 years' work experience and specialises in undertaking and managing Environmental Impact Assessments (EIAs) and Basic Assessment (BAs), primarily related to energy generation and electrical distribution projects. She has extensive experience in overseeing public participation and stakeholder

	engagement processes and has been involved in environmental baseline assessments, fatal flaw / feasibility assessments and environmental negative mapping / sensitivity analyses.
Environmental Consultant	Liandra Scott-Shaw
Contact Details	liandras@sivest.co.za
Qualifications	BSc Biological Science and BSc (Hons) Ecological Science
Professional Affiliations	IAIA (International Association for Impact Assessment) SACNASP (South African Council for Natural Scientific Professions) SER (Society for Ecological Restoration)
Expertise	Liandra joined SiVEST in January 2014 and holds the position of Environmental Consultant in the Pietermaritzburg office. Liandra specialises in the field of Vegetation Ecology and Environmental Management and has been involved in the compilation of Environmental Impact Assessments (EIAs) and Basic Assessments (BAs) and specialist vegetation studies since joining SiVEST.
Environmental Consultant	Stephan Jacobs
Contact Details	stephanj@sivest.co.za
Qualifications	BSc Environmental Sciences and BSc (Hons) Environmental Management and Analysis
Professional Affiliations	IAIA (International Association for Impact Assessment)
Expertise	Stephan joined SiVEST in May 2015 and holds the position of Graduate Environmental Consultant in the Johannesburg office. Stephan specialises in the field of Environmental Management and has been involved in the compilation of Environmental Impact Assessments (EIAs) and Basic Assessments (BAs). Stephan has also assisted extensively in the undertaking of field work and the compilation of reports for specialist studies such as surface water and visual impact assessments. Stephan also has experience in Environmental Compliance and Auditing and has acted as an Environmental Control Officer (ECO) for several infrastructure projects.

Please refer to attached CV's for more information in **Appendix 2**. Declarations of Independence of each specialist are contained in **Appendix 3**. Legal Requirements and Guidelines

1.6 Key Legal and Administrative Requirements Relating to the Proposed Development

1.6.1 *Constitution of South Africa*

The Constitution of South Africa (No. 108 of 1996) provides environmental rights and includes implications for environmental management. 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."

The Constitution is the overarching legislation for South Africa. Although it provides for certain rights and obligations, the NEMA has been promulgated in order to manage the various spheres of both the social and natural environment.

1.6.2 *National Environmental Management Act No. 107 of 1998 – NEMA EIA Requirements*

The National Environmental Management Act (Act No. 107 of 1998) was promulgated in 1998 but has since been amended on several occasions from this date. This Act replaces parts of the Environment Conservation Act (Act No 73 of 1989) with exception to certain parts pertaining to Integrated Environmental Management.

The act intends to provide for:

- co-operative environmental governance by establishing principles for decision-making on matters affecting the environment;
- institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state;
- to provide for the prohibition, restriction or control of activities which are likely to have a detrimental effect on the environment; and
- to provide for matters connected therewith.

NEMA is the overarching legislation which governs the EIA process and environmental management in South Africa. Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an environmental authorisation. Activities that may significantly affect the environment must be considered, investigated and assessed prior to implementation. A comprehensive list of such activities were gazetted and the proposed Rondekop WEF triggers activities from all three listing notices (GN 324, 325 and 327 as published on 7 April 2017) gazetted on 7 April 2017 (Government Gazette 326) (the "EIA Regulations").

Therefore, a full EIA is required for the proposed project in terms of section 21 to 24 of the EIA Regulations.

1.6.3 *NEMA EIA Regulations, 2014 (as amended)*

In terms of these Regulations, a full Environmental Impact Assessment is required for the proposed development based on triggered activities. However, several activities which trigger a basic assessment were also identified and need also be specified. Ultimately, these activities will not form a separate assessment, but will fall into the greater EIA.

The following Schedules of the Government Notice No. R. 324, 325 and 327 of 7th April 2017 are of relevance to the project in question. All of the Listed Activities identified in terms of Sections 24(2) and 24D include:

Table 11: Listed activities in terms of the NEMA Regulations

Activity No(s):	**Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R327)**	**Describe the portion of the proposed project to which the applicable listed activity relates.**
12 (ii) (a) (c)	GN R. 327 Item 12: *The development of:* *ii) infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs-* *(a) within a watercourse;* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.*	The proposed WEF will entail the construction of buildings and other infrastructure exceeding 100 square metres in size. The WEF infrastructure avoids the identified surface water features (drainage lines) where possible, although some structures occurring within a watercourse and/or 32 m of a watercourse.
19	GN R. 327 Item 19: *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;*	The surface water impact assessment revealed that there are surface water features located within the development area. The proposed WEF will involve the excavation, removal, infilling, depositing and moving of more than 10 m^3 of soil, sand, pebbles or rock from a water course. Although the layout of the proposed development will be designed to avoid the identified surface water features (drainage lines) as far as possible, some of the internal and access roads, will need to traverse the identified surface water features and during construction of these roads, soil will therefore need to be removed from the watercourses.
24 (ii)	GN R. 327 Item 24: *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;*	Internal access roads up to 12 m wide, including structures for stormwater control would be required to access each turbine and the substation, with a total footprint of about ~ 75 ha. Where possible, existing roads will be upgraded. Turns will have a radius of up to 50 m in order for abnormal loads (especially turbine blades) to access the various turbine positions.
28 (ii)	GN R. 327 Item 28: *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for*	The proposed project site is currently used and zoned for agricultural purposes and the proposed WEF will result in a special

	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;*	zoning being required as an area greater than 1 hectare will be transformed into an industrial / commercial use.
Activity 48 (i) (a) (c)	GN R. 327 Item 48: The expansion of *(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more;* *where such expansion occurs—* *(a) within a watercourse; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;*	The proposed WEF will entail the expansion (upgrading) of roads and other infrastructure by 100 m^2 or more within a watercourse or within 32 m from the edge of a watercourse. Although the layout of the proposed development will be designed to avoid the identified surface water features (drainage lines) as far as possible, some of the internal and access roads, will need to traverse the identified surface water features and during construction of these roads, soil will therefore need to be removed from the watercourses.
56 (ii)	GN R. 327 Item 56: *The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -* *(ii) where no reserve exists, where the existing road is wider than 8 metres –* *excluding where widening or lengthening occur inside urban areas.*	The existing access roads will need to be upgraded in order to access the site. Internal access roads will be up to 12 m wide. Where possible, existing roads will be upgraded. Access roads to the site will be approximately 9 m wide while access roads to the substation will be approximately 6 m wide.
Activity No(s):	**Provide the relevant Scoping and EIR Activity(ies) as set out in Listing Notice 2 (GN 325)**	**Describe the portion of the proposed project to which the applicable listed activity relates.**
1	GN R. 325 Item 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 development will entail the development of a wind energy facility with a maximumexport capacity up to 325MW will be constructed. The proposed WEF will be located outside an urban area.
15 (i) (ii)	GN R. 325 Item 15: *The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-*	The proposed development will transform more than 20 hectares of indigenous vegetation. Clearance will also be required for the proposed on-site substation,

	(i) the undertaking of a linear activity; or *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*	internal access roads and other associated infrastructure. The total clearance will not exceed 114ha.
Activity No(s):	**Provide the relevant Scoping and EIR Activity(ies) as set out in Listing Notice 3 (GN 324)**	**Describe the portion of the proposed project to which the applicable listed activity relates.**
Activity 4 (g) (ii) (cc) (ee)	GN R. 325 Item 4: *The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *g. Northern Cape* *ii. Outside urban areas:* *(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	Internal access roads up to 12 m wide, including structures for stormwater control would be required to access each turbine and the substation, with a total footprint of ~ 75 ha. Where possible, existing roads will be upgraded. Turns will have a radius of up to 50 m in order for abnormal loads (especially turbine blades) to access the various turbine positions. These roads will occur within the Northern Cape Province, outside an urban area. Sections of the site are located within a CBA. Turbine 25 and crane pad 25 and small section of an internal road – approximately 300 m fall in CBA 1, construction camp 3 and 4 are within in a CBA1 , the southern and centre ridge are located in CBA 2, construction camps C6 and C5 and Substations 5 and 6 occur in CBA 2. Turbine 26 – 48 are in a CBA 2. An ecology impact assessment has been undertaken to assesses the impacts of this infrastructure on the indigenous vegetation and has been included in the DEIAr.
Activity 12 (g) (i) (ii)	GN R. 324 Item 12: *The clearance of an area of 300 square metres or more of indigenous vegetation* *g. Northern Cape* *i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list,*	The proposed development will transform more than 300 m^3 of indigenous vegetation. Clearance will also be required for the proposed on-site substation, internal access roads and other associated infrastructure. Clearance will occur within a CBA

	within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; *ii. Within critical biodiversity areas identified in bioregional plans;*	Turbine 25 and crane pad 25 and small section of an internal road – approximately 300 m fall in CBA 1, construction camp 3 and 4 are within in a CBA1 , the southern and centre ridge are located in CBA 2, construction camps C6 and C5 and Substations 5 and 6 occur in CBA 2. Turbine 26 – 48 are in a CBA 2. An ecology impact assessment has been undertaken to assesses the impacts of this infrastructure on the indigenous vegetation and has been included in the DEIAr.
Activity 14 (ii) (a), (c); g (ii) (dd) (ff) .	GN R. 324 Item 14: *The development of -* *(ii) infrastructure or structures with a physical footprint of 10 square metres or more;* *where such development occurs –* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *g. Northern Cape* *(ii) Outside urban areas:* *(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	The proposed WEF will entail development of roads and other infrastructure by 10 m^2 or more within a watercourse or within 32 m from the edge of a watercourse. Although the layout of the proposed development will be designed to avoid the identified surface water features (drainage lines) as far as possible, some of the internal and access roads, will need to traverse the identified surface water features. The development of the infrastructure will occur within a CBA and outside an urban area. An ecology impact assessment was undertaken to assesses the impacts of this infrastructure on the indigenous vegetation and is included in the DEIAr.
Activity 18 (g) (ii) (cc) (ee) (ii) .	GN R 324 Item 18: *The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre-* *g. Northern Cape* *ii. Outside urban areas:* *(cc) Sensitive areas as identified in an environmental management framework as*	Existing access roads will need to be upgraded in order to access the site. Internal access roads will be up to 12 m wide. Where possible, existing roads will be upgraded. Access roads to the site will be approximately 9 m wide while access roads to the substation will be approximately 6 m wide. This widening of the roads will occur within a CBA as well

	contemplated in chapter 5 of the Act and as adopted by the competent authority; *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland;*	as within and / or 100 m from the edge of a water course. An ecology impact assessment was undertaken to assesses the impacts of this infrastructure on the indigenous vegetation and is included in the DEIAr.
Activity 23 (ii) (a) (c) (g) (ii) (cc) (ee) .	GN R. 324 Item 23: *The expansion of -* *(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;* *where such expansion occurs –* *(a) within a watercourse;* *in front of a development setback adopted in the prescribed manner;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *g. Northern Cape* *(ii) Outside urban areas:* *(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	The proposed WEF will entail development and expansion of roads and other infrastructure by 10 m^2 or more within a watercourse or within 32 m from the edge of a watercourse. Although the layout of the proposed development will be designed to avoid the identified surface water features (drainage lines) as far as possible, some of the internal and access roads, may need to traverse the identified surface water features. The development of the infrastructure will occur within a CBA and outside an urban area.

1.6.4 *Environmental Impact Assessment Guideline for Renewable Energy Projects, DEA Notice 989 of 2015*

The purpose of this document is primarily to provide guidance on the environmental management legal framework applicable to renewable energy operations and all the role players in the sector. The guideline is principally intended for use by the following stakeholder groups:

Public Sector Authorities (as regulator and/or competent authority);
Joint public sector authorities and project funders, e.g., Eskom, IDC, etc.
Private Sector Entities (as project funder/developer/consultant);

Other interested and affected parties (as determined by the project location and/or scope).

This guideline seeks to identify activities requiring authorisation prior to commencement of that activity and provide an interface between national EIA regulations and other legislative requirements of various authorities.

The guidelines are applicable for the construction, installation and/or development of the following renewable energy projects:

- Concentrating Solar Power Plant;
- Wind Energy Facility;
- Hydropower Station; and
- Photovoltaic Power Plant.

As the proposed development is for a WEF it is subject to the recommendations proposed in the guidelines.

1.6.5 *National Energy Act No. 34 of 2008*

South Africa has two acts that direct the planning and development of the country's electricity sector:

i. The National Energy Act of 2008 (No. 34 of 2008)
ii. The Electricity Regulation Act (ERA) of 2006 (No. 4 of 2006) (see section 3.1.6).

The National Energy Act (Act no, 34 of 2008), promulgated in 2008, has, as one of its key objectives, the promotion of diversity of supply of energy and its sources. From this standpoint, the Act directly references the importance of the renewable energy (RE) sector, with a mention of the wind energy sector included. The aim is to ensure that the South African economy is able to grow and develop, fast tracking poverty alleviation, through the availability of a sustainable, diverse energy mix. Moreover, the goal is to provide for the increased generation and consumption of RE (Republic of South Africa, 2008).

1.6.6 *Electricity Regulation Act No. 4 of 2006*

In 2011, the electricity regulation on new generation capacity was published under Section 35(4) of the Electricity Regulation Act (No. 4 of 2006). These regulations apply to the procurement of new generation capacity by organs of state.
The objectives of the regulations include:

- To facilitate planning for the establishment of new generation capacity;
- The regulation of entry by a buyer and a generator into a power purchase agreement;
- To set minimum standards or requirements for power purchase agreements;
- The facilitation of the full recovery by the buyer of all costs efficiently incurred by it under, or in connection with, a power purchase agreement including a reasonable return based on the risks assumed by the buyer thereunder and to ensure transparency and cost reflectivity in the determination of electricity tariffs; and
- The provision of a framework for implementation of an IPP procurement programme and the relevant agreements concluded.

The Act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated.

1.6.7 *National Heritage Resources Act No. 25 of 1999*

This Act requires investigation to determine the impact of heritage resources when developments exceed the thresholds list in section 38 (1) of the act:

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m 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 a site—
    i. exceeding 5 000 m^2 in extent; or
    ii. involving three or more existing 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 heritage resources authority;
(d) the re-zoning of a site exceeding 10 000 m2 in extent; or
(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

The proposed WEF would involve

(a) the construction of linear infrastructure exceeding 300m in length,
(c) the development of a WEF that will change the character of more than 0,5ha, involving more than 3 erven and
(d) the rezoning of a site that will exceed 1ha.

The law ensures community participation in the protection of national heritage resources and will involve all three levels of government in the management of the country's national heritage. The South African Heritage Resources Agency (SAHRA) will establish and maintain a national policy, strategy plans and standards for heritage resources management and will monitor the system as a whole.

A heritage assessment has been conducted to explore how the proposed development may impact on heritage resources as protected by the Act (Sections 6, 8 and 9, and Appendix 6E).

1.6.8 *National Water Act No. 36 of 1998, as amended*

The National Water Act (NWA) No 36 of 1998 was promulgated on the 20th August 1998. This Act is important in that it provides a framework to protect water resources against over exploitation and to ensure that there is water for socio-economic and economic development, human needs and to meet

the needs of the aquatic environment. The Act also recognises that water belongs to the whole nation for the benefit of all people.

It is important to note that water resources are protected under the Act. Under the act, water resources as defined include a watercourse, surface water, estuary or aquifer. A watercourse is defined as a river or spring, a natural channel in which water flows regularly or intermittently, or a wetland, lake or dam into which, or from which water flows.

One of the main aims of the Act is the protection of water resources. 'Protection' in relation to a water resource entails:

- Maintenance of the quality of the water resource to the extent that the water use may be used in a sustainable way;
- Prevention of degradation of the water resource; and
- The rehabilitation of the water resource.

In the context of the proposed development and any potential impact on water resources, the definition of pollution and pollution prevention contained within the Act is relevant. 'Pollution', as described by the Act is the direct or indirect alteration of the physical, chemical or biological properties of a water resource, so as to make it (*inter alia*):

- less fit for any beneficial purpose for which it may reasonably be expected to be used; or
- harmful or potentially harmful to the welfare or human beings, to any aquatic or non-aquatic organisms, or to the resource quality.

This definition of pollution is quite wide ranging, and it applies to all types of water resource. Activities which cause alteration of the biological properties of a watercourse (i.e. the fauna and flora contained within that watercourse are also considered pollution).

In terms of section 19 of the Act owners / managers / people occupying land on which any activity or process undertaken which causes / or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring. These measures may include (inter alia):

- measures to cease, modify, or control any act or process causing the pollution;
- comply with any prescribed waste standard or management practice;
- contain or prevent the movement of pollutants;
- remedy the effects of the pollution; and
- remedy the effects of any disturbance to the bed and banks of a watercourse.

Chapter 4 of this Act is founded on the principle that National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, a person can only be entitled to use water if the use is permissible under the Act. This Chapter is therefore of central significance to the Act, as it lays the basis for regulating water use. The various types of licensed and unlicensed entitlements to use water are dealt with in detail.

Chapter 4 Part 1: General Principles

This Part sets out general principles for regulating water use. Water use is defined broadly, 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 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.

Section 21 of the NWA identifies eleven water use types.

(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.

A surface water assessment has been conducted to explore how the proposed development may impact on water resources as protected by the Act (Sections 6, 8 and 9, and Appendix 6B). If the project requires a General Authorisation or Water Use Licence, it will be determined and applied for prior to construction.

1.6.9 *National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004 as amended)*

The overarching aim of the National Environmental Management: Biodiversity Act (NEMBA) No. 10 of 2004, within the framework of NEMA, is to provide for:

- The management and conservation of biological diversity within South Africa, and of the components of such biological diversity;
- The use of indigenous biological resources in a sustainable manner; and

- The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources.

The South African National Biodiversity Institute (SANBI) was established in terms of the NEMBA, its purpose being (*inter alia*) to report on the status of the country's biodiversity and the conservation status of all listed threatened or protected species and ecosystems.

NEMBA provides for a range of measures to protect ecosystems and for the protection of species that are threatened or in need of protection to ensure their survival in the wild, including a prohibition on carrying out a "restricted activity" involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7 of the Act. Lists of critically endangered, endangered, vulnerable and protected species have been published and a permit system for listed species has been established.

The NEMBA is relevant to the proposed project as the construction of the Wind Energy Facility and other components (such as the substation) may impact negatively on biodiversity. The project applicant is therefore required to take appropriate reasonable measures to limit the impacts on biodiversity, to obtain permits if required and to also invite SANBI to provide commentary on any documentation resulting from the proposed development.

A detailed Terrestrial Ecology Impact Assessment has been undertaken as part of the DEIAr in Sections 6, 8 and 9, and Appendix 6H.

1.6.10 *National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003 as amended)*

The overarching aim of the National Environmental Management: Protected Areas Act (NEMPAA) No. 57 of 2003, within the framework of NEMA, is to provide for:

- provide for the declaration and management of protected areas;
- provide for co-operative governance in the declaration and management of protected areas;
- effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity;
- provide for a representative network of protected areas on state land, private land and communal land;
- promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas;
- promote participation of local communities in the management of protected areas, where appropriate; and
- provide for the continued existence of South African National Parks.

The proposed project falls outside any protected areas and outside the areas earmarked as part of the National Protected Areas Expansion Strategy (Sections 6, 8 and 9, and Appendix 6H).

1.6.11 *National Forests Act, 1998 (Act No. 84 of 1998)*

The National Forest Act (NFA) was enacted to:

- Provide for the protection, management and utilisation of forests;
- The protection of certain plant and animal life;
- The regulation of trade in forest produce;
- The control and management of a national hiking way system and National Botanic Gardens.

The NFA enforces the necessity for a license to be obtained prior to destroying any indigenous tree in a natural forest and, subject to certain exemptions, cutting, disturbing, damaging, destroying or removing any protected tree. The list of protected trees is currently contained in GN 908 of 21 November 2014. Licenses are issued by the Minister and are subject to periods and conditions as may be stipulated.

The NFA is relevant to the proposed project as the removal and/or disturbance and/or clearance of indigenous vegetation may be required and a license in terms of the NFA may be required for this to be done.

However, the ecologist confirmed that no protected tree species would be impacted by the proposed development a full detail of his report can be found in Appendix 6H

1.6.12 *Conservation of Agricultural Resources Act No. 43 of 1983*

The Conservation of Agricultural Resources Act (CARA) No. 43 of 1983 controls the utilisation of natural agricultural resources in South Africa. The Act promotes the conservation of soil, water sources and vegetation as well as the combating weeds and invader plants.

The primary objective of the Act is to conserve natural agricultural resources by:

- maintaining the production potential of land;
- combating and preventing erosion and weakening or destruction of the water resources;
- protecting vegetation; and
- combating weeds and invaders plants.

The CARA is relevant to the proposed projects as the construction of a Wind Energy Facility as well as other components (such as the substation) may impact on agricultural resources and vegetation on the site. The Act prohibits the spreading of weeds and prescribes control measures that need to be complied with in order to achieve this. As such, measures will need to be taken to protect agricultural resources and prevent weeds and exotic plants from invading the site as a result of the proposed development.

An agricultural assessment has been conducted to explore how the proposed development may impact on the agricultural production potential of the proposed site (Sections 6, 8 and 9, and Appendix 6A).

1.6.13 *Subdivision of Agricultural Land Act No. 70 of 1970, as amended*

The Subdivision of Agricultural Land Act No. 70 of 1970 controls the subdivision of all agricultural land in South Africa; prohibiting certain actions pertaining to agricultural land. Under the Act the owner of agricultural land is required to obtain consent from the Minister of Agriculture in order to subdivide agricultural land.

The purpose of the Act is to prevent uneconomic farming units from being created and degradation of prime agricultural land. To achieve this purpose the act also regulates leasing and selling of agricultural land as well as registration of servitudes.

The Act is of relevance to the proposed development as any portion of land within the study area that is zoned for agricultural purposes that will need to be leased for a period exceeding 10 years, will be regulated by this Act.

1.6.14 *National Road Traffic Act No. 93 of 1996, as amended*

The National Road Traffic Act (NRTA) No. 93 of 1996 provides for all road traffic matters and is applied uniformly throughout South Africa. The Act enforces the necessity of registering and licensing motor vehicles. It also stipulates requirements regarding fitness of drivers and vehicles as well as making provision for the transportation of dangerous goods.

All the requirements stipulated in the NRTA will need to be complied with during the construction and operational phases of the proposed WEF (Sections 6, 8 and 9, and Appendix 6I).

1.6.15 *Civil Aviation Act No. 13 of 2009*

The Civil Aviation Act No. 13 of 2009 controls and regulates aviation within South Africa. It provides for the establishment of a South African Civil Aviation Authority and independent Aviation Safety Investigation Board in compliance with Annexure 13 of the Chicago Convention. It gives effect to various conventions related to aircraft offences, civil aviation safety and security, and provides for additional measures directed at more effective control of the safety and security of aircrafts, airports and matters connected thereto.

As wind turbines and lattice masts are seen as obstacles, formal application to the CAA for the proposed Rondekop WEF on 26 October 2018 (Please see Appendix 7I).

1.6.16 *Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009)*

The Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009) and the Nature and Environmental Conservation Ordinance 19 of 1974 are of relevance to the Northern Cape Province. These are developed to protect both animal and plant species within the province. These may be species which are under threat or which are already considered to be endangered. The provincial environmental authorities are responsible for the issuing of permits in terms of this legislation.

A terrestrial ecology assessment has been conducted to explore how the proposed development may impact on biodiversity as protected by the Act. (Sections 6, 8 and 9, and Appendix 6H).

1.6.17 *Astronomy Geographic Advantage Act No. 21 of 2007*

The Astronomy Geographic Advantage Act No. 21 of 2007 provides for:

The preservation and protection of areas that are uniquely suited for optical and radio astronomy; Intergovernmental cooperation and public consultation on matters concerning nationally significant astronomy advantage areas and matters connected therewith.

Under Section 22(1) of the Act the Minister has the authority to protect the radio frequency spectrum for astronomy observations within a core or central astronomy advantage area. As such, the Minister may under section 23(1) of the Act, declare that no person may undertake certain activities within a core or central astronomy advantage area. These activities include the construction, expansion or operation; of any fixed radio frequency interference source, facilities for the generation, transmission or distribution of electricity, or any activity capable of causing radio frequency interference or which may detrimentally influence the astronomy and scientific endeavours.

In terms of section 7(1) and 7(2) of this Act, national government established the following astronomy advantage areas (AAA):

- Central Karoo AAA (GN 198 of 2014) – Rondekop falls outside this AAA
- Sutherland Central AAA Rondekop falls inside this AAA, but outside the core area
- Northern Cape AAA – GN115 of 2010 - Rondekop falls inside of this AAA

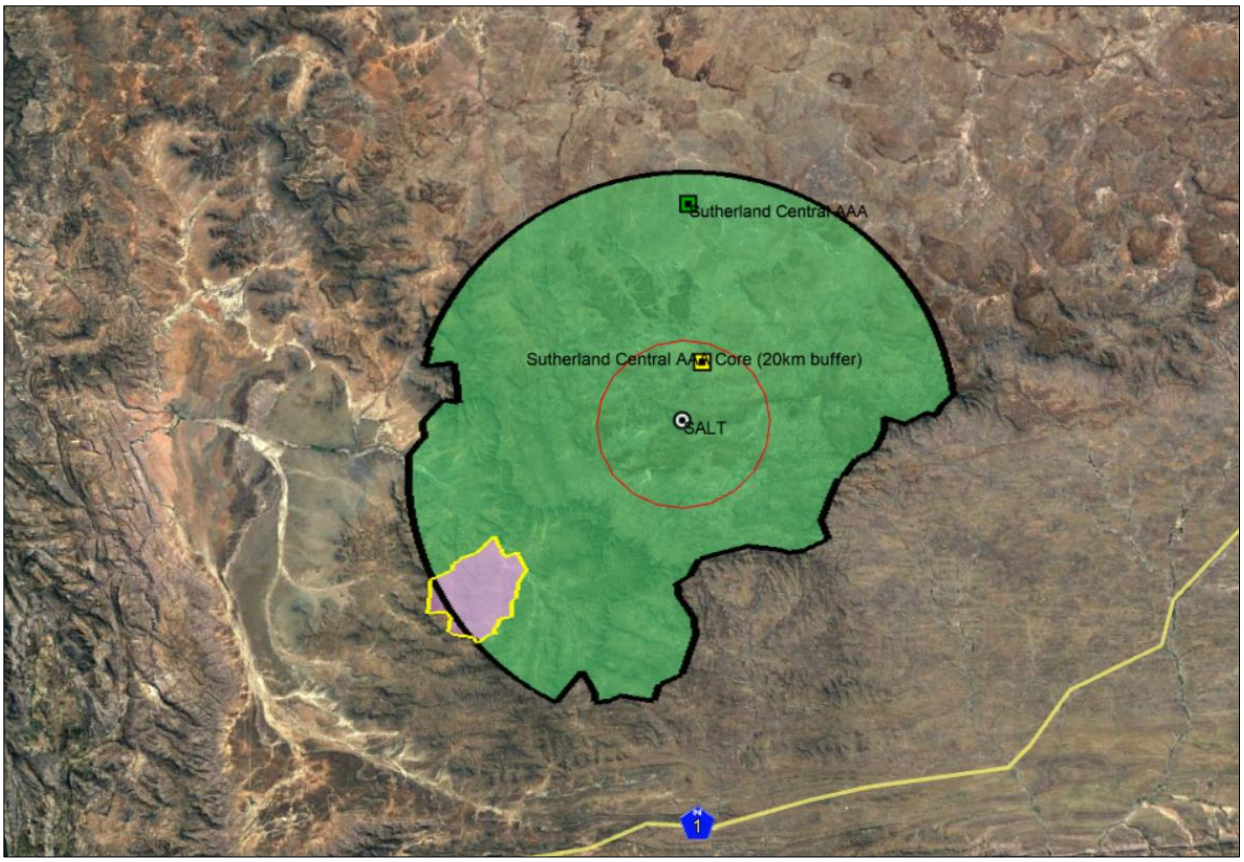

Figure 11: Sutherland Central AAA core area and AAA.

The applicant is engaging with the authorities including SKA and SALT. Any correspondence received from these authorities will be included throughout the EIA phase.

1.6.18 *Renewable Energy Development Zones*

The Strategic Environmental Assessment (SEA) for Wind and Solar Photovoltaic (PV) Energy in South Africa (CSIR, 2015) has identified 8 Renewable Energy Development Zones (REDZs) that are of strategic importance for large scale wind and solar PV development in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy, as well as associated strategic transmission corridors, including the rollout of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution.

- Renewable Energy Development Zones (REDZs) for large scale wind and solar photovoltaic development;
- associated Strategic Transmission Corridors which support areas where long term electricity grid will be developed;
- process of basic assessment to be followed and reduced decision-making timeframe for processing of applications for environmental authorisation in terms of NEMA; and
- acceptance of routes which have been pre- negotiated with all landowners as part of applications for environmental authorisations for powerlines and substations.

Table 12: The Council for Scientific and Industrial Research (CSIR) identified the following eight geographic areas for REDZ following a Strategic Environmental Assessment (SEA)

REDZ Number	Name	Applicability of REDZ
REDZ 1	Overberg	Large scale wind and solar photovoltaic energy facilities
REDZ 2	Komsberg	Large scale wind and solar photovoltaic energy facilities
REDZ 3	Cookhouse	Large scale wind and solar photovoltaic energy facilities
REDZ 4	Stormberg	Large scale wind and solar photovoltaic energy facilities
REDZ 5	Kimberley	Large scale solar photovoltaic energy facilities
REDZ 6	Vryburg	Large scale solar photovoltaic energy facilities
REDZ 7	Upington	Large scale solar photovoltaic energy facilities
REDZ 8	Springbok	Large scale wind and solar photovoltaic energy facilities

The proposed facility is located partially within the Komsberg Renewable Energy Development Zone (REDZ 2), one of the eight REDZ formally gazetted[3] in South Africa for the purpose of development of solar and wind energy generation facilities (**Table** and **Figure 12**). Considering that a portion of the proposed facility is located outside of the Komsberg REDZ, the Rondekop WEF will be subject to a full EIA process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended, EIA Regulations 2014 (as amended).

[3] Formally gazetted on 16 February 2018 (government notice 114).

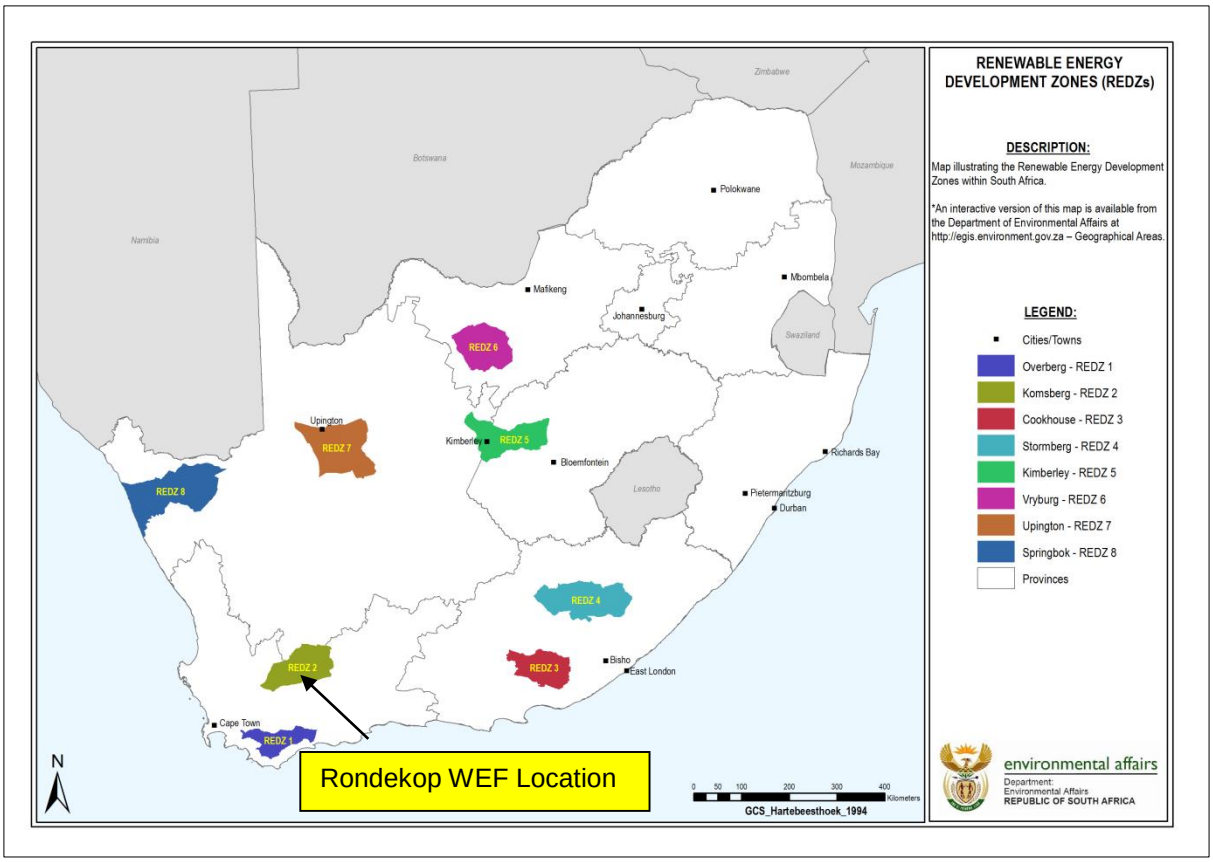

Figure 12: Formally gazette REDZ in South Africa and the proposed Rondekop WEF location in relation to the REDZ 2 (Komsberg REDZ)

1.6.19 *Noise regulations*

The South African Noise Control Regulations (National) describe a disturbing noise as any noise that exceeds the ambient noise by more than 7dB. This difference is usually measured at the complainant's location should a noise complaint arise. Therefore, if a new noise source is introduced into the environment, irrespective of the current noise levels, and the new source is louder than the existing ambient environmental noise by more than 7dB, the complainant will have a legitimate complaint. A noise disturbance or nuisance as defined in the national legislation means any sound which disturbs or impairs the convenience of any person.

It is recommended that a setback distance of 500m from residences (including rural dwellings) be used for this project. This is based on this authors experience on similar projects. All turbine positions met the 500m setback distance.

National Standards

The most applicable standard for planning purposes used in this study is SANS 10103:2008 which provides typical rating levels for noise in various types of districts. Ideally, in such areas one does not want to experience any anthropogenic noise pollution.

Table 13: Typical rating levels for noise in various types of districts

Type of District	Equivalent Continuous Rating Level, LAeq,T for Noise					
	Outdoors (dB(A))			Indoors, with open windows (dB(A))		
	Day-night	Daytime	Night-time	Day-night	Daytime	Night-time
Rural Districts	45	45	35	35	35	25
Suburban districts with little road traffic	50	50	40	40	40	30
Urban districts	55	55	45	45	45	35
Urban districts with one or more of the following: Workshops; business premises and main roads	60	60	50	50	50	40
Central business districts	65	65	55	55	55	45
Industrial districts	70	70	60	60	60	50

SANS 10103:2008 defines Daytime as 06:00 to 22:00 hours and night time as 22:00 to 06:00 hours. The rating levels in the table above indicate that in rural districts the ambient noise should not exceed the guideline 35 dB(A) at night and 45 dB(A) during the day. The day / night (24-hour) rating limit is 45 dB(A). These levels can thus be seen as the maximum target levels for any noise pollution sources. If the current ambient (residual) noise exceeds the rating limit, then actual ambient (residual) limit will be used when a noise complaint arises in terms of the Environment Conservation Act - Noise Control Regulations.

SANS 10103: 2004 also provides a guideline for expected community responses to excess environmental noise above the ambient (residual) noise.

Table 14: Expected community responses to excess environmental noise above the ambient (residual) noise

EXCESS Lr dB(A)	ESTIMATED COMMUNITY/GROUP RESPONSE	
	CATEGORY	DESCRIPTION
0 - 10	Little	Sporadic complaints
5 - 15	Medium	Widespread complaints
10 - 20	Strong	Threats of community / group action
> 15	Very Strong	Vigorous community / group action

1.6.20 *Additional Relevant Legislation*

- Occupational Health and Safety Act No. 85 of 1993
- Road Safety Act (Act No. 93 of 1996)

- National Road Traffic Regulations Act (Act 22 of 2000)
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008 as amended)
- Development Facilitation (Act No. 67 of 1995)
- The Hazardous Substances Act (Act No. 15 of 1973)
- Water Services Act (Act No. 108 of 1998)
- Electricity Regulation Act (Act No. 4 of 2006 as amended)
- Municipal Systems Act (Act No. 32 of 2000)
- Mineral and Petroleum Resource Development Act (Act No. 28 of 2002 as amended)
- Northern Cape Planning and Development Act, 1998 (Act No. 7 of 1998)

1.7 Key Development Strategies and Guidelines

1.7.1 *Integrated Development Plan*

An Integrated Development Plan (IDP) is defined in the Local Government: Municipal Systems Act No. 32 of 2000), as an inclusive and strategic plan that:

- Links, integrates and co-ordinates plans and takes into account proposals for the development of the municipality;
- Aligns the resources and capacity of the municipality with the implementation of the plan
- Forms the policy framework on which annual budgets must be based; and
- Is compatible with national and provincial development plans and planning requirements binding on the municipality in terms of legislation.

The IDP for the Namakwa District Municipality is aligned with the National Development Plan, which has identified various central development challenges.

In September 2015 the world's governments signed an historic agreement to eradicate poverty, improve the living standards and well-being of all people, promote peace and more inclusive societies and reverse the trend of environmental degradation. The 2030 Agenda for Sustainable Development commits to promoting development in a balanced way—economically, socially and environmentally—in all countries of the world, leaving no one behind and paying special attention to those people who are poorest or most excluded. It contains 17 Sustainable Development Goals with associated targets to assess progress.

The 17 goals, ranging from alleviating poverty and reducing inequality through job creation and economic growth, as well as ensuring access to affordable, reliable, sustainable and modern energy for all, are in many ways interrelated and cross-cutting in nature. The role of Namakwa DM in the electricity distribution industry, including consideration of renewable energy, reticulation, and municipal debt and tariff structures will be critical.

In his 2015/16 State of the Nation Address, former President Jacob Zuma announced the Nine Point Plan with a purpose of growing the economy and at the same time fast-tracking the implementation of the NDP.

The first key priority area identified for the Nine Point Plan is resolving the energy challenge. The Province is moving ahead with the implementation of the nine-point plan, which amongst others include coordinating high impact projects such as the Renewable energy projects and facilitate the forging of partnerships to ensure that these key priorities reach their full potential but more specifically that the people of the Northern Cape people benefit from these.

The proposed Rondekop WEF is located within the Karoo Hoogland Local Municipality and greater Namakwa DM. The Namakwa Integrated Development Plan (IDP) sets out to utilise natural resources in the Province by optimally utilising and managing resources in each sector; this includes the growing realisation of investing in more renewable energy-based development. The Namakwa DM has a competitive advantage in the energy sector as wind, solar, wave, nuclear and natural gas energy plants have all been identified as suitable investments in the area. Amongst other sectors such as agriculture and tourism, renewable energy is thus prioritised. Several large-scale renewable energy projects have already been included in the IDP of the district. The district also recognises the importance of the agriculture and tourism industries in the area and promotes their development and transformation, especially eco-heritage (Namakwa DM, 2014).

The Karoo Hoogland is predominantly rural in nature with a high unemployment rate resulting in high poverty levels and is linked with many other places through shared environmental, social and economic systems and structures. The Karoo Hoogland Municipality is also integral to the province and will be an economical growth node in the Northern Cape as it has significant development potential in sectors such as agriculture (both horticulture and livestock), tourism and mining (Renewable Energy).

Upon reviewing the spatial planning component, the Namakwa DM as well as the Karoo Hoogland LM spatial development frameworks do not suggest any potential conflicts between the planned spatial development visions and the proposed WEF project. In addition, the site where the proposed project will be developed is not located near any settlement or tourism attraction (Sutherland is over 45km away) or agricultural land that might be sensitive to the environmental effects of the proposed project.

After considering the reviewed documentation, the proposed WEF is in alignment with national, provincial and local objectives, plans and strategies relating to socio-economic development of the areas under analysis. There were no fatal flaws or contraventions identified as all spheres of government prioritise the development of renewable energy projects. The proposed project fits well with the plans to diversify the provincial, district and local economies through investment in renewable energy projects.

It can be suggested that the proposed project does not conflict with any of the identified developmental priorities of the local governments in question but is also in alignment with the identified means to stimulate the local economy. The IDP notes that climate change will impact on biodiversity and with this the ability of biodiversity and ecosystems to provide ecosystem services that support human society. This is particularly important in rural areas such as the Namakwa District, where the link between people and the environments that support them (and place them at risk in terms of droughts and other extreme

weather events) is far more direct than in more urbanized. Some features in the landscape are more likely to support resilience of biodiversity to climate change than others. Such features include: riparian corridors and buffers; coastal corridors; areas with temperature, rainfall and altitudinal gradients; areas of high diversity; areas of high plant endemism; refuge sites including south-facing slopes and kloofs; and priority large unfragmented landscapes. Keeping these areas in a natural or near-natural state will help ecosystems and species to adapt naturally to climate change, thus supporting healthy landscapes and the ability of ecosystems to continue to provide ecosystem services to communities. Policy decisions taken in the next decade will largely determine the dimension of the impact of climate change. Local government is in the front line of implementation and service delivery, and thus needs to pursue adequate mitigation and adaptation strategies which should include participation from the public sector, the private sector and NGOs. Therefore, it is evident that the proposed development is aligned with the goals of the municipal IDPs in the study area.

1.7.2 *Draft Integrated Energy Plan for the Republic of South Africa, 2016*

The Draft Integrated Energy Plan (IEP), developed by the DoE, are anchored in the National Energy Act, 2008 (Act No. 34 of 2008). The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development, while:

- Maintaining control over economic costs;
- Serving national imperatives such as job creation and poverty alleviation; and
- Minimising the adverse impacts of the energy sector on the environment.

The IEP takes into consideration the crucial role that energy plays in the entire economy and is informed by the output of analyses founded on a solid fact base. It is a multi-faceted, long-term energy framework which has multiple objectives, some of which include:

- To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector;
- To guide the selection of appropriate technologies to meet energy demand (i.e. the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels);
- To guide investment in and the development of energy infrastructure in South Africa; and
- To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors.

The IEP considers the national supply and demand balance and proposes alternative capacity expansion plans based on varying sets of assumptions and constraints. While infrastructural matters are briefly discussed, the IEP does not explicitly consider supply and demand at specific geographical locations within the country, nor does it take into account infrastructure bottlenecks at specific locations. These are, or will be, covered in detail as follows:

- Electricity infrastructure (transmission and distribution) is dealt with in other plans and the Integrated Resource Plan (IRP) should assess these in detail, taking into consideration the grid planning currently conducted by Eskom;
- Electricity supply is dealt with in the IRP;
- Liquid fuels will be dealt with in the 20-Year Liquid Fuel Infrastructure Roadmap which will cover logistical matters relating to pipelines and storage facilities for petroleum products.
- The Gas Utilisation Master Plan (GUMP) will take into consideration the bottlenecks and capacity constraints of the current natural gas infrastructure. All the above will inform the integrated energy planning process and will enable overall enhancement through ongoing periodic iterations to ensure alignment.

1.7.3 *Integrated Resource Plan, 2010 and updated draft 2018*

The Integrated Resource Plan (IRP) was created in order to plan for projected national electricity demand. The IRP 2010-30 was promulgated in March 2011 and was planned to be a "living plan", as it needs to consider changes in the macroeconomic environment, developments in new technologies and changes in national priorities and imperatives, amongst other factors. Since the promulgation of the (IRP) 2010-30 there have been a number of developments in the energy sector in South and Southern Africa. In addition, the electricity demand outlook has changed from that expected in 2010. As a result, the DoE is in the processing of updating the IRP and has recently published a Draft IRP for 2018.

While the IRP 2010-30 remains the official government plan for new generation capacity until it is replaced by an updated plan, there are a number of assumptions that have changed, and these include:

- The changed landscape over the past years, in particular in electricity demand and the underlying relationship with economic growth;
- Electricity demand projection that did not increase as envisaged;
- Technology costs;
- Existing Eskom plant performance that is way below the 80% availability factor;
- Additional capacity committed to and commissioned, as well as technology costs that have declined significantly

The Draft IRP 2018 recommends that 15.1% of the generation capacity should be from wind energy by 2030, as indicated below in **Figure 13** below.

	Coal	Nuclear	Hydro	Storage (Pumped Storage)	PV	Wind	CSP	Gas / Diesel	Other (CoGen, Biomass, Landfill)	Embedded Generation
2018	39 126	1 860	2 196	2 912	1 474	1 980	300	3 830	499	Unknown
2019	2 155					244	300			200
2020	1 433				114	300				200
2021	1 433				300	818				200
2022	711				400					200
2023	500									200
2024	500									200
2025					670	200				200
2026					1 000	1 500		2 250		200
2027					1 000	1 600		1 200		200
2028					1 000	1 600		1 800		200
2029					1 000	1 600		2 850		200
2030			2 500		1 000	1 600				200
TOTAL INSTALLED	33 847	1 860	4 696	2 912	7 958	11 442	600	11 930	499	2600
Installed Capacity Mix (%)	44.6	2.5	6.2	3.8	10.5	15.1	0.9	15.7	0.7	

Installed Capacity
Committed / Already Contracted Capacity
New Additional Capacity (IRP Update)
Embedded Generation Capacity (Generation for own use allocation)

Figure 13: Proposed updated generation plan for the period ending 2030 (draft IRP 2018)

A further iteration of the draft 2018 IRP was presented by the DoE to Nedlac on 6 March 2019 which included 1600MW of wind energy from 2022. However, it must be noted that the IRP remains in draft format and would need to go through a formal process to gazette once final (Ref: https://www.ee.co.za/article/analysis-of-the-updated-draft-irp2019-presented-to-nedlac-on-6-march-2019.html#.XIan4qO6KAM).

1.7.4 *Renewable Energy Independent Power Producer Procurement Program (REIPPPP)*

(The following information was extracted from the Eskom website: Guide to Independent Power Procurement (IPP) processes in South Africa and Eskom**,** June 2010 http://www.eskom.co.za/live/content.php?Item_ID=14324)

The objective of this section is to provide an overview of the processes in the country and within Eskom relating to Independent Power Producers (IPPs). It is important that certain enabling policies, rules and regulations are in place to provide certainty and transparency in the introduction of IPPs.

- Country Process

In August 2009, the Department of Energy (DoE) gazetted the Electricity Regulations on New Generation Capacity under the ERA. The New Generation Regulations establish rules and guidelines that are applicable to the undertaking of an Independent Power Producer (IPP) Bid Programme and the procurement of an IPP for new generation capacity. They also facilitate the fair treatment and non-discrimination between IPPs and the buyer of the energy.

In terms of the New Generation Regulations, the Integrated Resource Plan (IRP) developed by the DoE sets out the new generation capacity requirement per technology, taking energy efficiency and the demand-side management projects into account. This required, new generation capacity must be met through the technologies and projects listed in the IRP and all IPP procurement programmes will be executed in accordance with the specified capacities and technologies listed in the IRP.

A decision that additional capacity be provided by an IPP must be made with the concurrence of the Minister of Finance. Once such a decision is made, a procurement process needs to be embarked upon to procure that capacity in a fair, equitable and transparent process.

The New Generation Regulations set out the procurement process. The stages within a bid programme are prescribed as follows:

i. Request for Qualifications
ii. Request for Bid (referred to as bid window)
iii. Announcement and contracting with the preferred bidder(s).

A successful bidder will be awarded a Power Purchase Agreement (PPA) subject to signature by the Regulator namely Eskom.

1.7.5 *Department of Energy White Paper on Renewable Energy, 2003*

The Department of Energy (DoE) gazetted its White Paper on Renewable Energy in 2003 and introduced it as a "policy that envisages a range of measures to bring about integration of renewable energies into the mainstream energy economy." At that time the national target was fixed at 10 000GWh (0.8Mtoe) renewable energy contribution to final energy consumption by 2013. The White Paper proposed that this would be produced mainly from biomass, wind, solar and small-scale hydropower. It went on to recommend that this renewable energy should to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. Since the White Paper was gazetted, South Africa's primary and secondary energy requirements have remained heavily fossil-fuel dependant, both in terms of indigenous coal production and use, as well as the use of imported oil resources. Alongside this, the projected electricity demand of the country has led the National utility Eskom, to embark upon an intensive build programme to secure South Africa's longer-term energy needs, together with an adequate reserve margin.

1.7.6 *The Northern Cape Provincial Spatial Development Framework (SDF)*

Energy is one of the primary objectives addressed in the SDF. Their energy objectives include promoting the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts. The development of the energy sector holds huge benefit for the Northern Cape which would have significant multipliers in the local economy. It is important that innovative planning be undertaken to provide the necessary

infrastructure and associated amenities to accommodate the industry in an efficient manner. Therefore, in order to ensure the sustainability of the current and future economic sectors and to maximise synergies, it is imperative that industrial development be undertaken in a manner that promotes the principles of environmental integrity, human wellbeing and economic efficiency.

1.7.7 *Aquatic – legislation application to wetlands*

Locally the South African Constitution, seven (7) Acts and two (2) international treaties allow for the protection of wetlands and rivers. These systems are protected from destruction or pollution by the following:

- Section 24 of The Constitution of the Republic of South Africa;
- Agenda 21 – Action plan for sustainable development of the Department of Environmental Affairs and Tourism (DEAT) 1998;
- The Ramsar Convention, 1971 including the Wetland Conservation Programme (DEAT) and the National Wetland Rehabilitation Initiative (DEAT, 2000);
- National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) inclusive of all amendments, as well as the NEM: Biodiversity Act;
- National Water Act, 1998 (Act No. 36 of 1998);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983); and
- Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
- Nature and Environmental Conservation Ordinance (No. 19 of 1974)
- National Forest Act (No. 84 of 1998)
- National Heritage Resources Act (No. 25 of 1999)

NEMA and the Conservation of Agricultural Resources Act (CARA), 1983 (Act No. 43 of 1983) would also apply to this project. These Acts have categorised many invasive plants together with associated obligations on the land owner. A number of Category 1 & 2 plants were observed in several areas of the site under investigation and are listed in the ecological assessment.

Provincial legislation and policy

Currently there are no formalised riverine or wetland buffers distances provided by the provincial authorities and as such the buffer model as described Macfarlane *et al.*, 2017 wetlands, rivers and estuaries was used. Note: The project is located within the Northern Cape Province, but the affected catchments span the provincial boundary, thus both the Northern and Western Cape legislation / requirements have been considered.

Other policies that are relevant include:

- Provincial Nature Conservation Ordinance (PNCO) – Protected Flora. Any plants found within the sites are described in the ecological assessment.
- National Freshwater Ecosystems Priority Areas (NFEPA) – (Nel *et al.*, 2011). This mapping product highlights potential rivers and wetlands that should be earmarked for conservation on a national basis.

1.7.8 *Convention on Biodiversity (CBD)*

South Africa became a signatory to the United Nations Convention on Biological Diversity (CBD) in 1993, which was ratified in 1995. The CBD requires signatory states to implement objectives of the Convention, which are the conservation of biodiversity; the sustainable use of biological resources and the fair and equitable sharing of benefits arising from the use of genetic resources. According to Article 14 (a) of the CBD, each Contracting Party, as far as possible and as appropriate, must introduce appropriate procedures, such as environmental impact assessments of its proposed projects that are likely to have significant adverse effects on biological diversity, to avoid or minimize these effects and, where appropriate, to allow for public participation in such procedures.

1.7.9 *National Veld and Forest Fire Act (Act No. 101 of 1998)*

Provides requirements for veldfire prevention through firebreaks and required measures for fire-fighting. Chapter 4 of the Act places a duty on landowners to prepare and maintain firebreaks. Chapter 5 of the Act places a duty on all landowners to acquire equipment and have available personnel to fight fires.

1.7.10 *Heritage*

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

- National Environmental Management Act (NEMA) Act 107 of 1998 – Regulation 326 (7 April 2017)
    - Basic Environmental Assessment (BA) – Appendix 1 Section (2)(d)
    - Environmental Scoping Report (SR) – Appendix 1 Section (3)(h)(iv) and Appendix 2 section (2)(g)(iv)
    - Environmental Impact Assessment (EIA) – Appendix 3 Section (3)(h)(iv)
- National Heritage Resources Act (NHRA) Act 25 of 1999
    - Protection of Heritage Resources – Sections 34 to 36; and
    - Heritage Resources Management – Section 38
- Mineral and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
    - Section 39(3)

The NHRA is utilised as the basis for the identification, evaluation and management of heritage resources and in the case of CRM those resources specifically impacted on by development as stipulated in Section 38 of NHRA. This study falls under s38(8) and requires comment from the relevant heritage resources authority.

2 ASSUMPTIONS AND LIMITATIONS

2.1 General Assumptions:

- It is assumed that all information provided by the Applicant to the Environmental Team was correct and valid at the time it was provided.

- It is not always possible to involve all Interested and / or Affected Parties (I&APs) individually, however, every effort has / is been made to involve as many interested parties as possible. It is also assumed that individuals representing various associations or parties convey the necessary information to these associations / parties.
- It is assumed that the information provided by the various specialists is unbiased and accurate.
- It is not possible to determine the actual degree of the impact that the development will have on the immediate environment without some level of uncertainties. Actual impacts can only be determined following construction and/or operation commences.

2.2 Specialist Assumptions and Limitations

The following assumptions, uncertainties and gaps in knowledge were encountered by the various specialists:

2.2.1 *Terrestrial Ecology*

- Compiling the list of species that could potentially occur on site is limited by the paucity of collection records for the area. The list of plant species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species that do not occur on site and may miss species that do occur on site. In order to compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons, be undertaken over a number of years and include extensive sampling. Due to time constraints, this was not possible for this study.
- Rare and threatened plant and animal species are, by their nature, usually very difficult to locate and can be easily missed.
- The study excludes Bats, Avifauna, Aquatic Ecology and Invertebrates.
- Cumulative impacts are assessed by adding expected impacts from this proposed development to existing and proposed developments of a similar nature that are within a 50 km radius of the site. However, many of the specialist reports are not in the public domain and were not accessible, with the exception of those provided by the EAP and applicant for this project.

2.2.2 *Avifauna*

- The pre-construction bird monitoring is based on both primary (data collection) and secondary data sources, such as those indicated in section 1.1.5 of the Avifauna Report.
- Any inaccuracies or lack of information in the bibliographic sources consulted could limit this study. In particular, the SABAP1 data is now fairly old (Harrison *et al*., 1997). To surpass this possible problem in the data used, the more recent and updated SABAP2 was consulted. However, the number of lists submitted for this area in the SABAP 2 is not yet adequate for the single use of this more recent data source. Therefore, both South African Bird Atlases (Project 1 and 2) were consulted in a complementary way. Species were considered as being possibly present within the study area if they occurred in any of the pentads, QDGS or wetland sites considered for analysis. Coordinate Avifauna Roadcounts data and Coordinated Waterbird Counts data was also requested for consideration in this study. A final bird list to inform sensitivity has subsequently been produced and tabulated in the final monitoring report (Bioinsight, 2018). Similarly, data from all nearby projects was difficult to attain for the purposes of this report. However, reports from 11 of these surrounding projects were obtained and

considered where considered relevant (such as priority species nesting sites and cumulative impacts etc.).

- As vantage points had good visibility conditions, it was assumed that not only flying birds but also individuals on the ground should be detected. However, large terrestrial birds which do not fly often or spend long periods on the ground, would be more difficult to detect on hilly or wooded areas. This fact directly implies that activity indexes for these species can be underestimated. To deal with this issue a vehicle based transect was set up in the development area. This allowed moving through the area and having different perspectives over topographic features - therefore increasing the chance of detecting these types of birds, though activity indexes obtained through these two different methods cannot be directly compared.
- Vantage point surveys are only conducted during daylight. Therefore, any bird movement occurring at night is not recorded.
- At this stage, no inter-annual variations are taken into consideration as only one year of data has been collected. Nevertheless, the basis for comparisons with subsequent years has been established.
- The recommendations on the current version of the applied guidelines were followed to the maximum extent possible and exceeded whenever feasible. The methodologies implemented were adjusted to the specificities of the area. Compliance and any deviations from the guidelines are presented in this report.
- Mitigation measures pertaining to any avifaunal component that are inherent to the project design, include the complete avoidance of any areas that are considered to have a very high sensitivity (i.e. no-go areas).
- Cumulative impacts are assessed by adding expected impacts from this proposed development to existing and proposed developments with similar impacts, within a 50km radius. The existing and proposed developments that were taken into consideration for cumulative impacts are listed in Appendix 2 of the Avifauna Report (Appendix 6C of the DEIAr).

2.2.3 *Bats*

- The pre-construction bat monitoring is based on both primary (data collection) and secondary data sources, such as those indicated in section 1.1.5 of the Bat Report.
- In South Africa, data on migratory paths of bats is still largely unknown, this limiting the ability to determine if the wind farm might have impact on migratory species.
- Any inaccuracies or lack of information in the bibliographic sources consulted could limit this study. In particular, 8 years have passed since the leading literature that is available for bat distribution in South Africa has been updated (Monadjem *et al*. 2010).
- Bat detectors were installed and used according to the manufacturer's indications. However, data gaps still occurred due to technical limitations of the detector and/or unavoidable malfunctions. Nevertheless, a sampling effort of more than 75% of the year was obtained as per the requirements of the 4.1 Edition of the "South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments – Pre-construction" (Sowler *et al.* 2017).
- Due to unforeseen circumstances, there was a gap in static detector monitoring between 16th October 2016 and 18th August 2018. Regardless, monitoring resumed on September 2018 to cover the outstanding months. It is considered that this gap is no cause for concern as the environment remains very homogenous with not much change observed in the interim (in terms of habitat or climatic variation).

- Mitigation measures pertaining to any bat component that are inherent to the project design, include the complete avoidance of any areas that are considered to have a very high sensitivity (i.e. no-go areas).
- Cumulative impacts are assessed by adding expected impacts from this proposed development to existing and proposed developments with similar impacts, within a 50km radius. The existing and proposed developments that were taken into consideration for cumulative impacts are listed in Appendix 2 of the Bat Report (Appendix 6Dof the DEIAr).

2.2.4 *Aquatic Ecology*

To obtain a comprehensive understanding of the dynamics of both the flora and fauna of the aquatic communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. No base-line long-term monitoring was undertaken as part of this assessment. However, a concerted effort was made to assess as much of the potential site, as well as make use of any available literature, species distribution data and aerial photography. Furthermore, based on the previous assessments undertaken between 2012-2018 in the area this was not foreseen as a huge limiting factor. The level of investigation undertaken is sufficient to inform this assessment.

It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.

For the purposes of this report it is assumed that any existing roads and tracks within the facility will be upgraded, while the new roads and associated transmission lines can avoid or span the observed watercourses as far as possible. A further assumption is that water will be sourced from a licensed resource and not illegally abstracted from any surrounding watercourses, particularly if dust suppression is required.

2.2.5 *Agriculture and soils*

The assessment rating of impacts is not an absolute measure. It is based on the subjective considerations and experience of the specialist but is done with due regard and as accurately as possible within these constraints.

The study makes the assumption that water for irrigation is not available across the site. This is based on the assumption that a long history of farming experience in an area will result in the exploitation of viable water sources if they exist, and none have been exploited in this area.

Cumulative impacts are assessed by adding expected impacts from this proposed development to existing and proposed developments with similar impacts in a 50 km radius. The existing and proposed developments that were taken into consideration for cumulative impacts are listed in Appendix B. SiVEST undertook every effort to obtain the information (including specialist studies, BA / EIA / Scoping and EMPr Reports) for the surrounding developments. However, many of the documents are not currently publically available to download and could therefore not be reviewed during this assessment.

There are no other specific constraints, uncertainties and gaps in knowledge for this study.

2.2.6 *Noise*

- The turbine positions were supplied by the applicant and are accepted as an accurate layout for the purposes of the environmental impact assessment.
- The worst-case scenario impacts were modelled i.e. wind from any direction, not only the prevailing wind, maximum turbine size as required for the site and the worst-case meteorological conditions.
- No wind noise masking effect is considered.
- The noise levels at the identified noise sensitive areas could thus be lower if the wind noise masks the turbine noise emissions.
- For the cumulative impact assessment, it was assumed that all proposed projects would enter into construction. Although this is very unlikely, the assumption was made in order to assess the worst-case scenario.

2.2.7 *Visual*

- The identification of visual receptors involved a combination of desktop assessment as well as field-based observation. Initially Google Earth imagery was used to identify potential receptors within the study area. Where possible, these receptor locations were verified and assessed during a four (4) day site visit which was undertaken between the 18th and the 21st of September 2018. Due to the extent of the study area and the nature of the terrain however, it was only possible to verify a few potentially sensitive receptor locations and as such, a number of broad assumptions have been made in terms of the sensitivity of the receptors to the proposed development. It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the receptor location and on people's perception of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that a visual impact will be experienced.

- Wind turbines are very large structures by nature and could impact on receptors that are located relatively far away, particularly in areas where the terrain is very flat. Given the nature of the receiving environment and the height of the proposed wind turbines, the study area or visual assessment zone is assumed to encompass an area of 8km from the nearest turbine position. The 8 km limit on the visual assessment zone relates to the fact that visual impacts decrease exponentially over distance. Thus, although the wind farm may still be visible beyond 8 km, the degree of visual impact would diminish considerably. As such the need to assess the impact on potential receptors beyond this distance would not be warranted.

- Access limitations and rugged terrain in the study area largely restricted the photographic survey to selected viewpoints along the main roads. Only one of these viewpoints is in close proximity to an identified receptor (VR2) and a photomontage has been provided for this

location. The remaining photomontages do not relate to identified receptors, although they demonstrate the visibility of the proposed turbines across a range of distances.

- Due to access limitations during the site visit, the impact rating assessment of the potentially sensitive visual receptor locations was undertaken via desktop means. Although the nature and sensitivity of these receptors could not be properly established during the field investigation, they were still regarded as being potentially sensitive to the visual impacts associated with the proposed WEF and were assessed as part of the VIA.

- Due to the varying scales and sources of information as well as the fact that the terrain data available for the study area is fairly coarse and somewhat inconsistent; maps and visual models may have minor inaccuracies. As such, minor topographical features or small undulations in the landscape may not be depicted on the Digital Elevation Model (DEM).

- The potential visual impact at each receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides a reasonably accurate indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the WEF development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen as merely a representation of the likely visual impact at a receptor location. In addition, the results of the matrix should be viewed in conjunction with the visual models to gain a full understanding of the likely visual impacts associated with the proposed development.

- No feedback regarding the visual environment has been received from the public participation process to date, however any feedback from the public during the review period of the Draft EIA Report will be incorporated into further drafts of this report.

- The viewshed analysis conducted for this assessment does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. In addition, the analysis is based on relatively coarse-grained terrain data derived from the NGI's 25m DEM and as such may not reflect localised topographic variations which may constrain views. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.

- As the study area lies within the Sutherland Central Advantage Area (not the core area), it is assumed that pilot activated lighting methods, as prescribed by the CAA, will be utilised for obstacle lighting on the turbines and that other lighting on the WEF site will be kept to a minimum. As such, the night-time environment in the study area was not fully investigated and only general measures to mitigate the impact of additional light sources on the ambiance of the nightscape have been provided.

- The assessment of receptor-based impacts has been based on the turbine layout provided by the client. It is however recognised that this is a preliminary layout and is subject to changes based on a number of potential factors, including the findings of the specialist studies. Should

the layout change or the turbine heights increase, a re-assessment of the visual impacts on identified receptor locations would be required.

- This study includes an assessment of the potential cumulative impacts of multiple renewable energy developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at the time of writing the report and where information has not been available, broad assumptions have been made as to the likely impacts of these developments.

- It was not possible to produce visual models (photomontages) for all the potentially sensitive receptor locations. Accordingly, an indicative range of locations was selected for modelling purposes to provide an indication of the possible impacts from different locations within the study area. It should be noted that this modelling is specific to each location, and that even sites in close proximity to one another may be affected in different ways by the proposed WEF development. The visual models represent a visual environment that assumes that all vegetation cleared during construction will be restored to its current state after the construction phase. This is however an improbable scenario as some vegetation cover may be permanently removed which may reduce the accuracy of the models generated. At the time of this study the proposed project was still in the planning stages and as such the turbine layouts, as provided by the client, may change.

- Although associated infrastructure (e.g. substation, roads, powerlines, etc.) has not been included in the visual models, this is not considered to be a major limitation as the visual impact of associated infrastructure would be minor when compared to that of wind turbines.

- It should be noted that the site visit was undertaken in late September 2018, during late winter/early spring. The study area is typically characterised by low levels of rainfall all year round and therefore the season is not expected to affect the significance of the visual impact of the proposed development. In addition, the vegetation cover within the study area is largely dominated by low shrubs and thus vegetation cover is not expected to have a significant effect on the visual impact of the proposed development.

- Clear weather conditions tend to prevail throughout most of the year in this area, and in these clear conditions, wind turbines would present a greater contrast with the surrounding landscape than they would on a cloudy overcast day. Although weather conditions were initially cloudy and overcast during the site visit, conditions cleared later in the week. The weather conditions during the time of the study were therefore taken into consideration when undertaking this VIA.

2.2.8 *Heritage and Palaeontology:*

2.2.8.1 ***Heritage***

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the current dense vegetation cover. As such,

should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

SiVEST under took every effort to obtain the information (including specialist studies, BA / EIA / Scoping and EMPr Reports) for the surrounding developments, however many of the documents are not currently publicly available to download. The information that could be obtained for the surrounding planned renewable energy developments was taken into account as part of the cumulative impact assessment.

*2.2.8.2 **Palaeontology***

The accuracy of Palaeontological Impact Assessments is reduced by several factors which may include the following: the databases of institutions are not always up to date and relevant locality and geological information was not accurately documented in the past. Various remote areas of South Africa have not been assessed by palaeontologists and data is based on aerial photographs alone. Geological maps concentrate on the geology of an area and the sheet explanations was never intended to focus on palaeontological heritage.

Similar Assemblage Zones, but in different areas is used to provide information on the presence of fossil heritage in an unmapped area. Desktop studies of similar geological formations and Assemblage Zones generally assume that exposed fossil heritage is present within the development area. The accuracy of the Palaeontological Impact Assessment is thus improved considerably by conducting a field-assessment.

2.2.9 *Social Impact*

It is assumed that the technical information provided by the project applicant, G7 Renewable Energies (Pty) Ltd and the environmental consultants SiVEST, is credible and accurate at the time of compiling the report.

It is also assumed that the data provided by the various specialists as used in this report are credible and accurate.

The demographic data used in this report was sourced from Statistics South Africa and is based on data gathered during Census 2011. This data is somewhat outdated but where possible is supplemented with the latest Stats SA's survey data such as the Mid-year population estimates and the Quarterly Labour Force Survey. The limitation of this is that this survey data is restricted to a provincial level and does not extend down to a municipal level.

It was also agreed with the project applicant and environmental consultant that contact with land owners would be treated with sensitivity. This, in an effort to retain the positive rapport that the project applicant,

G7 Renewable Energies (Pty) Ltd, had painstakingly established with land owners, and to ensure that the information provided to land owners was of an accurate and consistent nature. Consequently, no site visit was undertaken as the region was sparsely populated and where necessary information could be obtained from the environmental consultants. It was also agreed that if any specific social issues arose that required a site visit and engagement with an affected party that this would be undertaken in a manner acceptable to that or those affected parties.

2.2.10 *Traffic*

- This study is based on the project information provided by SiVEST.
- It is assumed that the turbine positions would be optimized in the future and that the exact and final turbine locations have not been provided. Therefore, turbine corridors were used as an indication of the possible location.
- According to the Eskom Specifications for Power Transformers (Eskom Power Series, Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers), the following dimensional limitations need to be kept when transporting the transformer – total maximum height 5 000mm, total maximum width 4 300 mm and total maximum length 10 500 mm.
- Maximum vertical height clearances along the haulage route is 5.2 m for abnormal loads.
- The imported elements will be transported from the most feasible port of entry, which is deemed to be Port of Saldanha. It is expected that the inverter will be imported and shipped.
- All haulage trips will occur on either surfaced national and provincial roads or existing gravel roads.
- Material for the construction of internal access roads will be sourced locally as far as possible.

3 PROJECT NEED AND DESIRABILITY

It is an important requirement in this 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 15** includes a list of questions based on the DEA's Guideline to determine the need and desirability of the proposed project. It should be noted this table was informed by the outcomes of the EIA Process.

Current energy supply in South Africa is primarily coal-based and, although these resources will last for more than a century if used at current rates, large power plants will need to be replaced over the next 30 years. Coal and other fossil fuels, including oil, produce Carbon dioxide when burned to produce energy. It is now widely accepted that climate change, partially caused by human-generated Carbon dioxide, and is to blame for the higher-than usual incidence of extremely damaging weather experiences (e.g. storms, droughts, melting polar ice-caps). Local air pollution is strongly related to energy supply options, with coal and oil products being major contributors to urban and rural air pollution and acid rain. One of the primary reasons for promoting renewable energy projects is the desire to make South Africa compliant with international treaties regarding climate-change effects.

Renewable energy options are a sustainable energy supply option that can significantly reduce reliance on fossil fuels. Other advantages include employment creation, proximity to point-of-use, minimal demand for water and less reliance on concentrated sources of energy. Greater use of renewable energy would also reduce South Africa's economic vulnerability to the variable costs of imported fuels. International and local communities are increasingly trying to find ways to shift economies towards greater reliance on renewable energy. Greater uptake of renewable energy would furthermore reduce the global risk of climate change, one of the factors taken into account in designing the conservation network in South Africa.

The combined generation capacity of all the renewable energy projects considered here in this EIA (50km buffer) is just less than 3 000 MW, which is more than the average size of one of the 14 coal power stations in South Africa (Eskom's Generation Division has 14 coal-fired power stations with an installed capacity of 38 548 MW, www.eskom.co.za).

Table 15: The guideline on the Need and Desirability's list of questions to determine the "Need and Desirability" of a proposed project.

NEED	
Question	**Response**
1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area)?	
1.1. How were the following ecological integrity considerations taken into account?: 1.1.1. Threatened Ecosystems, 1.1.2. Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure, 1.1.3. Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs"), 1.1.4. Conservation targets, 1.1.5. Ecological drivers of the ecosystem, 1.1.6. Environmental Management Framework, 1.1.7. Spatial Development Framework, and 1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	**The environmental sensitivities present on site were assessed within the Terrestrial Ecological Scoping and Impact Assessment undertaken as part of this EIA Process. The specialist identified all ecological sensitive areas on site that would need to be avoided buy the proposed developments, as well as how suitable to develop within these areas so that the ecological integrity of the area is maintained (refer to Section 5.7 and Appendix 6).** **Following the recommendations from the specialist, *inter alia,* the avoidance of the placement of the turbines and cranes pads on rocky outcrops, the applicant revised the initial layout. Furthermore, based on the recommendations certain road alignments were applied to avoid drainage lines and wetlands.** **A sensitivity map produced based on the input obtained from the various specialist studies is included in Section 4 of this report as well as Appendix 5. Overall the ecology**

NEED	
Question	**Response**
	specialist concluded that based on the vegetation found on the site and the detailed site assessment the impact to this vegetation is considered low due to the presence of this vegetation on other ridges in the area.
1.2. How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	**The environmental sensitivities present on site were assessed within the Terrestrial Ecological Scoping and Impact Assessment undertaken as part of this EIA Process. The specialist identified all ecological sensitive areas on site that would need to be avoided by the proposed development, as well as how to suitably develop within these areas so that the ecological integrity of the areas is maintained (refer to Section 5.7 and Appendix 6H).** **A sensitivity map has been produced based on the input obtained from the various specialist studies is included in Section 5 and Appendix 6 of this Report. Measures to avoid, remedy, mitigate and manage impacts are included within the compiled EMPr, included as Appendix 8 of the Report, which forms part of this EIA Report. Overall the ecology specialist concluded that based on the vegetation found on the site and the detailed site assessment the impact to this vegetation is considered low due to the presence of this vegetation on other ridges in the area.**
1.3. How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	**This development has the potential to impact on the ecology of the area, this includes impacts on the natural vegetation, biodiversity, sensitive habitats and ecosystem function. The overall ecology impact is considered low negative (Section 6.2.1 and Appendix 6H). However, the impact on Loss, degradation or fragmentation of vegetation in CBA remained medium after mitigation the specialist noted that the absolute area (in hectares) is very small**

NEED	
Question	**Response**
	compared to the overall amount of area included within CBAs. **The amount of habitat that will be lost to the project is insignificant compared to the area in hectares of the regional vegetation type that occurs on site and over the entire geographical range of the vegetation type. Measures to avoid, remedy, mitigate and manage impacts have been included within the Ecology Impact Assessment and the EMPr, which forms part 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?	**The description of the potential waste generation is detailed in section 4.2.6 of this report. It is not anticipated that a significant amount of waste will be generated.** **The EMPr includes measures to avoid, remedy, mitigate and manage impacts are included within the compiled EMPr (Appendix 8) which forms part of the EIA report.**
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 was undertaken as part of the assessment for this project. <u>The overall findings of the HIA is that the impact to heritage resources will be of low (negative) significance following mitigation</u>. The cultural landscape in this area is considered to be of low significance and the impacts on the cultural landscape of low significance.** **It is anticipated that the proposed WEF will have a high impact on the cultural landscape. However, it must be noted that this area has been identified as a REDZ and that there are at least four other WEFs approved for the surrounding area. Thus, changes to the current cultural landscape are already in process. A Heritage profile is included in 6E of this Report as well as the EMPr (Appendix 8).**

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?	**This project requires water during the construction phase and minimal water is required during the operational phase. Temporary infrastructure to obtain water from available local sources/ new or existing boreholes including a potential temporary above ground pipeline (approximately 35cm diameter) will be investigated to feed water to the on-site batching plant. Water will potentially be stored in temporary water storage tanks. The necessary approvals from the DWS will be applied for separately.**
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	**The proposed project aims to harness wind energy for the generation of electricity. This project is seen as a source of clean energy and reduces the dependence on non-renewable sources, such as coal fired power plants. The proposed development is located in the Komsberg REDZ. The REDZs represent areas where wind and solar photovoltaic development is being incentivised from resource, socio-economic and environmental perspectives. For more information, please refer to the Alternatives section included in Section 4.3 of this report (this section) for an outline of the suitability of this activity.**

NEED	
Question	**Response**
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?	
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 assessment, i.e. assuming the worst-case scenario will occur and then identifying ways to mitigate or manage these impacts.** **The assessment of cumulative impacts assumed that all proposed projects will be constructed. In reality, only a handful of projects would be constructed and therefore this approach is considered to be precautionary in nature.** **Additionally, based on the specialist findings (birds, bats, terrestrial and aquatic ecology) the layout was amended to avoid sensitive areas where possible. This has been assessed and discussed in more detail in section 4.4 of this report.** **Please refer to Appendix 6 of this report for the full specialist studies. These studies outline the assumptions and limitations that were applicable to the respective studies. This has also been detailed in Section 5 of this report.** **The risk associated with the limits in knowledge is considered to be low.**

NEED	
Question	**Response**
1.9. How will the ecological impacts resulting from this development impact on people's environmental right in terms following: 1.9.1. Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? 1.9.2. Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	**Please refer to Section 6 and Appendix 6 for the specialist studies undertaken. The overall negative impact to people's environmental right in terms of social and visual impacts are considered to be low. In addition, the social assessment found that the employment opportunities created would be considered a medium positive impact.**
1.10. Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	**This is considered and addressed as part of the Socio-Economic Impact Assessment undertaken for this project (included in Appendix 6 and summarised in Section 5.15 of this report).** **The study concluded that "most of the impacts apply over the short term to the construction phase of the project. All of these impacts can be mitigated to within acceptable ranges and there are no fatal flaws associated with the construction of the project. Positive impacts can be enhanced. Although the project will be highly visible and is likely to change the sense of place of the area over the operational phase, it will also have significant benefits in respect of the supply of renewable energy into a grid system heavily reliant on coal powered systems. In this sense the project forms part of a national effort to reduce South Africa's carbon emissions and thus carries with it a significant benefit".**

NEED	
Question	**Response**
	Additionally, "from a Socio-Economic perspective the impacts associated with the proposed WEF are considered to be overall of medium significance with the negative impacts being able to be mitigated to acceptable levels with the implementation of the recommended mitigation measures. There are no obvious fatal flaws associated with the proposed development at a social level. All the proposed layout alternatives appear to be acceptable, and there should be no problem with the proposed development proceeding with environmental authorisation. It is unlikely that any further assessment will be required from a Socio-economic perspective".
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 proposed Rondekop project will have a positive impact on the ecological integrity objectives or targets of the area. This has been discussed in detail in the Socio-Economic impact assessment summarised in Section 5.15 of this report and the full impact assessment is included in Appendix 6 of this report.** **The proposed Rondekop WEF will therefore be aligned with the vision and goals of the DM and the LM.**
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 the Alternatives section included in Section 4.3 of this report (this section) for an outline of the suitability of this activity.**
1.13. Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	**Please refer to the summary of the Ecology Impact Assessment in Section 5.7of this EIA Report and the full Terrestrial ecology specialist study in Appendix 6H of this report.**
2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	

NEED	
Question	**Response**
2.1.1. The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,	**The Karoo Hoogland's IDP calls for economic interventions in sector development (agricultural, tourism and renewable energy).** **The proposed Rondekop WEF will therefore be aligned with the vision and goals of the LMs.** **The proposed project will also be supportive of the IDPs' objective of creating more job opportunities.** **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 250 (full-time equivalent) employment opportunities will be created during the construction phase and 20 permanent opportunities 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 (on a national level) while also be providing advanced skills transfer and training to the local communities and creating contractual and permanent employment in the area.**
2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integration of segregated communities, need to upgrade informal settlements, need for densification, etc.),	**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.)	**Please refer to Section 5 and 6.2 of this report for a description of the receiving environment and impact assessment, respectively. The impact of the proposed**

NEED	
Question	**Response**
	project on cultural/heritage areas (archaeology and palaeontology) have been assessed in the form of a Heritage Impact Assessment attached as Appendix 6E and summarised in Section 5.14. **The proposed project site is currently being used for agricultural purposes, predominantly grazing. Should the proposed project proceed, ~ 114 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 Impact Assessment (Appendix 6A and summarised in Section 5.11 was undertaken as part of this Scoping report and is included within the report to reflect the impact of the proposed project in terms of the land use and agricultural potential. All agricultural impacts of the proposed development are assessed as being of low significance.**
2.1.4. Municipal Economic Development Strategy ("LED Strategy").	**Please refer to the Socio-Economic Impact Assessment summarised in Section 5.15 and included in Appendix 6 for an outline of how the LED**
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?	**Please refer to the Socio-Economic Impact Assessment summarised in Section 5.15 and included in Appendix 6G for an outline of the social impacts that could occur due to the proposed development of the WEF.**
2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	
2.4. Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long term? Will the impact be	

NEED	
Question	**Response**
socially and economically sustainable in the short- and long-term?	
2.5. In terms of location, describe how the placement of the proposed development will:	
2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other,	**Please refer to the Socio-Economic Impact Assessment summarised in Section 5.15 and included in Appendix 6 for an outline of the positive impacts associated with the creation of employment opportunities that could be created by the solar facility.**
2.5.2. reduce the need for transport of people and goods,	**Not applicable. This is a renewable energy project proposal.**
2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	**Not applicable. This is a renewable energy project proposal.**
2.5.4. compliment other uses in the area,	**A Soils and Agricultural Impact Assessment was undertaken to determine the impact on the current land-use. Refer to Section 5.11 and Appendix 6 for a summary of the study and the full study, respectively. The preferred project site is currently being used for agricultural purposes, predominantly grazing. Should the proposed project proceed, approximately 114 ha of the land will be developed on and it is not expected that this will significantly threaten the agricultural activities present on site as it will be undertaken in tandem.**
2.5.5. be in line with the planning for the area,	
2.5.6. for urban related development, make use of underutilised land available with the urban edge,	**Not applicable. The proposed project is located within a rural area and the site is zoned for agricultural use.**
2.5.7. optimise the use of existing resources and infrastructure,	**The proposed project will connect to the Eskom Komsberg Substation, and will make use of existing access roads as far as possible. It will also make use of the excellent onsite wind resource.**
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	**This project is a renewable energy project and not related to bulk infrastructure expansion.**

NEED		
Question		**Response**
	reconstruction priorities of the settlement),	
2.5.9.	discourage "urban sprawl" and contribute to compaction/densification,	**Please refer to the Socio-Economic Impact Assessment summarised in Section 5.15 and included in Appendix 6 for management measures on how to manage the impact associated with the "disruption of local social structures as a result of the construction work force and in-migration of job seekers".**
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,	**Based on the findings of this scoping, the proposed project would <u>not</u> have a significant ("high") negative impact on the receiving environment, with the implementation of suitable mitigation measures (Section 6 and will therefore not go against sustainable land development practices and processes. In addition, the proposed project will be designed according to relevant national specifications and standards which are regarded as best practice in the renewable energy sector. In addition, the proposed WEF is partially located in a REDZ and the development proposal will therefore be aligned with national planning priorities.**
2.5.12.	take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	**Please refer to the Alternatives section included in Section 4.3 of this report (this section) for an outline of the selection and suitability of this activity.**
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),	**Please refer to the Socio-Economic Impact Assessment summarised in Section 5.15 and included in Appendix 6G. In addition, as noted in this section of the report, the Applicant will ultimately own the project and, if successful, will compile an Economic Development Plan which will be compliant**

NEED	
Question	**Response**
	with REIPPPP requirements and will inter alia set out to achieve the following: • **Create a local community trust or similar (as required by REIPPPP) which has an equity share in the project life to benefit historically disadvantaged communities;** • **Initiate a skills development and training strategy to facilitate future employment from the local community; and** • **Give preference to local suppliers for the construction of the facility.** • **Support local community upliftment projects and entrepreneurship through socio-economic and enterprise development initiatives.**
2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	**A Heritage Impact Assessment was undertaken as part of the assessment for this project. Please refer to section 5.14 and Appendix 6E The overall findings of the HIA is that the impact to heritage resources will be low (negative) significance.**
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?	**This facility is proposed partially in REDZ 2. Several WEFs (Table 108 for an outline of the WEFs proposed in a 50 km radius) are proposed in the area, which lends itself potentially to a renewable energy development area.**
2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	
2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	**Please refer to the Social Impact Assessment summarised in Section 5.15 and included in Appendix 6G.**
2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	
2.6.3. Based on the limits of knowledge and the level of risk, how and to what	

NEED	
Question	**Response**
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?	**Please refer to the Socio-Economic Impact Assessment summarised in Section 5.15 and included in Appendix 6G.**
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?	

NEED	
Question	**Response**
2.12. What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	
2.13. What measures were taken to:	
2.13.1. ensure the participation of all interested and affected parties,	**The Public Participation Process (PPP) for the proposed WEF that has been undertaken to date and will still be undertaken as part of the EIA phase included in the Report (Appendix 7) and summarised in Section 8. The Scoping Report was released for a 30-day commenting period to all the relevant authorities and stakeholders. The PP comment period ran from 14 November 2018 – 14 December 2018. All I&APs were notified once the FSR was submitted to the DEA as well as of the acceptance of the FSR. The DEIAr will be released for a 30-day commenting period to all relevant stakeholder and authorities. Various methods will be employed to notify potential (I&APs) of the proposed project, namely, through an advert, site notices on site and in Sutherland and notification letters.** **The Scoping and EIA process has taken cognisance of all interests, needs and values espoused by all interested and affected parties, including occupiers. Opportunity for public participation has been provided to all I&APs throughout the Scoping Phase and will be provided during the EIA phase in terms of the 2014 EIA Regulations, as amended.**
2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	
2.13.3. ensure participation by vulnerable and disadvantaged persons,	
2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	
2.13.5. ensure openness and transparency, and access to information in terms of the process,	
2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge,	
2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein was promoted.	
2.14. Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	**Please refer to the Socio-Economic Impact Assessment summarised in Section 5.15 and included in Appendix 6G.**

NEED	
Question	**Response**
2.15. What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	**An EMPr has been developed to address health and safety concerns and is included in the EIA report (Appendix 8). An Environmental Control Officer (ECO) will be appointed to monitor compliance.**
2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1. the number of temporary versus permanent jobs that will be created,	**Please refer to the Socio-Economic Impact Assessment summarised in Section 5.15 and included in Appendix 6G.**
2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),	
2.16.3. the distance from where labourers will have to travel,	
2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits),	
2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	
2.17. What measures were taken to ensure:	
2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment,	**Legislation, policies and guidelines, which could apply to impacts of the proposed project on the environment, have been considered. The scope and content of this scoping report have been informed by applicable integrated environmental management legislation and policies. This has been included in Section 1 of this EIA report.**
2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	**The PPP for the proposed Rondekop WEF that was undertaken as part of the Scoping phase has been included in the EIA Report (summarised in Section 8) This scoping report was released for a 30-day commenting period to all the relevant authorities and**

NEED	
Question	**Response**
	stakeholders and were given an opportunity to comment during the 30-day public review period. Various methods were employed to notify potential (I&APs) of the proposed project, namely, through an advert, site notices on site and in Sutherland and notification letters. **The scoping and EIA process has taken cognisance of all interests, needs and values espoused by all interested and affected parties. Opportunity for public participation were and will continue to be provided to all I&APs throughout the scoping and EIA process in terms of the 2014 EIA Regulations, as amended.**
2.18. What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	**The outcomes of this scoping and EIA process and the associated conditions of the EA (should it be granted) will serve to address this question.**
2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	**The proposed mitigation measures included in the EMPr and summarised in Section 13.1 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. Wind Energy Facilities 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 the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental	**The EMPr which is included in the EIA report (Appendix 8) must form part of the contractual agreement and be adhered to by both the contractors/workers and the applicant.**

NEED	
Question	**Response**
damage or adverse health effects will be paid for by those responsible for harming the environment?	
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?	**Please refer to the Alternatives section included in Section 4.3 of this report (this section) for an outline of the selection and suitability of this activity.**
2.22. Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	**Please refer to Section7.9 of this report for a summary of the cumulative impacts.**

3.1 National Renewable Energy Requirement

In 2010 South Africa (SA) had 44,157MW of power generation capacity installed. Current forecasts indicate that by 2025, the expected growth in demand will require the current installed power generation capacity to be almost doubled to approximately 74,000MW (IRP, 2018).

This growing demand, fuelled by increasing economic growth and social development within Southern Africa, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmental impact, climate change and the need for sustainable development. Despite the worldwide concern regarding GHG emissions and climate change, South Africa continues to rely heavily on coal as its primary source of energy, while most of the countries renewable energy resources remain largely untapped (DME, 2003). There is therefore an increasing need to establish a new source of generating power in SA within the next decade.

The use of renewable energy technologies, as one of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of Eskom's long-term strategic planning and research process. It must be remembered that wind energy is plentiful, renewable, widely distributed, clean and reduces greenhouse gas emissions when it displaces fossil-fuel derived from electricity. In this light, renewable wind energy can be seen as desirable.

The REIPPP programme and the competitiveness nature of the bidding process has resulted in significant lowering of solar and wind tariff prices since 2011. Solar PV, for example, was bid with tariffs of R2.80/kWh at the inception of the REIPPPP in 2011, to 62c/kWh on average at present. Further projects will increase the competitive nature of the REIPPP program and further result in cost savings to South African consumers.

3.2 National Renewable Energy Commitment

In support of the need to find solutions for the current electricity shortages, the increasing demand for energy, as well as the need to find more sustainable and environmentally friendly energy resources, South Africa has embarked on an infrastructure growth programme supported by various government initiatives. These include the National Development Plan (NDP), the Presidential Infrastructure Coordinating Commission (PICC), the Department of Energy's Integrated Resource Plan, the National Strategy for Sustainable Development, the National Climate Change Response White Paper, the Presidency of the Republic of South Africa's Medium-Term Framework, and the National Treasury's Carbon Tax Policy Paper.

The Government's commitment to growing the renewable energy industry in South Africa is also supported by the *White Paper on Renewable Energy* (2003) which sets out the Government's principals, goals and objectives for promoting and implementing renewable energy in South Africa. In order to achieve the long-term goal of achieving a sustainable renewable energy industry, the Department of Energy has set a target of contributing 17,8*GW* of renewable energy to the final energy consumption by 2030. This target is to be produced mainly through, wind and solar; but also, through biomass and small-scale hydro (DME, 2003; IRP, 2010).

3.3 Wind Power Potential in South Africa and Internationally

Onshore wind energy technology is the most commonly used and commercially developed renewable energy technology in South Africa, wind is abundant and inexhaustible (DEA Guideline for Renewable Energy, 2015). Wind energy is one of the lowest-priced renewable energy sources and is economically competitive (www.wasaproject.info).

3.4 Site Specific Suitability

The selection of a potential Wind Energy Facility project site included several key aspects including wind resource, grid connection suitability as well as environmental, competition, topography and access. This study was undertaken by CES in 2009 and included a high-level screening of potential environmental and socio-economic issues, as well as 'fatal flaws' to determine suitable areas for project development.

This project is also partially located in the Komsberg REDZ 2 which is a geographical area that has been identified on a strategic planning level to have reduced negative environmental impacts but high commercial attractiveness (due to its proximity to, *inter alia*, the national grid) and socio-economic benefit to the country. The development of wind energy is therefore important for South Africa to reduce its overall environmental footprint from power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability.

This region of the Northern Cape Province in South Africa has above average wind resource potentials. Based on high quality wind measurements conducted since 2010, the wind resource in this area also proved to be exceptionally high, further evidenced by the first phase's ability to bid the lowest tariff (R0.56/kWh) of all wind farm projects in round 4 of the REIPPPP in August 2014. Advanced wind modelling conducted for an area about 25 km around the first phase showed that the surrounding terrain

(which includes the Rondekop site) held very similar, if not better wind potential and therefore was feasible for further wind farm development.

Wind resource is only one driver of site selection, the other aspects should be considered when holistically evaluating a project.

Grid connection suitability is the next element which drives the project location. Long connection lines have increased environmental impacts as well as add increased costs to the project development. The Rondekop project site has good grid connection potential as the project is likely to connect to the existing regional Komsberg Substation, the facility is located approximately 45km from the substation, thereby minimising the need for an extensive grid network upgrade or long power line.

Environmental is a key aspect that Rondekop considers when evaluating a wind project. The project should be developed in a sustainable and ecologically friendly manner ensuring its development has the least possible impact on the land on which it will be built.

Other key criteria which refines the site selection on a micro level include competition, topography and access.

The project site has topography which is suitable for the development of a wind project. The region does have several ongoing EIA developments, with four (4) 140MW projects currently under construction. The project site can be accessed easily via Matjiesfontein on the N1, the vehicle will turn north onto the R354, left at DR02249 and left at R356. Upgrade of the district gravel road will be done by the current preferred bidder projects to allow for direct access to site.

The farms are currently used for agricultural purposes, specifically commercial sheep farming. The proposed development is not envisioned to impact farming activities after the construction phase had been completed. The site is therefore considered to be suitable from a land use perspective.

3.5 Local Need

The Northern Cape Province faces numerous socio-economic and developmental challenges, which are not unique to the Province and are observed throughout the country. Reducing poverty through social development and achieving a sustainable economic growth in the Province through diversification and transformation of its economy are at the forefront of the provincial government's developmental objectives (Northern Cape Government, 2008; Office of the Premier of the Northern Cape, 2012).

The Northern Cape Province is endowed with biological diversity, mineral resources, and renewable energy sources such as solar and wind. Therefore, the achievement of its developmental objectives is envisaged to be done by capitalising on the local resources and specifically, the development of the agriculture and agro-processing, mineral extraction and mineral beneficiation, fishing and aquaculture, manufacturing, and tourism industries (Northern Cape Government, 2008; Office of the Premier of the Northern Cape, 2012).

Ensuring availability of inexpensive energy is seen to be fundamental to growing competitive industries in the Province (Northern Cape Government, 2008). However, provincial government advocates the development of the energy sector in the Province through “the promotion of the adoption of energy applications that display a synergy with the province’s natural resource endowments” (Northern Cape Government, 2008). This implies the use of renewable energy sources and natural gas fields that the Province enjoys (Northern Cape Government, 2008). Provincial strategic documents specifically promote the development of large-scale renewable energy projects, similar to the one under analysis, which among others, would contribute to renewable energy targets set by national government and allow to secure supply, tackle climate change and address the needs of the Province (Office of the Premier of the Northern Cape, 2012).

Harnessing renewables is also seen to contribute towards alleviation and reduction of poverty in the Province. One of the interventions that underpins the provincial approach to poverty eradication is “utilisation of natural resources in a sustainable manner”, which in turn implies the transition to greater exploitation of renewables, including wind (Northern Cape Government, 2008).

Considering the above, it can be concluded that the development of the proposed project follows the provincial priorities and developmental objectives. From a spatial perspective, the project also does not appear to raise any red flags.

Similar to the Province, the district and local municipality where the proposed project is to be established, also face challenges of poverty, unemployment, and income inequality. Therefore, the municipalities’ developmental priorities largely coincide. Although much of the focus within district and local municipalities relates to the development and delivery of basic services, infrastructure, agriculture and tourism, the development of a green economy remains to be seen as an additional fundamental pillar of growth. Thus, in like manner with the national and provincial policies, the district and local municipalities have placed considerable emphasis on the prioritisation and promotion of renewable energy resources within their boundaries. As previously mentioned, the Namakwa DM has a competitive advantage in the energy sector as wind, solar, wave, nuclear and natural gas energy plants have all been identified as suitable investments in the area. Amongst other sectors such as agriculture and tourism, renewable energy is thus prioritised. Several large-scale renewable energy projects have already been included in the IDP of the district. The district also recognises the importance of the agriculture and tourism industries in the area and promotes their development and transformation, especially eco-heritage (Namakwa DM, 2014).

Based on the above reviewed IDPs and SDF’s, it is evident that the proposed project fits well with the plans to diversify the provincial, district and local economies through investment in renewable energy projects.

4 TECHNICAL DESCRIPTION

The Rondekop WEF will have an energy generation capacity (at 132kV point of utility connection) of up to 325 megawatt (MW), and will include up to 48 wind turbines, each between 3MW and up to 8MW in nameplate capacity with a foundation of up to 30 m in diameter and up to 5 m in depth. The hub height of each turbine will be between 90 m and up to 140 m and its rotor diameter between 100 m and up to 180 m. Each turbine will have a permanent compacted hard standing laydown area (also known as a

crane pad) of 90 m x 50 m during construction and for ongoing maintenance purposes for the lifetime of the turbines.

Each turbine will have electrical transformers (690V/33kV) adjacent to it (typical footprint of 2 m x 2 m but can be up to 10 m x 10 m at certain locations) to step up the voltage to 33kV.

Underground 33kV cabling between turbines will be buried along access roads, where feasible, with overhead 33kV lines grouping turbines to crossing valleys and ridges outside of the road footprints to get to the onsite 33/132kV substation. The total footprint of this onsite substation will be approximately 2.25 ha. The 33kV powerline and 33kV substation yard footprint will be assessed in this wind farm EIA and the 132kV footprint in a separate basic assessment process. The current applicant will remain in control of the low voltage (33kV) components of the 33/132kV substation, whereas the high voltage components (132kV) of this substation will likely be ceded to Eskom shortly after the completion of construction.

Internal access roads and access roads to site and access roads will be required and will be up to 12 m wide, including all structures for stormwater control. Where possible, existing roads will be upgraded. Turns will have a radius of up to 50 m for abnormal loads (especially turbine blades) to access the various turbine positions.

The four (4) wind measuring lattice masts, between 90 m -140 m in height, will be strategically placed within the wind farm development footprint to collect data on wind conditions during the operational phase. The final height of the lattice masts will be exactly the same as the final hub height of the wind turbines.

The temporary infrastructure includes a fenced (~6 m high) construction camp, on-site concrete batching plant and new or existing water abstraction, transportation and storage amenities for the batching plant.

The campsite structures will be used for offices, administration, operations and maintenance buildings during the operational phase.

The potential existing and/or new boreholes, 35 cm diameter pipeline and temporary storage tanks will require necessary approvals from the DWS will be applied for separately.

These layout alternatives have been discussed in more detail in **Chapter 9**.

4.1 Project Location

The proposed Wind Energy Facility is located approximately 45 km south-west of Sutherland in the Karoo Hoogland Local Municipality in the Namakwa District Municipality, Northern Cape Province.

The application site included the following properties:

Table 16: **Application Site properties**

FARM DESCRIPTION	21 DIGIT SURVEYOR GENERAL CODE
Ashoek No 224	C07200000000022400000
Remainder of Bloem Fontein No 192	C07200000000019200000
Portion 1 of Bloem Fontein No 192	C07200000000019200001
Portion 1 of Lange Huis 174	C07200000000017400001
Remainder of Hout Hoek No 191	C07200000000019100000
Remainder of Roodeheuvel No 170	C07200000000017000000
Portion 1 of Roodeheuvel No 170	C07200000000017000001
Portion 1 of Urias Gat No 193	C07200000000019300001
Portion 2 of Urias Gat No 193	C07200000000019300002
Remainder of Vinke Kuil 171	C07200000000017100000
Remainder of Venters Kraal No 166	C07200000000016600000
Portion 1 of Venters Kraal No 166	C07200000000016600001
Portion 3 of Venters Kraal No 166	C07200000000016600003
Remainder of Wind Heuvel No 190	C07200000000019000000
Portion 1 of Wind Heuvel No 190	C07200000000019000001
Remainder of Zeekoegat No 169	C07200000000016900000
Remainder of Farm 220	C07200000000022000000

APPLICATION SITE		
CENTRE POINT COORDINATES		
POINT	**SOUTH**	**EAST**
Midpoint	S32° 44' 20.72"	E20° 17' 26.90"

The project site has been identified based on wind resource, grid connection suitability, competition, flat topography, land availability, landowner support and site access. The buildable area of the site will however be determined by sensitive areas identified during the Scoping and EIA phase.

The proposed development location is shown in the locality map **Figure 2** below.

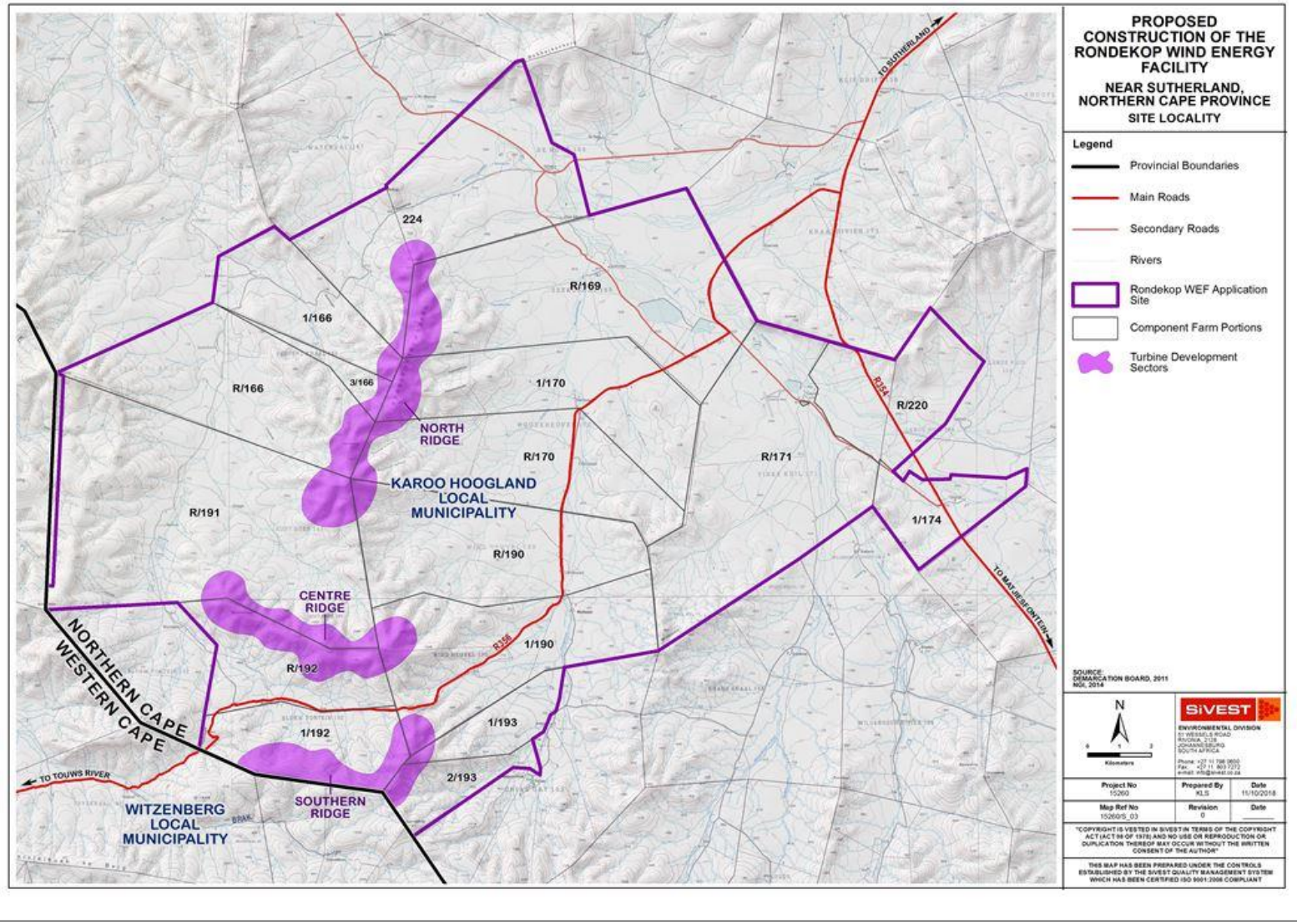

Figure 2: Proposed Wind Energy Facility site locality map

4.2 Wind Energy Facility Technical details

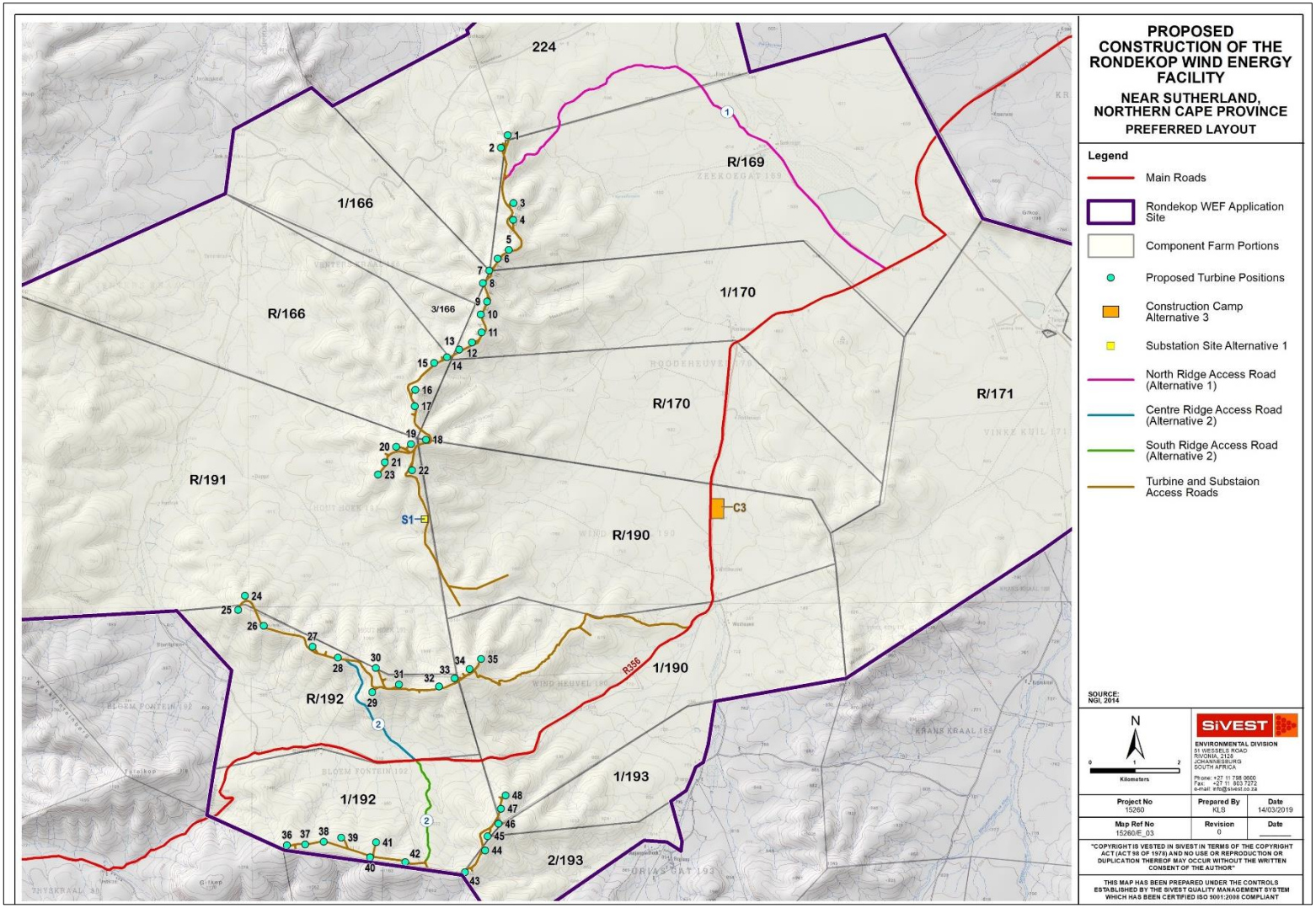

Figure 14: Proposed Wind Energy Facility Refined Layout map

The key technical details and infrastructure required is presented in the table below **(Table 17).**

Table 17: Rondekop Wind Energy Facility summary of key components

PROJECT	TECHNICAL DETAILS	
Rondekop Wind Energy Facility	Turbines	Up to 48 turbines (between 3MW and *up to* 8MW in nameplate capacity) Hub height: between 90 m and up to 140 m Rotor diameter: between 100 m and up to 180m Crane pad (90m x 50m) Foundation of 30m diameter and up to 5 m in depth Total footprint up to ~ 25 ha
	Access roads	Up to 12m wide Total footprint up to ~ 73,2 ha of which ~39 ha is upgrading existing roads Six (6) alternatives, 2 per ridge; preference for Three (3) access roads, 1 per ridge
	Substation	One (1) 33/132kV substation Total footprint ~2,25ha Six (6) alternatives
	Construction camp	One (1) construction camp for use during construction phase Offices and other buildings for use during operational phase ~ 13 ha Fences around construction camp will be ~ 6 m high Six (6) alternatives
	Electrical infrastructure	Electrical transformers (690V/33kV) adjacent to each turbine (typical footprint of 2 m x 2 m but can be up to 10 m x 10 m at certain locations) to step up the voltage to 33kV. Underground 33kV cabling between turbines buried along access roads, where feasible, with overhead 33kV lines grouping turbines to crossing valleys and ridges outside of the road footprints to get to the onsite 33/132kV substation.
	Masts	Up to 4 (the height will be the same as the final wind turbine hub height) wind measuring lattice masts

4.2.1 *Turbines*

There will be up to 48 wind turbines constructed with a capacity up to 325MW. The electrical generation capacity for each turbine will range between 3MW and up to 8MW, depending on the final wind turbine selected for the proposed development. The wind turbines and all other project infrastructure will be placed strategically within the application site based on environmental constraints. The size of the wind turbines will depend on the developable area and the total generation capacity that can be produced as a result. The wind turbines will therefore likely have a hub height of up to 140 m and a rotor diameter of up to 180 m (**Figure 15**). Each wind turbine will have a foundation diameter of up to 30 m and will be approximately 5 m deep, however, these dimensions may be larger if geotechnical conditions dictate as such. Permanent compacted hardstanding laydown areas (also known as crane pads) will be required for each wind turbine during construction and for ongoing maintenance purposes for the lifetime of the project. These crane pads will be up to 90m x 50m per turbine which equates to a total footprint of 21.6 hectares and total turbine foundations would equate to ~ 3.4 ha for 48 positions.

It must be noted that the final selection for the turbine type will be conducted after the project has been selected as a Preferred Bidder project under the DoE REIPPPP. This is as a result of technology constantly changing as time progresses.

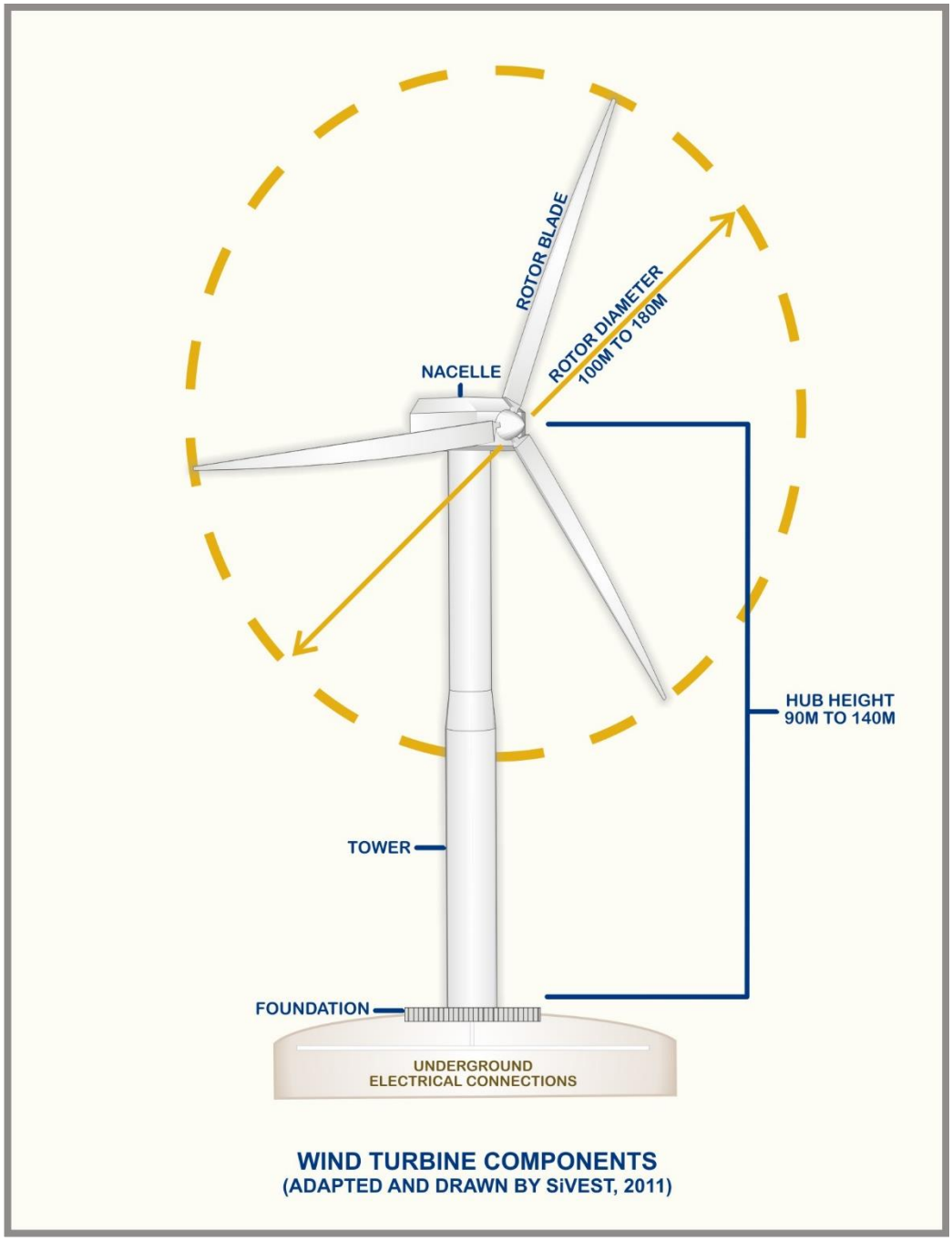

Figure 15: Typical Components of a Wind Turbine with specifications as proposed by Rondekop Wind Farm (Pty) Ltd.

4.2.2 *Electrical Transformers*

Electrical transformers with a capacity of 690V/33 kV will be situated adjacent to each of the proposed wind turbines in order to step up the voltage to 33 kV. It should be noted that the typical footprint of such a transformer is approximately 2 m x 2 m but can be up to 10 m x 10 m at certain locations.

4.2.3 *Underground Cabling / Overhead Power Lines*

The wind turbines will be connected (**Figure 16**) to the proposed 33/132kV on-site substation using a combination of:

- underground 33kV cables, buried along access roads where feasible; and
- Outside of the road footprints and where topography and environmental concerns preclude underground cabling, overhead 33kV power lines will be used.

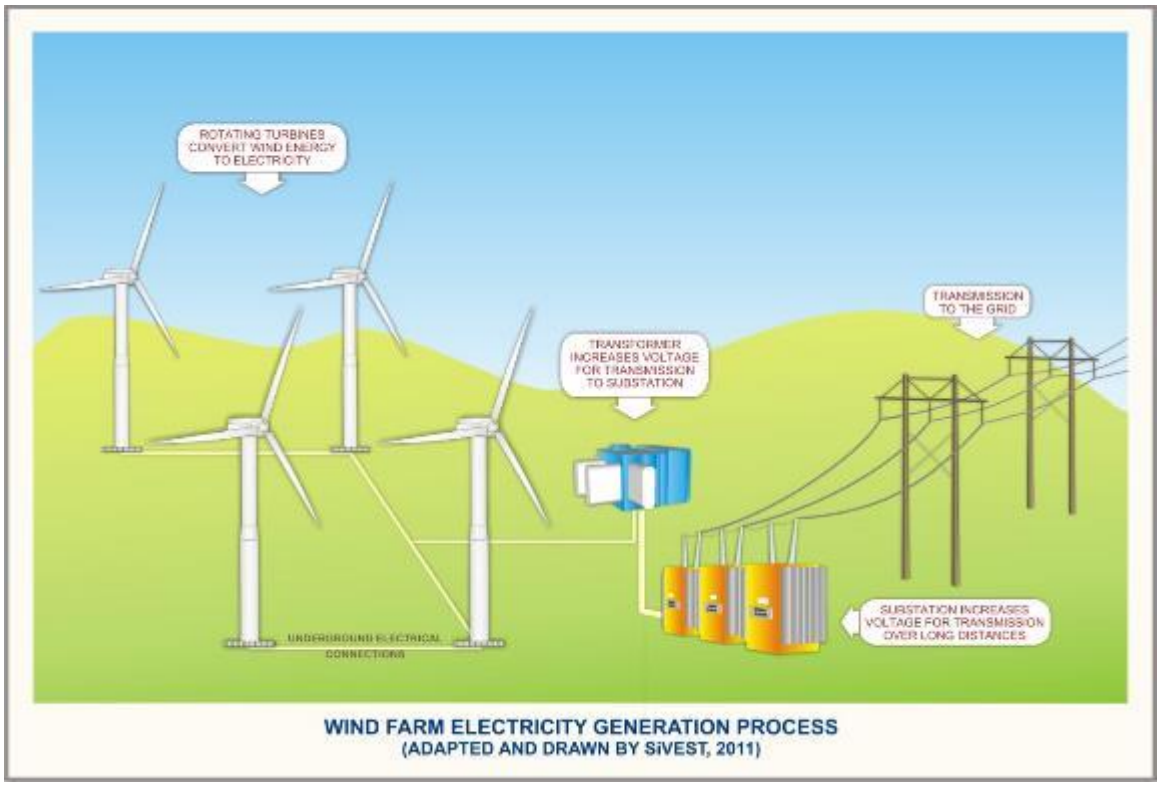

Figure 16: Conceptual WEF electricity generation process showing electrical connections

The associated 132kV line and substation yard will be assessed in a separate Basic Assessment.

Proposed access roads to site, between turbines and the substation will be up to 12m in width with all relevant stormwater infrastructure. Where possible, existing roads will be upgraded. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various turbine positions. Access roads to the site will be approximately 9 m wide while access roads to the substation will be approximately 6 m wide.

4.2.4 *Temporary Infrastructure*

Temporary infrastructure in the form of a construction camp will be required for the construction phase of the proposed development. The construction camp will have a footprint of approximately 13 ha, which will include an on-site concrete batching plant for use during the construction phase. The site will also accommodate offices, administration, operations and maintenance buildings required during the operational phase.

4.2.5 *Other Associated Infrastructure*

Other infrastructure includes the following:

- Up to four (4) wind measuring lattice masts will be strategically placed within the wind farm development footprint to collect data on wind conditions during the operational phase. The height of these masts will be the same as the hub height of the selected turbine type.
- Fencing, around the construction camp and batching plant, will be up to 6 m high where required.
- Temporary infrastructure to obtain water from available local sources *via* new or existing boreholes including a potential temporary above ground pipeline (approximately 35cm diameter) to feed water to the on-site batching plant. Water will potentially be stored in temporary water storage tanks. Lengths of pipes and volumes of abstraction and water storage tanks will be determined at final design and applied for in a separate application to DWS.

4.2.6 *Service Provisions: Water Sewage and waste requirements*

Rondekop Wind Farm (Pty) Ltd will first consult with the local municipality in order to confirm the supply of services (in terms of water, waste removal, sewage and electricity) for the proposed project. The municipalities have been consulted as part of the 30-day public review period of the DSR and FSR and will be consulted further for the DEIAR. **At this stage, no services are required from them.** The applicant will make use of private contractors to ensure that the services are provided. The applicant will also ensure that adequate waste disposal measures are implemented by obtaining waste disposal slips for waste removed from site (in line with the EMPr).

An outline of the services that will be required is discussed in detail below.

4.2.6.1 ***Water Usage***

- During the construction phase a temporary water supply for construction will need to be installed that will make use of existing or new boreholes and will comprise of over-ground water pipelines and tanks to the construction camp. Approval for any additional water requirements will form part of a separate water use authorization approvals process. A maximum of 50 000 m3/ annum would be required for the construction phase.

- During the operational phase, water use will be minimal.

4.2.6.2 ***Sewage Usage***

- The project will require sewage services during the construction and operational phases. Low volumes of sewage or liquid effluent are estimated during both phases. Liquid effluent will be limited to the ablution facilities during the construction and operational

phases, which will be regularly serviced and emptied by a suitable (private) contractor on a weekly basis. It is anticipated that sewage will be disposed of in the municipal waterborne sewage system, if the municipality confirms capacity.

4.2.6.3 Solid Waste Generation

The quantity of waste generated will depend on the construction phase, which is estimated to extend between 18 to 24 months. During the construction phase, the following waste materials are expected:

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

Solid waste will be managed via the EMPr (**Appendix 8**), which incorporates waste management principles. General waste will be collected and temporarily stockpiled in skips in a designated area on site and thereafter removed, emptied into trucks, and disposed at a registered waste disposal facility on a regular basis by an approved waste disposal Contractor (i.e. a suitable Contractor). Any hazardous waste (such as contaminated soil as a result of spillages) will be temporarily stockpiled (for less than 90 days) in a designated area on site (i.e. placed in leak-proof storage skips), and thereafter removed off site by a suitable service provider for safe disposal at a registered hazardous waste disposal facility. Waste disposal slips and waybills will be obtained for the collection and disposal of the general and hazardous waste. These disposal slips (i.e. safe disposal certificates) will be kept on file for auditing purposes as proof of disposal. The waste disposal facility selected will be suitable and able to receive the specified waste stream (i.e. hazardous waste will only be disposed of at a registered/licenced waste disposal facility). The details of the disposal facility will be finalised during the contracting process, prior to the commencement of construction. Where possible, recycling and re-use of material will be encouraged. Waste management is further discussed in the EMPr. During the operational phase of the proposed Rondekop WEF, waste generation will be minimal and will be disposed of a licenced landfill site.

4.2.6.4 Electricity Requirements

In terms of electricity supply for the construction phase, the developer will utilise a combination of generators and solar systems. During the operational phase, the wind farm will not have any electricity requirements as the project itself will generate and distribute electricity.

4.3 Alternatives

As per the EIA Regulations, feasible and reasonable alternatives are required to be considered during the EIA process. Alternatives are defined in Chapter 1 of the EIA Regulations as “different means of meeting the general purpose and requirements of the activity”. These alternatives may include:

(a) The property on which or location where it is proposed to undertake the activity;

(b) The type of activity to be undertaken;
(c) The design or layout of the activity;
(d) The technology to be used in the activity;
(e) The operational aspects of the activity; and
(f) The option of not implementing the activity.

Each of the alternatives are discussed in relation to the proposed project in the sections below.

4.3.1 *The properties on which or location where it is proposed to undertake the activity*

The proposed site was selected through an environmental and social pre-feasibility assessment commissioned by the applicant for several sites within the Roggeveld area. This study was undertaken by in independent environmental consultant, CES, in 2009 and included a high-level screening of potential environmental and socio-economic issues, as well as 'fatal flaws' to determine suitable areas for project development. The consideration of a number of criteria resulted in the selection of the site by the applicant.

The applicant selected the preferred project location through an in-depth assessment on three scales, namely National, Regional and finally on a local scale, based on environmental, legislative and technical parameters.

A detailed overview of the site selection process is provided below.

4.3.1.1 ***National Alternatives***

The applicant first and foremost considered the wind resource of South Africa as the wind resource is the main determining factor of project success due to the highly competitive nature of the REIPPPP. Secondly, environmental and social considerations were used to refine the viable locations. Based on these high-level considerations, the applicant identified fourteen (14) areas in South Africa that could potentially have significant wind resources. These 14 areas were subjected to an environmental and social pre-feasibility assessment (CES, 2009). The significance of the following environmental and socio-economic issues and potential fatal flaws were identified to rank the 14 potential sites:

- Visual impact including proximity to scenic areas, sense of place, prevailing land use, areas of conservation or recreational use, topography, proximity to dense settlements and shadow flicker;
- Noise/ acoustic considerations including proximity to existing ambient noise sources and settlements;
- Impacts to birds and bats based on proximity to important bird areas and migratory routes;
- Terrestrial fauna and flora assessed in terms of local species and biomes;
- Hydrology impacts in terms of the presence of wetlands and surface water features;
- Heritage impacts;
- Road access and powerline servitudes;
- Potential safety impact considerations; and
- Proximity to airfields.

The pre-feasibility assessment determined that two sites namely Swellendam 2 and Uitvlugt were potentially fatally flawed as indicated in **Table 18** below. Although the other sites had various areas of concern/ risk, they were not deemed fatally flawed from an environmental and social perspective and required further investigation.

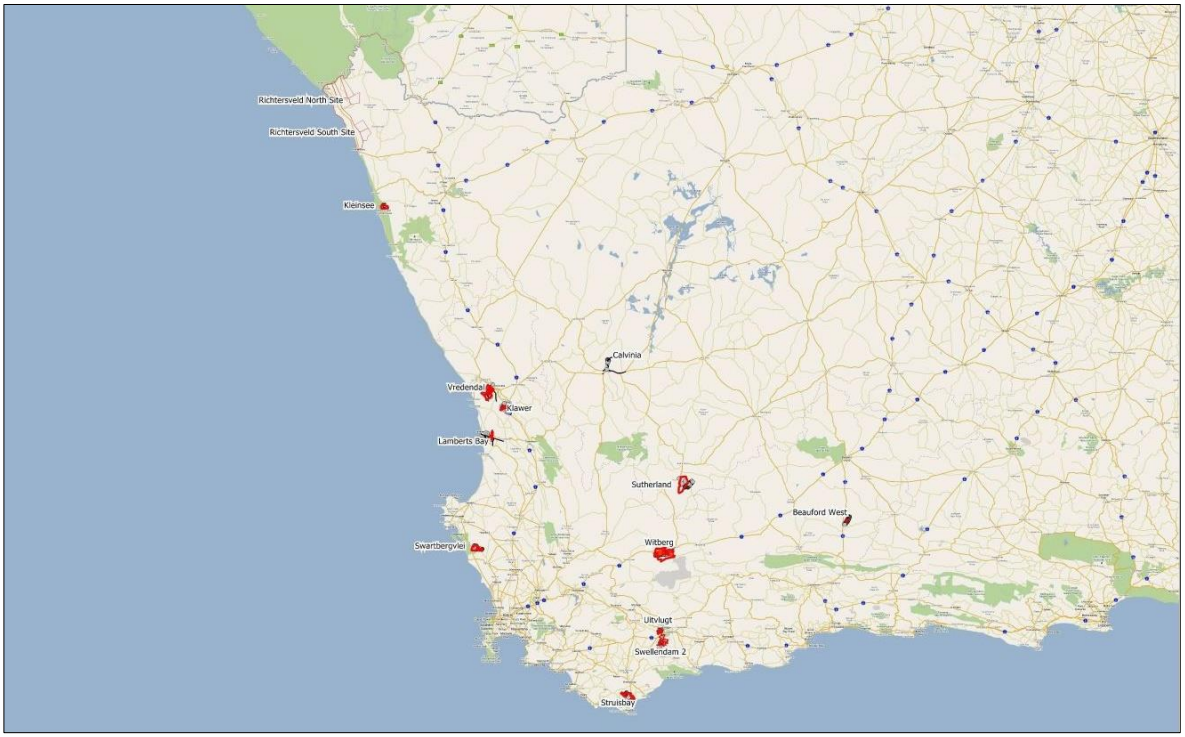

Figure 3: Overview map of the areas investigated in the pre-feasibility assessment and site selection process

Table 18: Outcome of the environmental and social pre-feasibility assessment

Site	Visual	Acoustic	Birds	Bats	Fauna	Flora	Hydrology	Heritage	Access	Safety	Motivation
Kleinsee	Minor	Minor	Minor	Major	Minor	Minor	Minor	Minor	Minor	Minor	This project was considered a no-go. The Kleinsee mining area where this site is located was subjected to a tender for land rights with conditions seen technically and financially.
Richtersveld South	Medium	Minor	Medium	Medium	Minor	Minor	Minor	Medium	Minor	Minor	This project was considered a no-go. Unfavourable wind conditions.
Richtersveld North	Medium	Minor	Medium	Medium	Minor	Minor	Minor	Medium	Minor	Minor	The applicant proceeded with the development of this site as technical and environmental pre-screenings seemed favourable.

Site	Visual	Acoustic	Birds	Bats	Fauna	Flora	Hydrology	Heritage	Access	Safety	Motivation
Lamberts Bay	Extreme	Minor	Medium	Major	Minor	Minor	Minor	Minor	Minor	Minor	The applicant proceeded with the development of this site. Further wind resource evaluation showed that the site had low wind resources.
Witberg	Medium	Minor	Major	Major	Minor	Minor	Minor	Minor	Medium	Minor	The applicant proceeded with the development of this site. All technical and environmental pre-screenings seemed favourable.
Beaufort West	Medium	Minor	Major	Medium	Minor	Minor	Medium	Minor	Minor	Minor	This project was considered a no-go. Unfavourable wind conditions.

Site	Visual	Acoustic	Birds	Bats	Fauna	Flora	Hydrology	Heritage	Access	Safety	Motivation
Sutherland (Roggeveld)	Minor	Minor	Major	Major	Minor	Minor	Minor	Medium	Medium	Minor	Sutherland was considered a no-go due to unfavourable wind condition and proximity to the astronomy centre, but the applicant proceeded with Roggeveld
Vredendal	Extreme	Minor	Medium	Major	Minor	Minor	Minor	Medium	Minor	Minor	This project was considered a no-go. High environmental risk and less favourable wind conditions
Calvinia	Medium	Minor	Minor	Major	Medium	Medium	Minor	Minor	Minor	Minor	This project was considered a no-go. Limited space and grid connection options for a feasible wind farm.

Site	Visual	Acoustic	Birds	Bats	Fauna	Flora	Hydrology	Heritage	Access	Safety	Motivation
Klawer	Extreme	Minor	Medium	Major	Minor	Minor	Medium	Minor	Minor	Minor	The applicant proceeded with the development of this site. All technical and environmental pre-screenings seemed favourable.
Struisbay	Major	Minor	Extreme	Extreme	Minor	Minor	Minor	Minor	Minor	Major	This project was considered a no-go. High environmental risks in terms of birds and bats.
Swartbergvlei	Extreme	Major	Extreme	Extreme	Minor	Medium	Minor	Minor	Minor	Major	This project was considered a no-go. High environmental risks in terms of birds and bats.
Uitvlugt	Extreme	Minor	Extreme	Extreme	Minor	Medium	Minor	Minor	Minor	Minor	This project was considered a no-go.

Site	Visual	Acoustic	Birds	Bats	Fauna	Flora	Hydrology	Heritage	Access	Safety	Motivation
Swellendam2	Extreme	Extreme	Extreme	Major	Minor	Medium	Minor	Minor	Minor	Medium	This project was considered a no-go.

The applicant proceeded to assess the remaining sites to determine technical feasibility, including:

- Wind resource: Analysis of publicly available information, proprietary information and specialist on-site analysis of weather data to determine the wind resource;
- Site extent to ensure that enough land can be secured to allow for a minimum number of wind turbines to make the project feasible;
- Grid access: Grid access and the distance to a viable connection point were key considerations in terms of prioritising appropriate sites;
- Land suitability: The current land use of the site properties was an important consideration for site selection in terms of limiting disruption to existing land use practices; and
- Landowner support: The selection of sites where the landowners are supportive of the development of renewable energy is essential for ensuring the success of the project.

These initial pre-feasibility assessments assisted the applicant with forthcoming decisions as to which site alternatives to be prioritised for the development of wind energy facilities.

In addition, the DEA's strategic environmental assessment (SEA) for wind and solar farms identified an area of about 160 x 60 km, centred on Eskom's Komsberg substation, as one of only eight priority areas for wind farm development in South Africa. The SEA itself is based on a large number of environmental and technical criteria and therefore supports the applicant's findings.

*4.3.1.2 **Regional Alternatives***

The applicant proceeded with researching the greater Roggeveld area. An EIA process commenced in mid-2010 for a 750MW WEF. Before completing the process, DEA requested that separate EIA processes be undertaken for each 140MW WEF in accordance with the maximum generation capacity per WEF as stipulated under the Department of Energy's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The original 750MW project was therefore divided into various phases, each with a potential to generate 140MW.

These detailed EIAs undertaken as part of the earlier 750MW project Roggeveld, lead the applicant to believe that there is an acceptable risk of environmental impacts by wind farms in this area. Based on high quality wind measurements conducted since 2010, the wind resource in this area also proved to be exceptionally high, further evidenced by the first phase's ability to bid the lowest tariff (R0.56/kWh) of all wind farm projects in round four (4) of the REIPPPP in August 2014. Advanced wind modelling conducted for an area about 25 km around the first phase showed that the surrounding terrain (which includes the Rondekop site) held very similar, if not better wind potential and therefore was feasible for further wind farm development.

[1] Coastal & Environmental Services, (2009b): Pre-Feasibility Assessment for 14 proposed wind energy facility sites in South Africa, CES, Grahamstown.

Prior to the initiation of the EIA, alternative properties were considered for the location of the proposed development. The site selection of the potential wind project included several key aspects including:

- Social Pre-Feasibility Assessments and Landowner Support: one of the considerations was the positive impact the WEF can have on the local communities residing within 50 km in dire need of development to create job opportunities. A WEF proposed on private land can only proceed with the consent of the landowner which was also a key consideration in site selection. Landowner notification has been included in Appendix in 7H.
- Wind Resource: to ensure that a project can compete against other wind farms bids in the highly competitive REIPPPP space, wind turbines must be placed in the areas with the highest wind resources. In the case of Rondekop WEF, ridgelines proved the most suitable in this respect due to flow acceleration effects whereas average wind speeds in the valleys between tend to be very low for the opposite reasons.,
- Environmental: desktop assessment undertaken in 2009 informed this site selection process,
- Grid Connection Suitability as well as Level of Competition: a WEF intended to feed into the national grid must be placed as close as possible to an existing substation in order to reduce the distance of a new 132kV powerline required to not only reduce project costs, but also reduce environmental impacts,
- Topography: determine the suitable areas for placement of turbines without excessive blasting or filling required. This is based on maximum allowable slopes, setbacks from farmsteads, setbacks from neighbouring farms required by provincial land use regulations and finally required buffers from Eskom power lines, and
- Access: the accessibility.

*4.3.1.3 **Local Alternatives***

The main project components are the wind turbines themselves which inform the layout of associated infrastructure such as roads, crane pads, substation and power line routes. Within the Rondekop area, detailed consideration was given to selecting areas that would be suitable for turbine placement or project infrastructure. In the selection process, some areas within the local site were eliminated for the following reasons:

- Social and landowner support: As confirmed by the social specialist, the unemployment rate of Central Karoo district is over 23%. The project has the ability to create significant job creation during the construction phase and limited job opportunities during the operational phase. The applicant also received consent from all affected landowners to undertake the proposed development (see Appendix 7H for notification of landowners).
- Wind resource: the applicant has measured wind on the proposed site for over three consecutive years and therefore have a very good understanding of where the ‘windy’ spots are within the project site and specifically where the hot spots are within the three proposed ridges (north, center and south).
- Environmental: This site was selected by Rondekop based on the above criteria ahead of other regional farms due to the cumulative assessment of all criteria. This internal process was undertaken by CES (Coastal Environmental Services) in 2009 and included a high-level screening of potential environmental and socio-economic issues, as well as ‘fatal flaws’ to

determine suitable areas for project development. The consideration of a number of criteria resulted in the selection of the site by the applicant.

- The CES 2009 assessment considered aspects such as visual, noise, bat, birds, ecology, hydrology and heritage and concluded that the site is not fatally flawed.
- Grid connection: the Komsberg main transmission substation is currently being upgraded whether after it can accommodate the electricity generated by Rondekop. The close proximity to Komsberg is therefore a major beneficial aspect of the project location.
- Topography and access: the study area is situated in an area with moderately to steeply sloping topography. The elevation on site varies from 675 to 1207 m above sea level, an elevation difference of approximately 500 m across a distance of around 5 km. The mountains form north-south and east-west running ridges, the northern half called the Kareefonteinsberg and local peaks called Rondekop, Windheuwel, Vaalberg, Aasvoelkop and Gifkop. The ridges drop quite steeply into valleys that fall into the surrounding plains, where dry stream beds coalesce into the Uriasgatrivier, Droeriveir and Windheuwelsrivier, all joining up to run into the Tankwarivier that runs northwards out of the study area. The plains are seldom flat and continue the downward slope from the mountains, but at a lower incline. The project site is easily accessible via the R354 and R356. The site is therefore considered highly suitable for the proposed development and no other locations are being considered the topography and access is favourable for the proposed WEF.

Therefore, one location alternative namely Rondekop WEF consisting of the properties listed in **Table** is the only and preferred location alternative.

4.3.2 *The type of activity to be undertaken;*

Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view. Based on the hilly to mountainous terrain, the climatic conditions and current land use being agricultural, it was determined that the Rondekop site would be best-suited for a WEF, instead of any other type of renewable energy technology. The terrain is not flat enough for a photovoltaic facility and there is not enough rainfall in the area to justify a hydro-electric plant. Therefore, no other renewable energy technology has been considered. Through the project development process, Rondekop Wind Farm (Pty) Ltd will continue to consider various wind turbine designs in order to maximise the capacity of the site. Therefore, no technology alternatives are feasible for assessment at this stage of the project other than a WEF.

One type of activity is therefore considered namely wind energy facility to generate energy from a renewable source of energy, wind energy.

4.3.3 *The design or layout of the activity;*

4.3.3.1 ***Turbine Layout Alternatives***

One layout alternative will be assessed for Rondekop WEF based on 48 wind turbines with associated crane pad areas and other associated infrastructure. The proposed layout is spread over three (3) ridges namely northern ridge, centre ridge and southern ridge. The proposed layout will be amended,

as needed, based on specialist input and input from I&APs. All maps including a turbine layout map is attached as **Appendix 5.**

One layout alternative for wind turbines with incremental amendments throughout planning phase has been proposed.

*4.3.3.2 **Road Layout Alternatives***

Various access road alternatives are currently proposed to connect the R356 to the three ridges. The proposed access to the site is from the tarred R354 connecting Matjiesfontein and Sutherland, turning north-west onto R356 provincial gravel road and heading west from where the access roads branches off. The six (6) access road alternatives (two (2) per ridge) branch off the R356.

Considering that the proposed Rondekop WEF is to be developed on three (3) separate ridges, there are two (2) proposed access roads to each ridge, therefore six (6) access road alternatives in total.

Three access road alternatives would connect the public R356 road to the new wind farm road network between the turbines on the ridges namely:

North ridge

- Access road alternative North 1, route is approximately 11.8 km in length, almost all of which comprises an existing farm road that will need to be upgraded; or
- Access road alternative North 2 is approximately 12.8 km in length and branches off the R356 and follows an existing farm road that will need to be upgraded.

Centre ridge

- Access road alternative Centre 1 is approximately 2.6 km in length and branches off the R356 to the north and connects between turbine 31 and 32; or
- Access road alternative Centre 2 is approximately 3.1 km in length and branches off the R356 and connects to the site near turbine 28.

Southern ridge

- Access road alternative South 1 is approximately 1.9 km in length and branches off the R356 to the south and connects near turbine 45; or
- Access road alternative South 2 is approximately 4.2 km in length and branches off the R356 to the south and connects near turbine 42.

All six (6) alternatives were assessed with the road network and one access road per ridge would require environmental authorisation in order to enable access to all three ridges. The internal access roads are assessed as part of all access road alternatives.

Each road section will be buffered by approximately 200 m to allow for incremental alternatives i.e. reroute within the buffer in order to avoid any sensitive features identified during the detailed specialist assessments.

*4.3.3.3 **Construction Camps***

Six (6) alternative construction camp layouts, including the area required for a batching plant, will be assessed namely construction camp:

- Construction Camp Alternative 1 is located adjacent to Access Road Alternative North 1 on the Farm 224 Ashoek at the end of an existing farm road;
- Construction camp Alternative 2 is also located adjacent to Access Road Alternative North 1 on the Farm 224 Ashoek at the end of an existing farm road;
- Construction Camp Alternative 3 is located adjacent to and east of the R356 public road on the Remainder of farm 190 Wind Heuvel;
- Construction Camp Alternative 4 is located at the intersection of an existing 4x4 track and the R356 on portion 1 of farm 190 Wind Heuvel;
- Construction Camp Alternative 5, is located at the intersection of the R356, access road alternative centre 2 and access road alternative south 1 extending to the north on the remainder of farm 192 Bloem Fontein; and
- Construction Camp Alternative 6 is located to the west of access road alternative centre 2 north of the R356 on the remainder of farm 192 Bloem Fontein.

Substations

Six (6) onsite 33/132kV substation location alternatives were identified based on technical studies which considered aspects such as topography, earth works and levelling, environmentally sensitive features, electrical losses, turbine locations and existing agricultural use. All six (6) positions are located relatively in the centre of the facility.

- Substation alternative 1 is located south of turbine 22 on the remainder of farm 191 Hout Hoek;
- Substation alternative 2 is located south of substation alternative 1 on the remainder of farm 191 Hout Hoek;
- Substation alternative 3 is located south east of substation alternative 2 on the remainder of farm 190 Wind Heuvel;
- Substation alternative 4 is located north east of substation alternative 3 on the remainder of farm 190 Wind Heuvel;
- Substation alternative 5 is located west of construction camp alternative 4 along an existing 4x4 jeep track; and
- Substation alternative 6 is located adjacent to access road alternative center 1 to the east on portion 1 of farm 190 Wind Heuvel.

4.3.4 *The technology to be used in the activity;*

Based on the hilly to mountainous terrain, the climatic conditions and current land use being agricultural, it was determined that the Rondekop site would be best-suited for a WEF, instead of any other type of renewable energy technology. The terrain is not flat enough for a photovoltaic facility and there is not enough rainfall in the area to justify a hydro-electric plant. Therefore, no other renewable energy technology has been considered. Through the project development process, Rondekop Wind Farm (Pty) Ltd will continue to consider various wind turbine designs in order to maximise the capacity of the site. Therefore, no technology alternatives are feasible for assessment at this stage of the project other than a WEF.

One technology alternative for wind turbines with incremental amendments throughout planning phase for turbine specifications has been proposed and assessed.

4.3.5 *The operational aspects of the activity;*

No operational alternatives were assessed in the EIA.

4.3.6 *No-go alternative*

The 'no-go' alternative is the option of not fulfilling the proposed project. The current agricultural land uses would continue including rural agriculture (small stock grazing), limited hunting and with limited tourism.

On a regional scale, the no-go alternative is also not preferred. Renewable energy facilities are key to the success of South Africa's plan to build resilience against climate change. South Africa currently relies almost completely on fossil fuels as a primary energy source (approximately 90%). Coal combustion in South Africa is the main contributor to carbon dioxide emissions, which is one of the main greenhouse gasses that has been linked to climate change.

An emphasis has been placed on securing South Africa's future power supply through alternative power generation source and to honour its commitments made under the Copenhagen Accord and subsequent Paris Agreement (ratified during November 2016) to mitigate climate change challenges.

DEA acknowledges the risks posed to South Africa by climate change confirming that "*South Africa has been experiencing the severe effects of drought conditions catalysed by the worst El Nino event in decades. The rising sea temperatures in the Pacific Ocean that resulted in increased temperatures and reduced rainfall in many parts of the world, was exacerbated by rising global temperatures associated with climate change. South African scientists and weather forecasters warn that this is what can be expected in the decades to come, if ambitious global action is not taken urgently to reduce the concentration of greenhouse gases in the atmosphere*" (DEA, 2016b).

With an increasing demand in energy predicted and growing environmental concerns about fossil fuel-based energy systems, the development of large-scale renewable energy supply schemes is important for increasing the diversity of domestic energy supplies and avoiding energy imports in the country.

The no-go option is a feasible option; however, this would prevent Rondekop from contributing to the environmental, social and economic benefits associated with the development of the renewables sector. Accordingly, all specialists have assessed the no-go option, although not the preferred option.

4.4 Proposed project development activities

4.4.1 *Design and Planning*

Since 2009, Rondekop has spent a significant amount of time measuring the wind resources onsite as well as ensuring financial and technical feasibility of the WEF and importantly to secure the required land rights.

Meteorological masts were installed onsite during 2015 to gather wind speed data to correlate the data with other meteorological data to produce a wind model for the project area. A measurement campaign of at least 12 months is necessary to ensure verifiable data is obtained. This data advises the economic feasibility of the project and informs the proposed layout of the wind turbine positions. Turbines are placed in the areas with highest wind resource, which in the case of this project area, is on the top of the ridges.

The project layout, including the placement of each individual turbine and subsequent proposed access roads, was finalised during the EIA process undertaken to date. The initial project layout was amended to provide project layout (Initial Layout **Figure 4** and **Figure 5**) which was informed by the findings of the specialist studies in the Scoping phase, excluding birds and bats and including a desktop terrestrial ecology assessment which included the identification of sensitive biophysical areas that need to be avoided. Thereafter the layout was amended based on sensitives identified by the bird, bat and terrestrial ecology assessment (Refined Layout **Figure 6**and **Figure 7**). Summary of changes are depicted in **Figure 8**.

All specialists were requested to comment on the final layout (**Figure 6**and **Figure 7**). See **Section 9** for an overview of the changes made from the initial layout to revised layout. Should the DEA issue a positive EA, the development of the project would continue to progress. Based on technical and financial factors, a turbine supplier would be selected, and the site development plan would be finalised for the specific selected turbine. The final micro-sited layout will be submitted to DEA along with a final EMPr for approval, as this is standard practice.

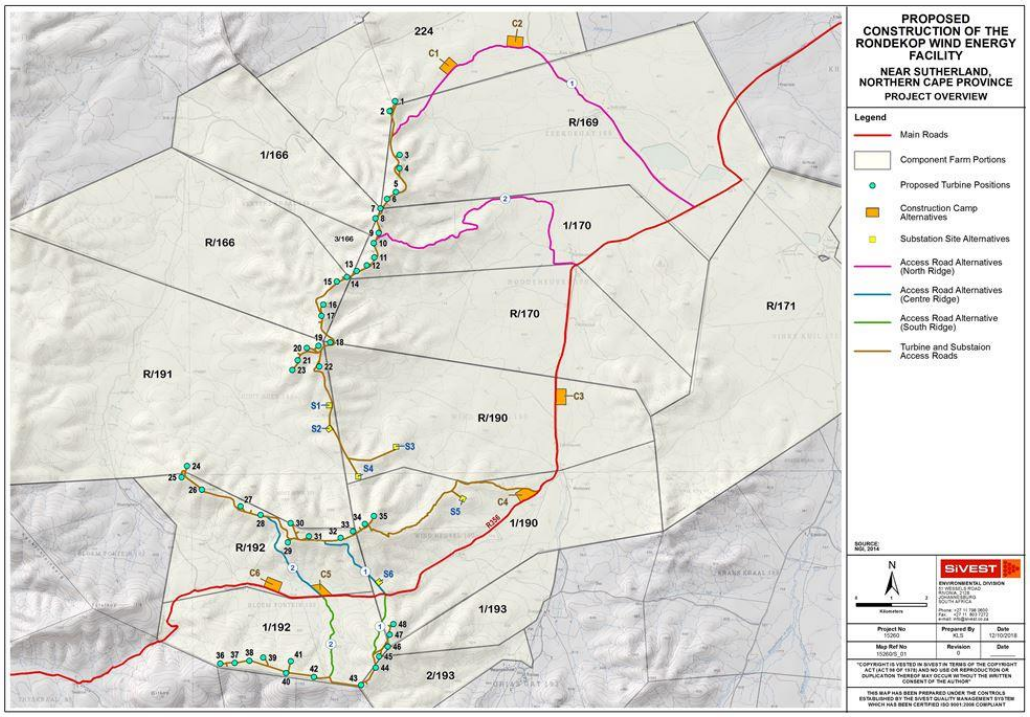

Figure 4: Initial Layout Map

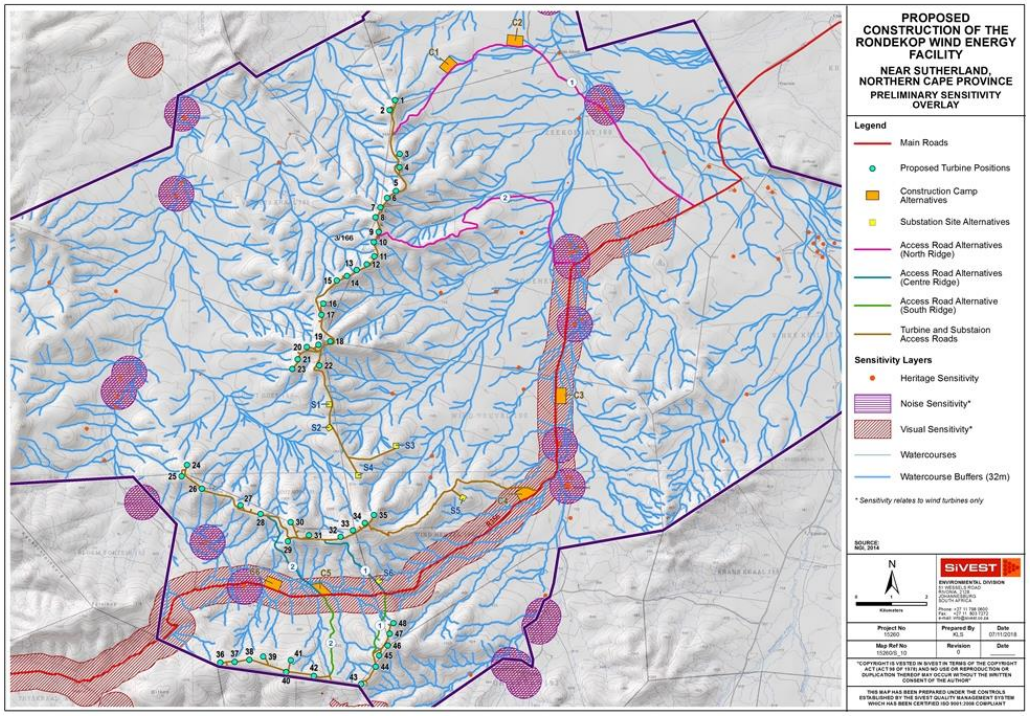

Figure 5: Initial Layout Map and sensitivity overlay

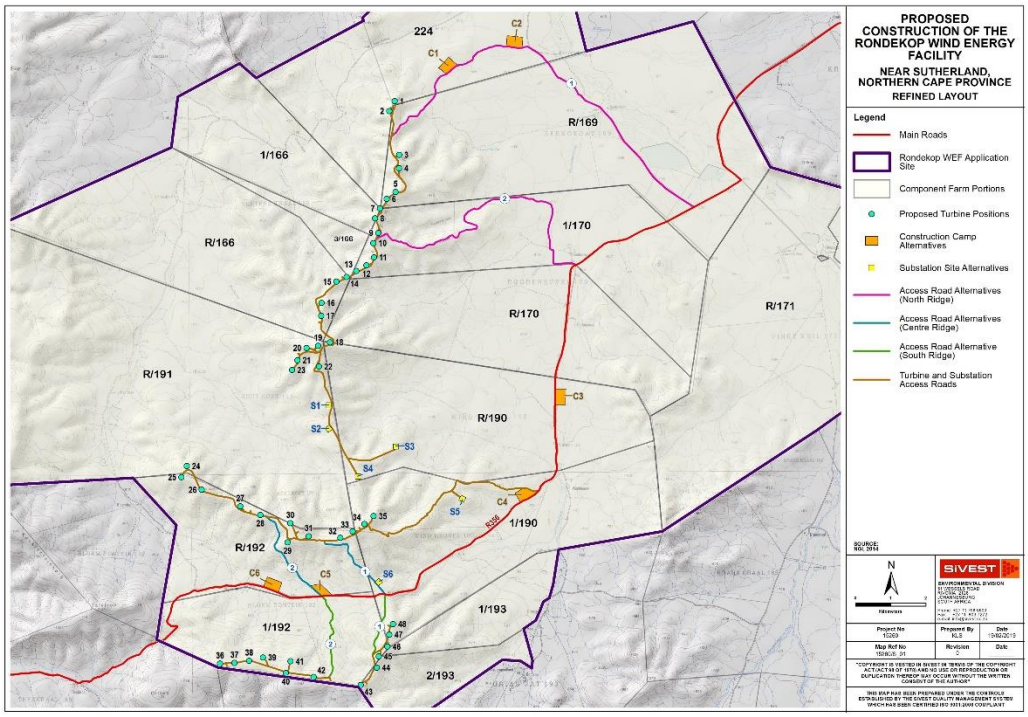

Figure 6: Refined Layout Map

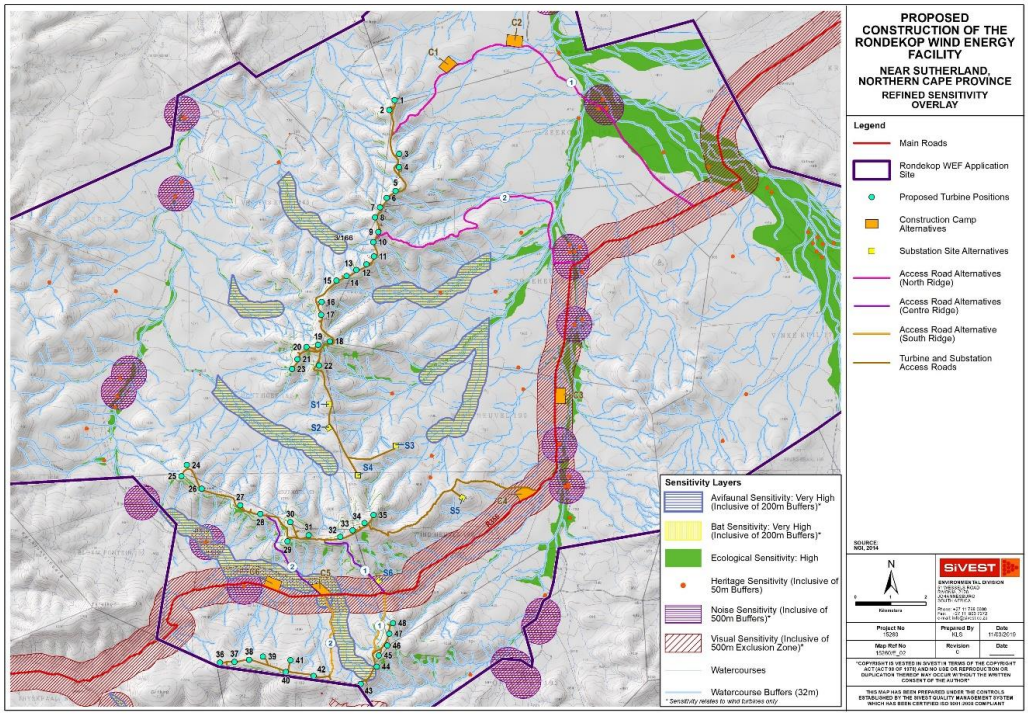

Figure 7: Refined Layout Map and refined sensitivity overlay

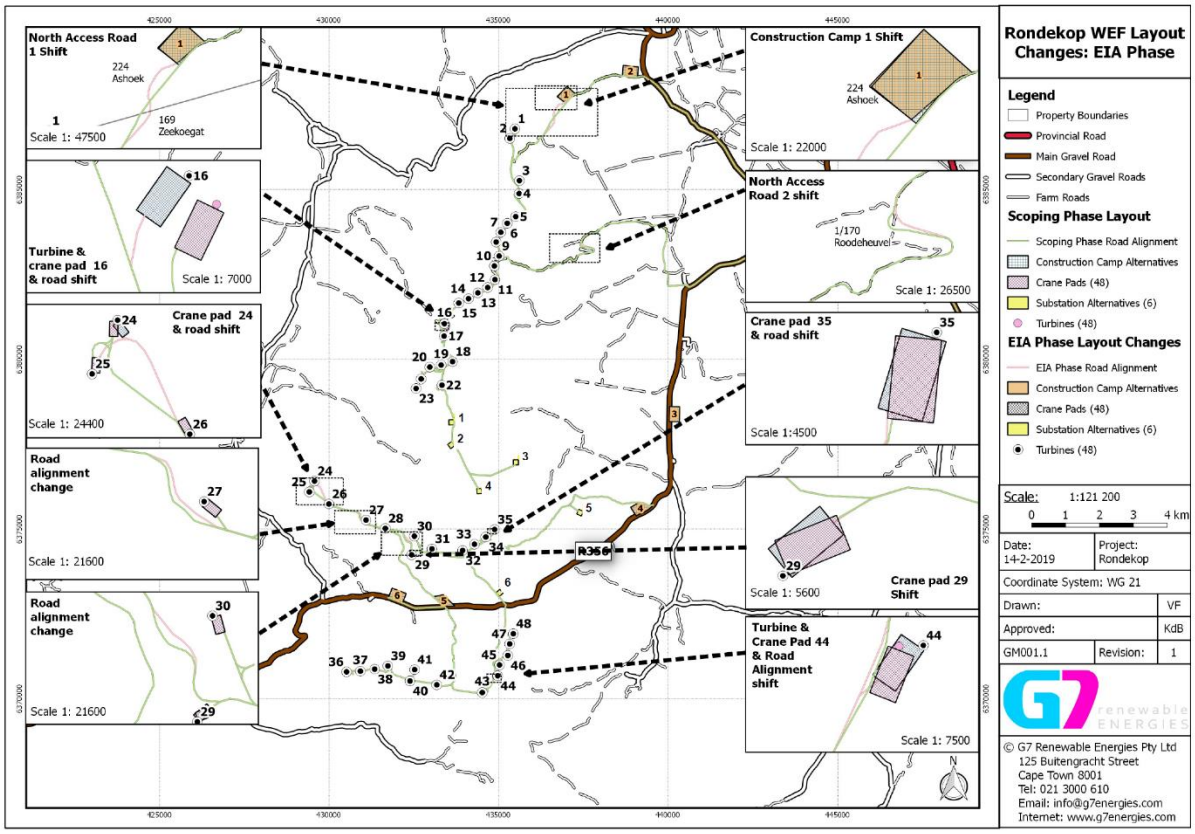

Figure 8: Initial Layout in comparison to the refined layout being put forward in the EIA phase, showing all layout changes.

4.4.2 Construction Phase

The construction phase will take place following the issuing of an EA from the DEA and once a Power Purchase Agreement (PPA) with an energy off-taker is signed, this could be Government (Eskom or similar) or private. The construction phase for the proposed Rondekop 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 to:

- To construct a temporary laydown area to enable the storage of construction equipment and machinery and will include the establishment of the construction site camp (including site offices and other temporary facilities for the appointed contractors).

- To construct wind turbine foundations at each turbine location. As noted above in Section 4.2, each turbine will be supported by a concrete foundation of approximately 90 m^2 x 50m^2, with the aid of a mechanical excavator.
- To construct the on-site substation. The construction of the substation building will entail construction of the foundations and building structures 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.

The exact sequence of construction activities will be finalised prior to commencement of construction. 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 as Appendix 8 of this EIA Report.

An independent Environmental Control Officer (ECO) will be appointed during the construction phase and will monitor compliance with the recommendations and conditions of the EMPr and EA respectively. Skilled as well as unskilled temporary employment opportunities will be created during the construction phase. Approximately 250 (full-time equivalent) employment opportunities are expected to be created during the construction phase.

4.4.3 Operational Phase

The following main 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 Rondekop WEF is expected to be approximately 20 years, but may be extended. 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 land use, i.e. agricultural or tourism practices. The only development related activities on-site will be routine servicing and unscheduled maintenance.

The projected operations are expected to provide positive economic benefitd (as highlighted in the Social Impact Assessment which is included in Appendix 6 of this report). Approximately 20 employment opportunities will be created during the operational phase of the project.

4.4.4 Decommissioning phase

At the end of the operational phase of the proposed WEF, the WEF may be decommissioned, or repowered (redesigned and refitted to operate for a longer period). The aim of the decommissioning phase would be to return the site to its original pre-construction condition. In the unlikely event that decommissioning is required (i.e. the facility becomes outdated oir the land is required for other purpose), the decommissioning phase will be undertaken in line with the EMPr and the site will be rehabilitated to its original pre-construction condition.

All the components of the wind turbines are considered to be reusable or recyclable. In the event of the Rondekop WEF being decommissioned the components will be reused, recycled or disposed of in accordance with the relevant regulatory requirements, the turbines may also be traded or sold as there is an active second-hand market for wind turbines or in the event that sale is not possible then the turbines may be used as scrap metal. It must be noted that the decommissioning phase of the proposed development will also create skilled and unskilled employment opportunities.

5 DESCRIPTION OF THE RECEIVING ENVIRONMENT

A general description of the study area is outlined in the section below. The receiving environment in relation to each specialist study is also provided below.

5.1 Regional Locality

The proposed development is located approximately 45 km south west from Sutherland in the Karoo Hoogland Local Municipality, which falls within the Namakwa District Municipality in the Northern Cape Province of South Africa (**Table 10**). The proposed Wind Energy Facility will be accessed by the R356 regional road which lies east of the site. The centre point and corner co-ordinates for the development site are included in **Table 19** below and in **Appendix 9**.

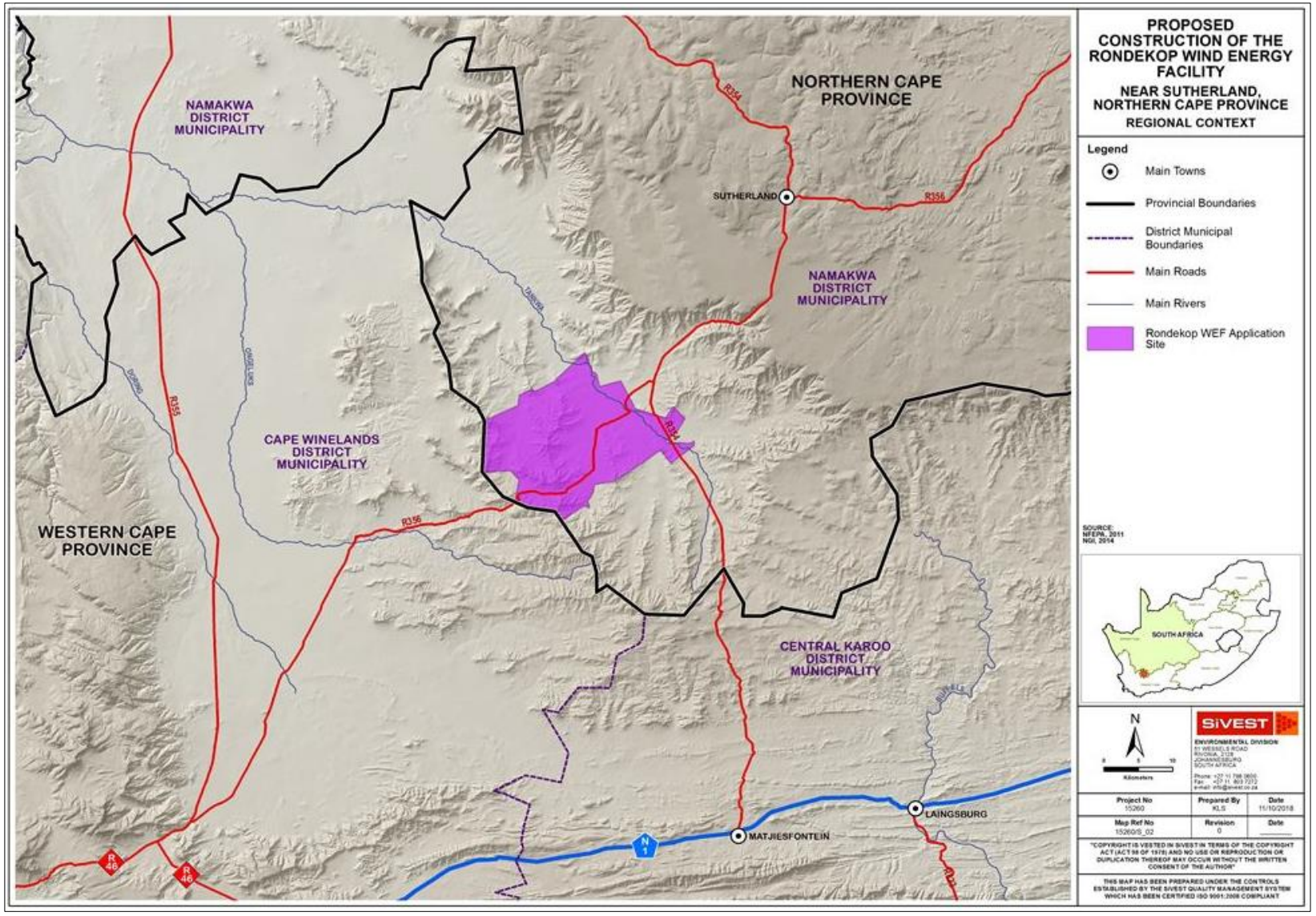

Figure 9: Regional context of the Rondekop WEF

5.2 Study Site Description

The entire site is largely in a natural state, with the exception of some scattered farm buildings, narrow gravel roads, jeep tracks and fences. The vegetation is used primarily for livestock grazing and is affected to some degree by this usage. This natural pattern extends beyond the site in all directions and gives the general area a sense of being relatively unspoilt, remote and natural

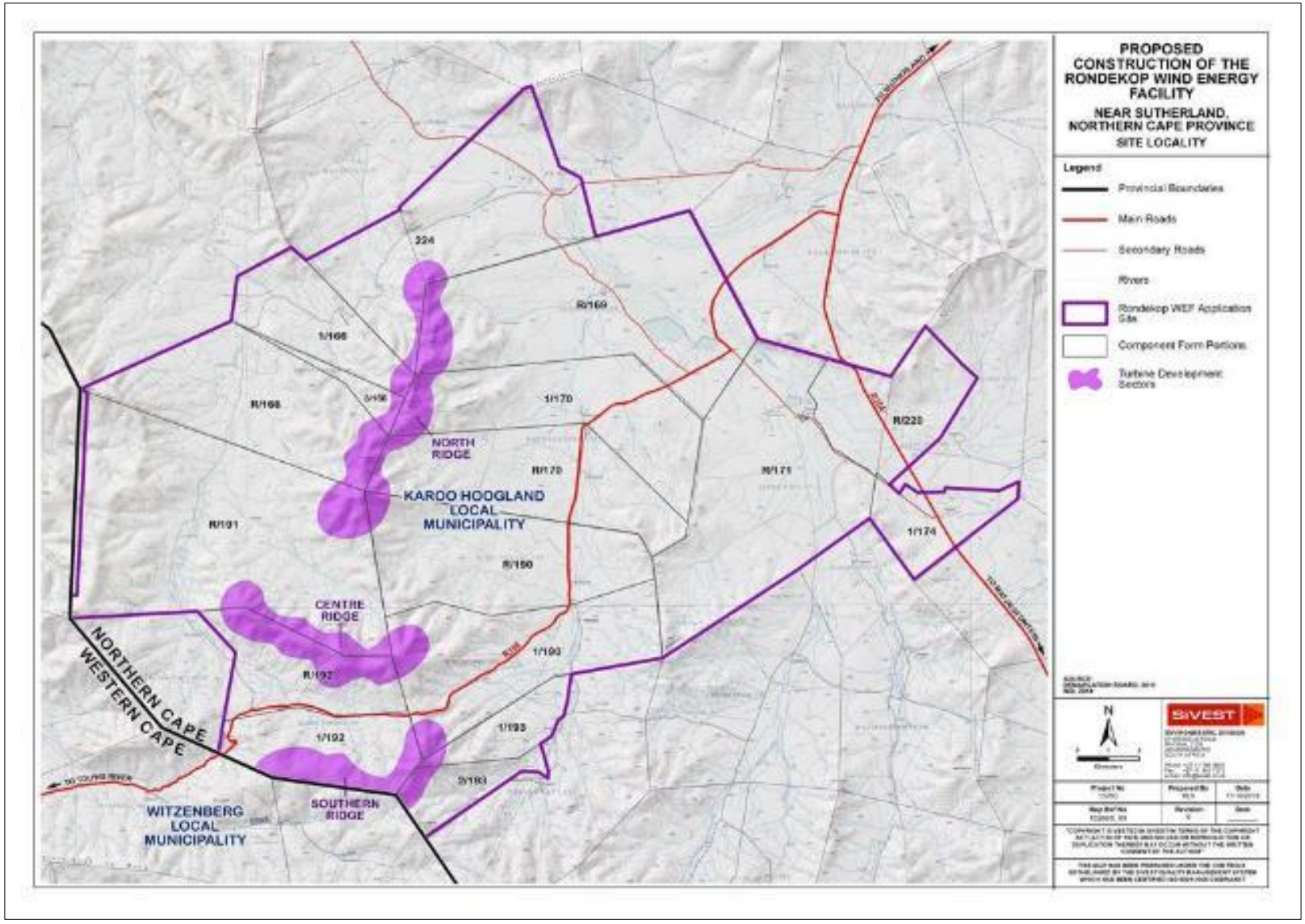

Figure 10: Site locality.

Table 19: Centre point and corner co-ordinates for the development site

APPLICATION SITE		
CORNER POINT COORDINATES		
POINT	**SOUTH**	**EAST**
A (North)	S32° 35' 53.159"	E20° 20' 54.122"
B (East)	S32° 42' 51.846"	E20° 30' 58.001"
C (South)	S32° 49' 2.929"	E20° 18' 35.703"
D (West)	S32° 41' 8.691"	E20° 11' 30.209"
CENTRE POINT COORDINATES		
POINT	**SOUTH**	**EAST**
Midpoint	S32° 44' 20.72"	E20° 17' 26.90"

5.3 Topography

The study area is situated in an area with moderately to steeply sloping topography (Figure 11). The elevation on site varies from 675 m to 1 207 m above sea level, an elevation difference of approximately 500 m across a distance of around 5,0 km. The mountains form north-south and east-west running ridges, the northern half called the Kareefonteinsberg and local peaks called Rondekop, Windheuwel, Vaalberg, Aasvoelkop and Gifkop. The ridges drop quite steeply into valleys that fall into the surrounding plains, where dry stream beds coalesce into the Uriasgatrivier, Droeriveir and Windheuwelsrivier, all joining up to run into the Tankwarivier that runs northwards out of the study area. The plains are seldom flat and continue the downward slope from the mountains, but at a lower incline.

The degree of slope of the site and surrounding areas are shown in **Figure 12**.

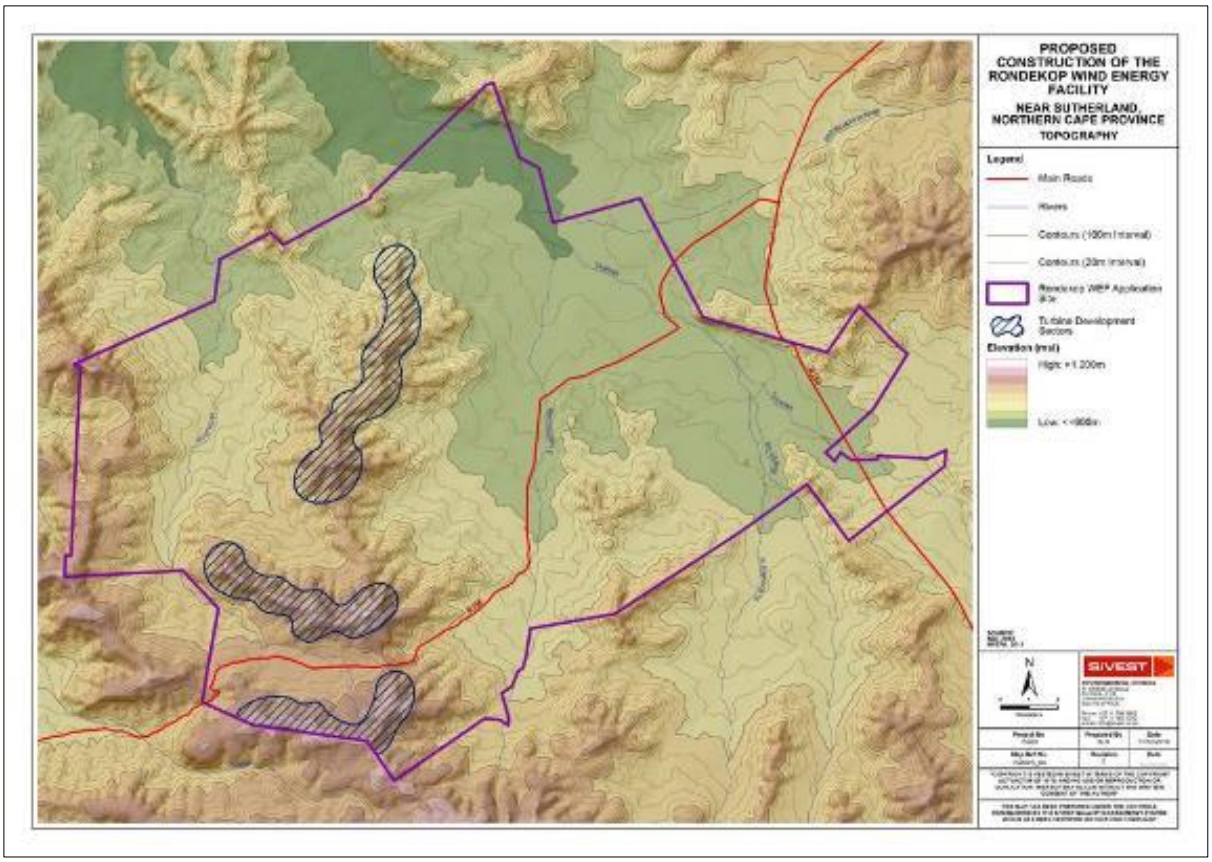

Figure 11: Topography of the study area.

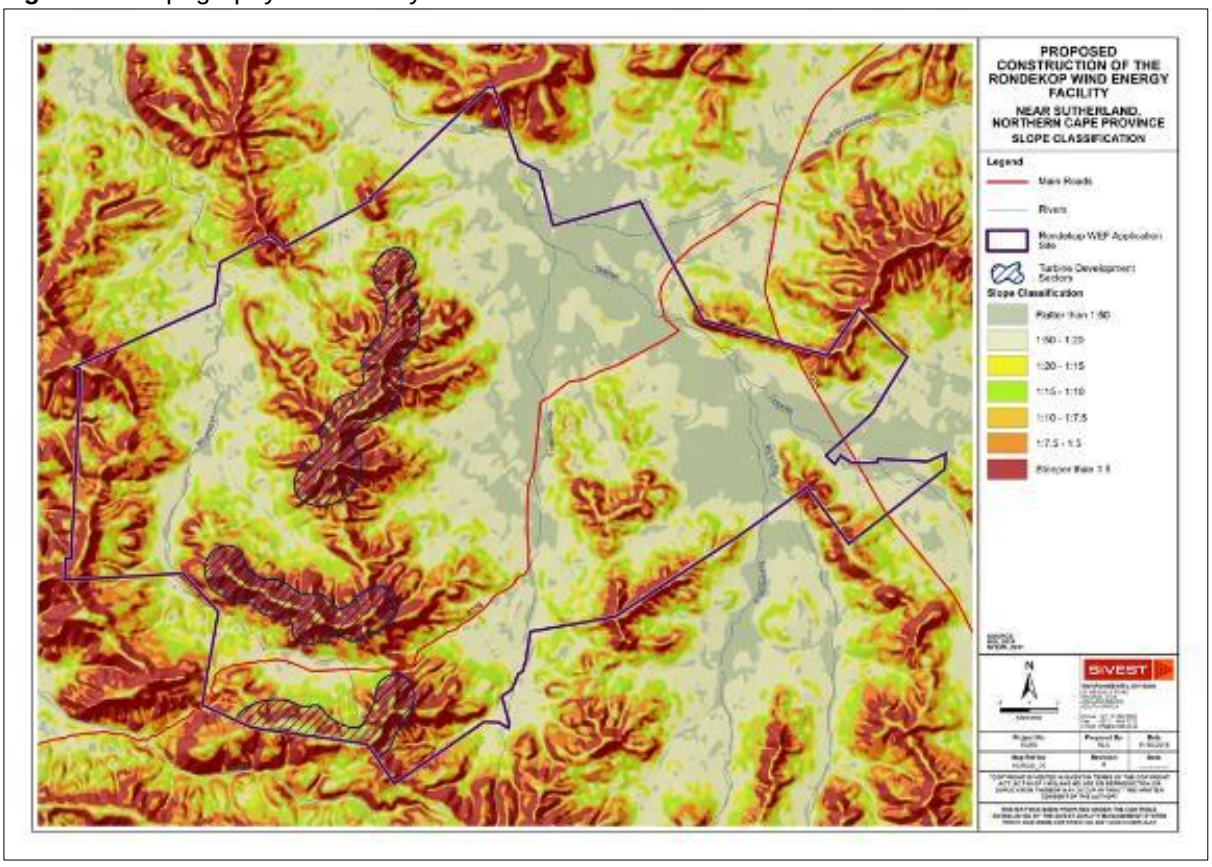

Figure 12: Degree of slope in region of the study area.

5.4 Geology

The underlying geology is mudstone (mainly), shale and sandstone of the Adelaide Subgroup (Beaufort Group), accompanied by sandstone, shale and mudstone of the Permian Waterford Formation (Ecca Group) and sandstone and shale of other Ecca Group Formations as well as Dwyka Group diamictites (all of the Karoo Supergroup). This geology gives rise to shallow, skeletal soils. Region is classified as Fc land type (to a large extent), with Ib land type playing a subordinate role. Glenrosa and Mispah forms are prominent at the peaks.

5.5 Land Use

Much of the land use in the study area is classified as low shrubland (**Figure 13**). Sheep farming (**Figure 14**) is the dominant activity in the study area although the arid nature of the climate restricts stocking densities which has resulted in relatively large farms across the area. The study area is therefore sparsely populated, and human-related infrastructure is largely restricted to isolated farmsteads and gravel access roads. The area is regarded as largely uninhabited and the closest built up area is the small town of Sutherland approximately 45 km to the north-east of the site.

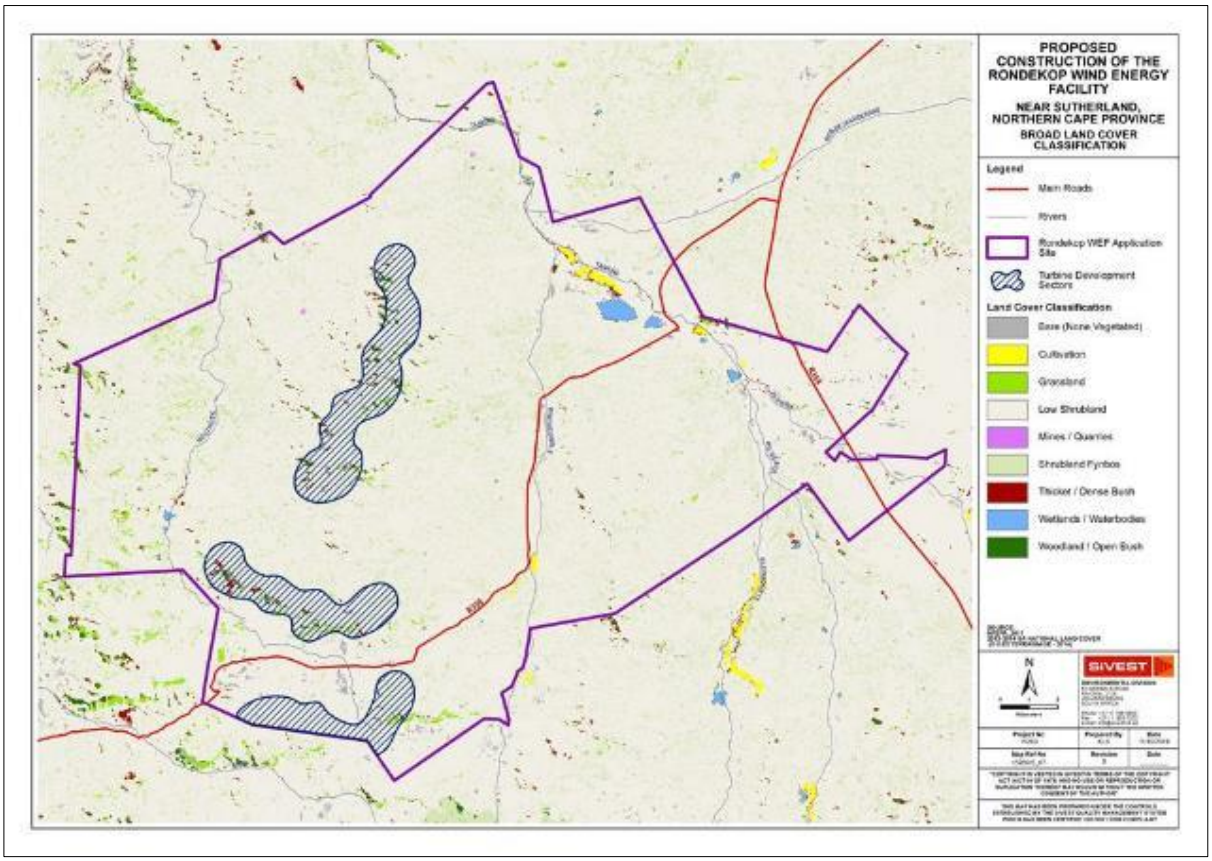

Figure 13: Land use in the region of the study area.

1 

Figure 14: Typical view of the sheep farming activities which are dominant within the study area.

It should be noted that the study area is also characterised by the presence of certain pastoral elements (**Figure 15**). These elements can be found throughout the study area and are typically present in areas where sheep farming is taking place.

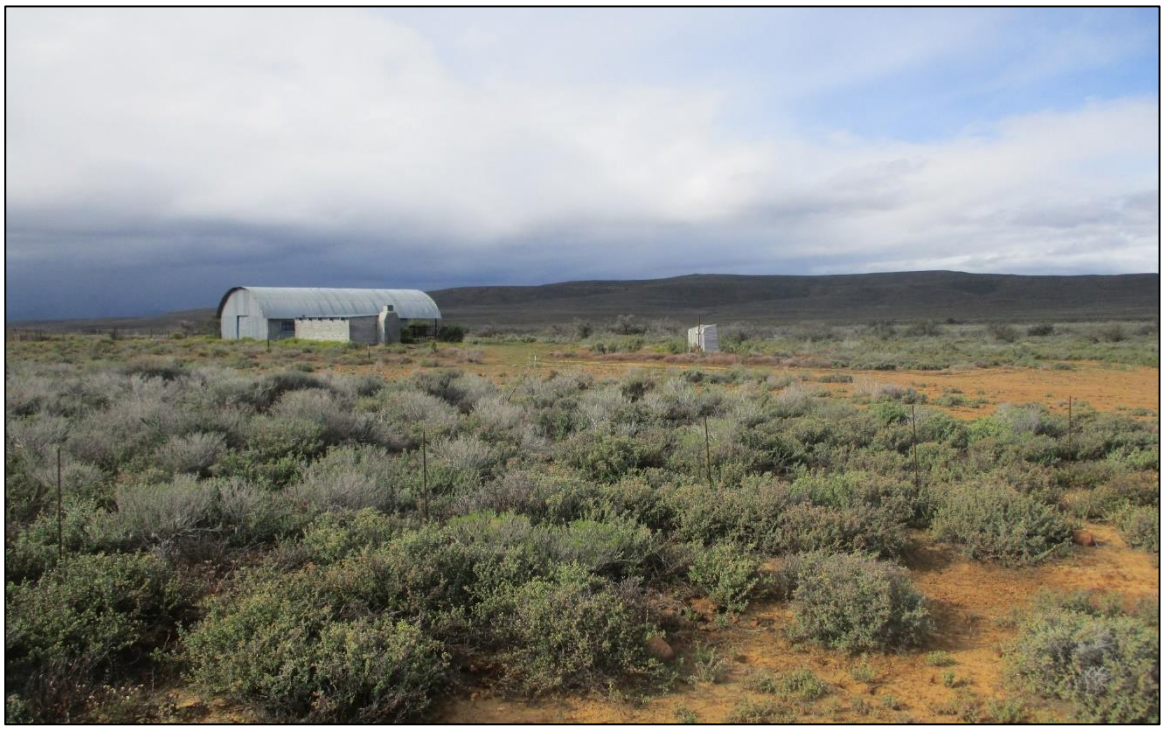

Figure 15: Example of typical pastoral elements which can be found within parts of the study area, especially in areas where sheep farming is taking place.

5.6 Climate[4]

The area is dominated by the Cape Winter Season (cold fronts, resulting in soft, misty showers) and is characterised by semi-arid climatic conditions, with most of the rain falling at the start of autumn and during the winter. Rainfall for the site is as low as 125 mm per annum (The World Bank Climate Change Knowledge Portal, undated). The average monthly distribution of rainfall is shown in **Figure 16**

Temperatures are moderate, with warm summers and cool winters. The average maximum daily temperatures vary from 27 ºC in February to 12 ºC in July, but temperatures can drop below 0 ºC in winter.

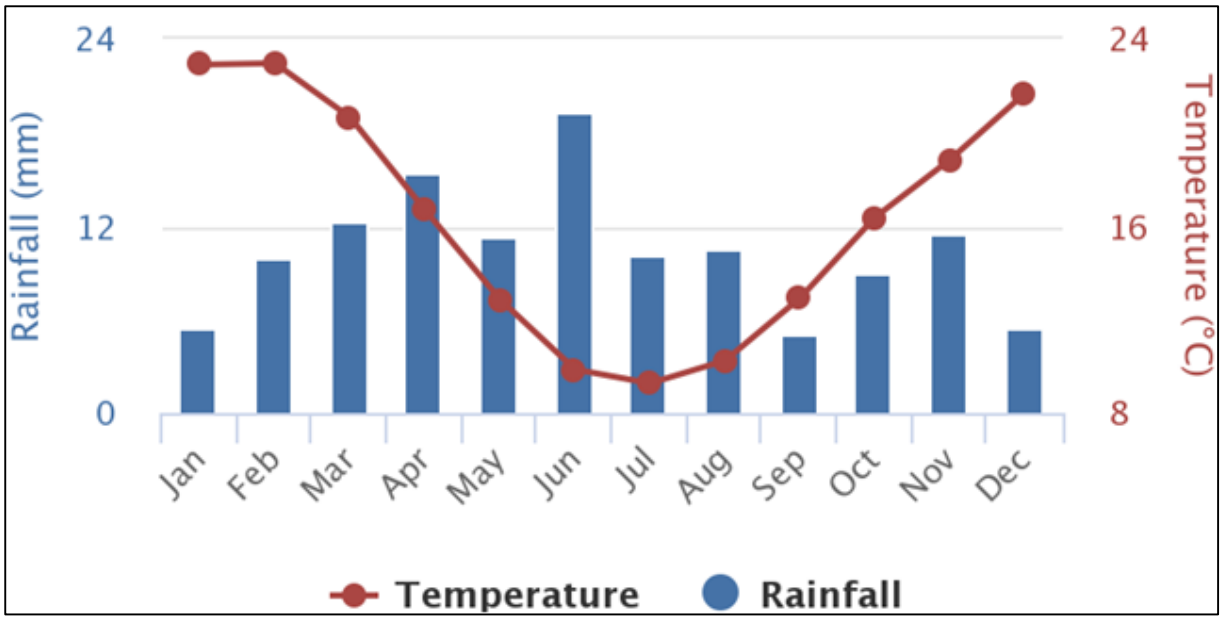

Figure 16: Average monthly temperature and rainfall for the site from 1990-2012 (The World Bank Climate Change Knowledge Portal, undated taken from Lanz, 2019).

5.7 Terrestrial Ecology

The Ecology Impact Assessment was conducted by Dr David Hoare and is included as Appendix 6H. The environmental ecology baseline is detailed below. This has been informed by a site-specific resonance survey which was undertaken between the 5th and the7th October 2018 as well as a detailed field survey was undertaken on 5th – 16th November 2018.

5.7.1 *Broad-scale vegetation patterns*

[4] Please note that there are variations in the datasets used by specialists informing their data. This is due to the various data sets interpolating data from weather stations across the country.

There are two regional vegetation types occurring in the study area, namely Koedoesberge-Moordenaars Karoo and Central Mountain Shale Renosterveld (**Figure 17**). The vegetation types that occur on site and nearby areas are briefly described below.

Koedoesberge-Moordenaars Karoo

Found in the Western Cape and Northern Cape Provinces in the Koedoesberge and Pienaar se Berg low mountain ranges bordering on southern Tanqua Karoo and separated by the Klein Roggeveld Mountains from the Moordenaars Karoo in the broad area of Laingsburg and Merweville. The unit also includes the Doesberg region east of Laingsburg and piedmonts of the Elandsberg as far as beyond the Gamkapoort Dam at Excelsior (west of Prince Albert). The vegetation type occurs at an altitude of 500–1 250 m (most of the area is at 680–1 120 m). The vegetation occurs on slightly undulating to hilly landscape covered by low succulent scrub and dotted by scattered tall shrubs, patches of 'white' grass visible on plains, the most conspicuous dominants being dwarf shrubs of *Pteronia, Drosanthemum* and Galenia.

Koedoesberge-Moordenaars Karoo remains poorly researched from the vegetation-ecological point of view. This means that information on plant species occurring there, including those of conservation importance, is relatively poor.

Central Mountain Shale Renosterveld

Northern and Western Cape Provinces: Southern and southeastern slopes of the Klein-Roggeveldberge and Komsberg below the Roggeveld section of the Great Escarpment (facing the Moordenaars Karoo) as well as farther east below Besemgoedberg and Suurkop west of Merweville and in the west in the Karookop area between Losper se Berg and high points around Thyshoogte. Altitude 1 050–1 500 m. Slopes and broad ridges of low mountains and escarpments, with tall shrubland dominated by renosterbos and large suites of mainly nonsucculent karoo shrubs and with a rich geophytic flora in the undergrowth or in more open, wetter or rocky habitats.

This is a very poorly known renosterveld type despite its interesting biogeographical borderline position—the unit straddles the Fynbos, Succulent Karoo and marginally the Nama-Karoo Biomes. It does not appear to have any endemic species.

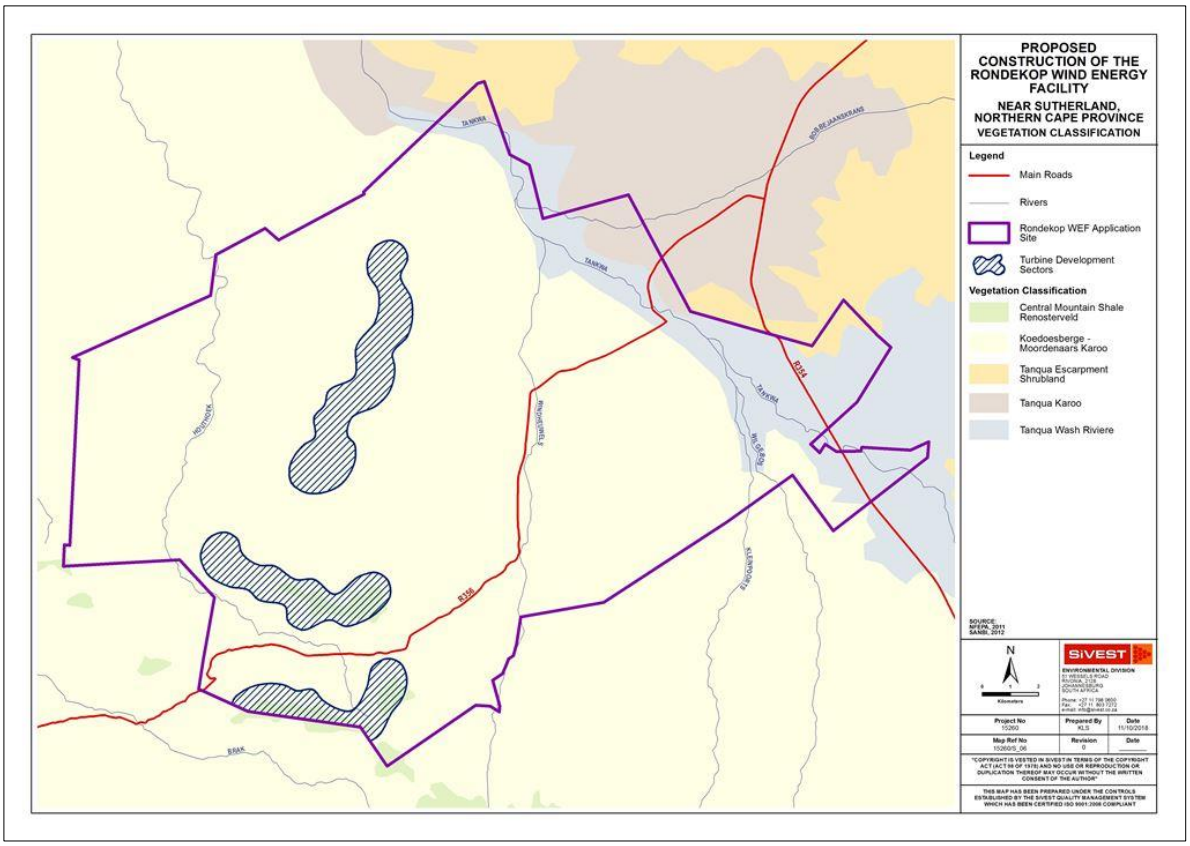

Figure 17: The national vegetation map (Mucina & Rutherford, 2006) for the study area. Rivers and wetlands (pans) delineated by the National Freshwater Ecosystem Priority Areas Assessment (Nel *et al.* 2011) are also depicted.

5.7.1.1 Conservation of broad vegetation types

On the basis of a scientific approach used at national level by SANBI (Driver *et al.*, 2005), vegetation types can be categorised according to their conservation status which is, in turn, assessed according to the degree of transformation relative to the expected extent of each vegetation type. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. The original extent of a vegetation type is as presented in the most recent national vegetation map (Mucina, Rutherford & Powrie 2005) and is the extent of the vegetation type in the absence of any historical human impact. On a national scale the thresholds are as depicted in Table 4 below, as determined by best available scientific approaches (Driver *et al.*, 2005). The level at which an ecosystem becomes Critically Endangered differs from one ecosystem to another and varies from 16% to 36% (Driver *et al.*, 2005).

Determining ecosystem status (Driver *et al.*, 2005). *BT = biodiversity target (the minimum conservation requirement).

Habitat remaining (%)			
80–100	least threatened	LT
60–80	vulnerable	VU
*BT–60	endangered	EN
0–*BT	critically endangered	CR

Table 20: Conservation status of different vegetation types occurring in the study area.

Vegetation Type	Target (%)	Conserved (%)	Transformed (%)	Conservation status	
				Driver *et al.* 2005; Mucina *et al.* 2006	National Ecosystem List (NEM:BA)
Koedoesberge-Moordenaars Karoo	19	0.3	1	Least threatened	Not listed
Central Mountain Shale Renosterveld	27	0	1	Least threatened	Not listed

According to scientific literature (Driver *et al.*, 2005; Mucina *et al.*, 2006), as shown in Table 4, both vegetation types are listed as Least Threatened. The total extent of the Koedoesberge-Moordenaars Karoo vegetation type is 47,145,009 hectares, very little of which has been transformed. It extends from near Tankwa Karoo towards Laingsburg and slightly beyond.

The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types that are afforded protection on the basis of rates of transformation. The thresholds for listing in this legislation are higher than in the scientific literature, which means there are fewer ecosystems listed in the National Ecosystem List versus in the scientific literature.

Neither vegetation type is listed in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).

5.7.2 *Fine-scale vegetation patterns*

A map of habitats within the study area and adjacent areas is provided in **Figure 22.** Transformed areas where no vegetation occurs were insignificant in area and were not mapped. This included roads, farm buildings and similar existing disturbances. The broad natural habitat units on site are as follows:

1. Lowland plains vegetation (succulent karoo);
2. Mountain vegetation (more diverse succulent karoo), consisting of:
    a. Midslopes;
    b. Plateaus;
    c. Crests;
    d. Summits;
    e. Rock outcrops;
    f. Scarp valleys; and
3. Dry stream beds and associated riparian vegetation;

4. Wetland.

These are described in more detail below and the distribution of each is shown in **Figure 22**

5.7.2.1 Lowland plains vegetation (succulent karoo)

The general study area is characterised by a low succulent, dwarf shrubland, typical of the regional vegetation type, Koedoesberge-Moordenaars Karoo, which is described as “low succulent scrub and… scattered tall shrubs, patches of ‘white’ grass visible on plains, the most conspicuous dominants being dwarf shrubs of *Pteronia, Drosanthemum* and *Galenia*.” A typical view of this vegetation is shown in **Figure 18.**

The general floristic character of this vegetation on site is fairly uniform across wide areas, often dominated by the same suite of species, including *Ruschia intricata*, *Drosanthemum karrooense*, *Pteronia incana*, *Galenia africana* and *Eriocephalus ericoides*. However, any local variation in topography can lead to localized increase in richness associated with a more diverse species composition. There is a high degree of succulence in the flora of this vegetation, a function largely of the aridity of the area, the mostly winter rainfall and the skeletal soils. The vegetation is drought-hardy and tolerant of a low level of grazing / browsing, but it has a low ability to recover from disturbance where the vegetation cover is removed. This is a typical pattern in arid areas where slow growth rates and water-scarcity do not allow rapid recovery from vegetation loss. In this vegetation, there are low rates of recruitment and existing plants are relatively old. The vegetation is an important cover for the landscape and, although not necessarily floristically sensitive, is sensitive to disturbance.

Figure 18: View showing succulent karoo vegetation on plains with steeper topography in background.

5.7.2.2 Mountain vegetation (more diverse succulent karoo)

This is essentially a variation on the plains vegetation with the exception of two important patterns related to local diversity and floristic composition:

1. the greater the local surface rockiness, the higher the diversity and the more likely it is that unusual species will be encountered; and
2. the higher the elevation the higher the local diversity and, once again, the higher the likelihood of finding unusual or rare plant species.

This habitat also falls primarily within Koedoesberge-Moordenaars Karoo, but in the southern half of the study area it also includes patches on the higher peaks of Central Mountain Shale Renosterveld. There is no regional difference in the sensitivity of these two vegetation types, but the pattern gives an indication of floristic variability on site.

There are several ecological differences between the mountainous areas and the flatter plains. The first is the increased steepness of the landscape (see **Figure 19**). The steeper areas sometimes have less stable substrates with looser soils, associated with the development of loose scree slopes. The vegetation is critical in stabilizing these areas. Areas lower down on slopes are vulnerable to any stability on areas higher up. The topography also introduces variation in slope and aspect, with some slopes facing hotter northern or western directions and others facing cooler southern and eastern directions, all of which introduces ecological variation into the landscape, providing new habitats for different species. Due to the sedimentary origin of the substrates, there are often bands of more resistant rock layers at specific heights on the mountain slopes. These substrates manifest themselves as small cliffs and rocky outcrops. There is a known diversity relationship between increased surface rockiness and increased local floristic species richness, which is true for the current study area, and many of the rarer floristic sitings on site were within rocky areas.

Figure 19: Vegetation in steeper parts of the landscape.

5.7.2.3 Riparian and floodplain vegetation

There is a network of dry stream beds throughout the lower-lying areas of the study area, with smaller streams joining together to form larger systems further downstream. In the mountain areas these start as dry drainage lines, but these are not mapped as part of this unit since they reflect the characteristics of the surrounding vegetation rather than that of being a unique habitat. Where the dry streams occur as a unique habitat, they consist of a sandy or rocky bed, often unvegetatated or sparsely vegetated, bordered by a line of shrubs or small thorn trees. A typical example is shown in **Figure 20.** As the stream beds get larger, the riparian fringe becomes more pronounced, often developing an almost impenetrable margin of thorn trees. There is a continuum from the smallest streams to the larger "rivers".

The riparian areas have a species composition and structure that is almost completely different to the surrounding landscape. The habitat contains a combination of bare rock and deeper sands, so it is able to support flora that is adapted to these substrate conditions, in addition to the sporadic flooding and scouring that takes place in these habitats as a result of rare large rainfall events. The thorn trees (and other shrubs) occur here because they are able to root deeply to access underground water, a source that is not available to other terrestrial habitats. Although not necessarily floristically sensitive, the habitat that is derived under these ecological conditions is critically important for fauna, providing food and shelter as well as corridors for undetected movement. In times of drought, riparian areas may offer

the only slightly green vegetation as a source of food. The deeper sands are important for burrowing animals and the shrubs and low trees offer shelter and browse.

Riparian habitats are disproportionately important in terms of the proportion of the area that they occupy in the landscape – they probably occupy 5-10% of the landscape in total, but provide a unique and important habitat for both flora and fauna. The plant species occurring within these habitats are not necessarily rare in a global sense, but degradation of this interconnected system can cause floristic loss and change in areas far removed from any impact. Maintenance of regional vegetation patterns therefore is dependent on maintaining the health and functionality of this component of the landscape. For this reason, and for the utilitarian importance to fauna, the riparian vegetation is considered to be ecologically sensitive. In addition, if there is any likelihood of the Riverine Rabbit occurring on site then this is the habitat in which it would be found.

Figure 20: Typical habitat on the banks of a small stream bed.

Figure 21: Typical vegetation within a larger stream, characterised by thorn trees, *Vachellis karoo*

5.7.2.4 Wetland

A single location was found on site where the plant species composition was interpreted as being a wetland. This included stands of *Phragmites australis* as well as *Tenaxia stricta*. The site was limited in extent (less than one hectare) and was located on the southern slopes of the central ridge on a relatively steep slope above a rocky ridge. It is unknown whether similar habitat occurs in other parts of the mountain outside the development footprint, but there are no further occurrences within the footprint of proposed infrastructure. Due to the limited occurrence of this habitat and the arid region in which the site is located, it is assumed that it is a rare habitat on site and therefore treated as sensitive.

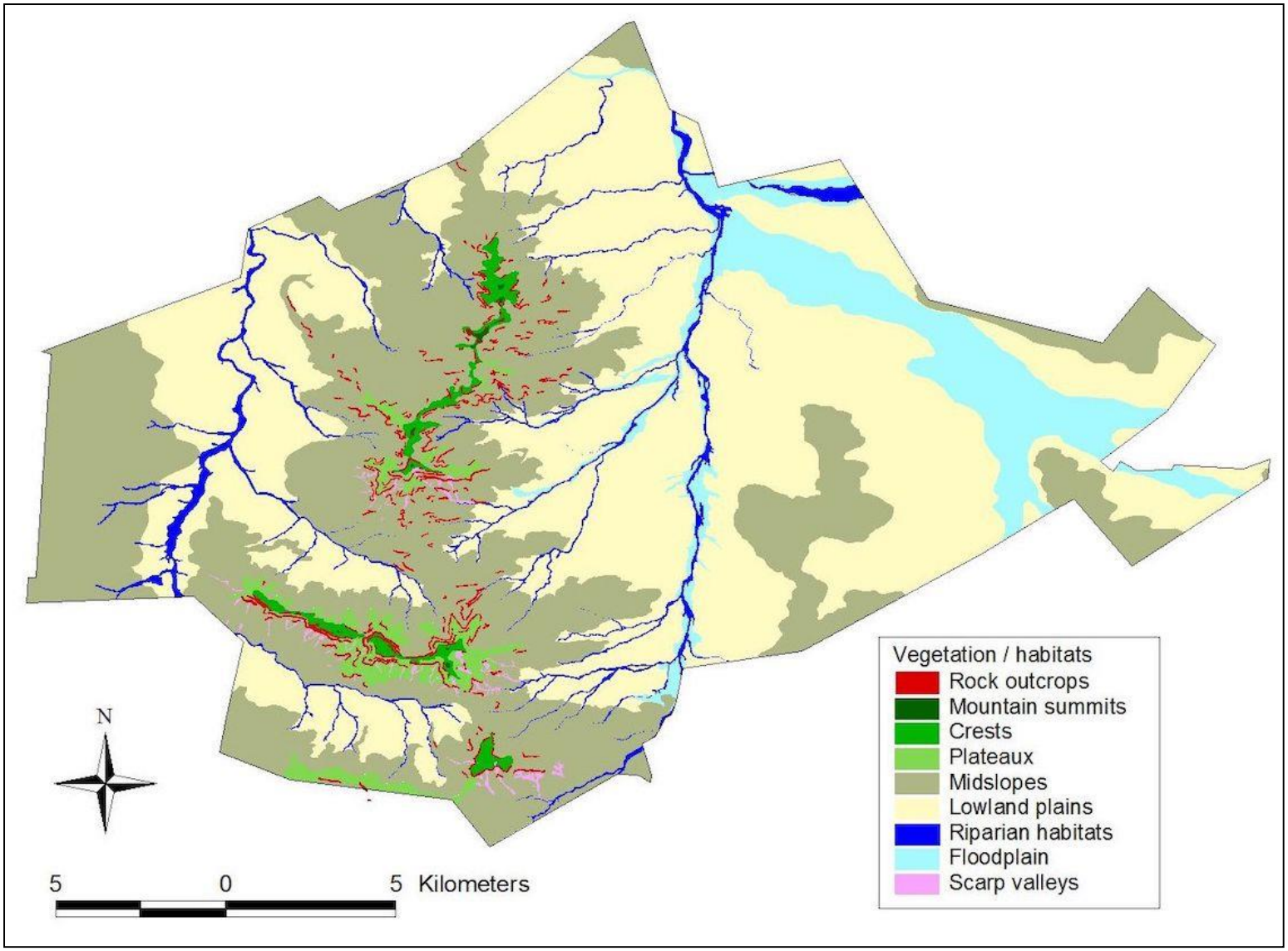

Figure 22: A map of habitats within the study area and adjacent areas

5.7.3 *Biodiversity conservation plans*

The Northern Cape Critical Biodiversity Area (CBA) Map (**Figure 23**) was published in 2016 (Holness & Oosthuysen 2016) and "updates, revises and replaces all older systematic biodiversity plans and associated products for the province". The Northern Cape Critical Biodiversity Area Map, published in 2016 (Holness & Oosthuysen 2016) derives CBAs from the earlier Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008). On the basis that there was limited biodiversity information for some parts of the province, including the current site, general correlations between biophysical parameters and known biodiversity patterns were used to define the CBAs. This included the fact that there is a perceived general increase in local diversity, as well as increased likelihood of encountering plant species of special concern, as elevation increases. This means that higher elevation areas generally have higher biodiversity value, although the specific location of such areas of high value were not known with great confidence. To accommodate this pattern and the low certainty, a proportion of all higher elevation areas were allocated by regional planners to CBA2 areas according to an algorithm that seeks a least-cost outcome for preserving biodiversity, i.e. the least amount of land space for preserving the greatest amount of area of biodiversity importance, as well as meeting specific conservation targets. The net result is that CBA2 areas on site may be identical in character to other natural areas on site that are not included in a CBA based on limited biodiversity information available for the site. Data collected in the field for this project (at the location of all turbines, substation options, and construction camp options) support the observation that there is no significant floristic difference on site between areas included within CBA2 areas and those outside of these designated areas.

The rationale for defining the recent (2016) CBA areas is derived from the earlier (2008) product. CBA1 and CBA2 areas in the 2016 map include the following areas:

- Important Bird Areas;
- SKEP expert identified areas;
- Threatened species locations;
- Features from previous conservation plans (including CBA1 and CBA2 areas from the Namakwa District Biodiversity Sector Plan);
- Areas supporting climate change resilience, e.g. areas of high diversity, topographic diversity, strong biophysical gradients, climate refugia, including kloofs, south-facing slopes and river corridors;
- Conservation Plans from adjacent provinces; and
- Landscape structural elements, e.g. rocky outcrops, koppies, dolerite dykes, boulder fields, woody vegetation on outwash plains.

It is important to understand the basis for defining CBAs in the study area, because it identifies the features that are considered important for biodiversity and are, therefore, sensitive in the landscape. The Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008) identifies the following features that are specifically of relevance in the study area and that are important for conserving biodiversity:

- South-facing Mountain Slopes >25ha in extent (= climate change refugia);
- Kloofs >50ha in extent (= keystone biodiversity resource and climate change refugia);
- Riverine Rabbit habitat;

- Areas identified by experts as being important for biodiversity;
- Critical sites for species;
- Corridors;
- Rivers.

The Northern Cape CBA map classifies the natural vegetation of the province according to conservation value in decreasing value, as follows:

- Protected
- Critical Biodiversity Area One (Irreplaceable Areas)
- Critical Biodiversity Area Two (Important Areas)
- Ecological Support Area
- Other Natural Area

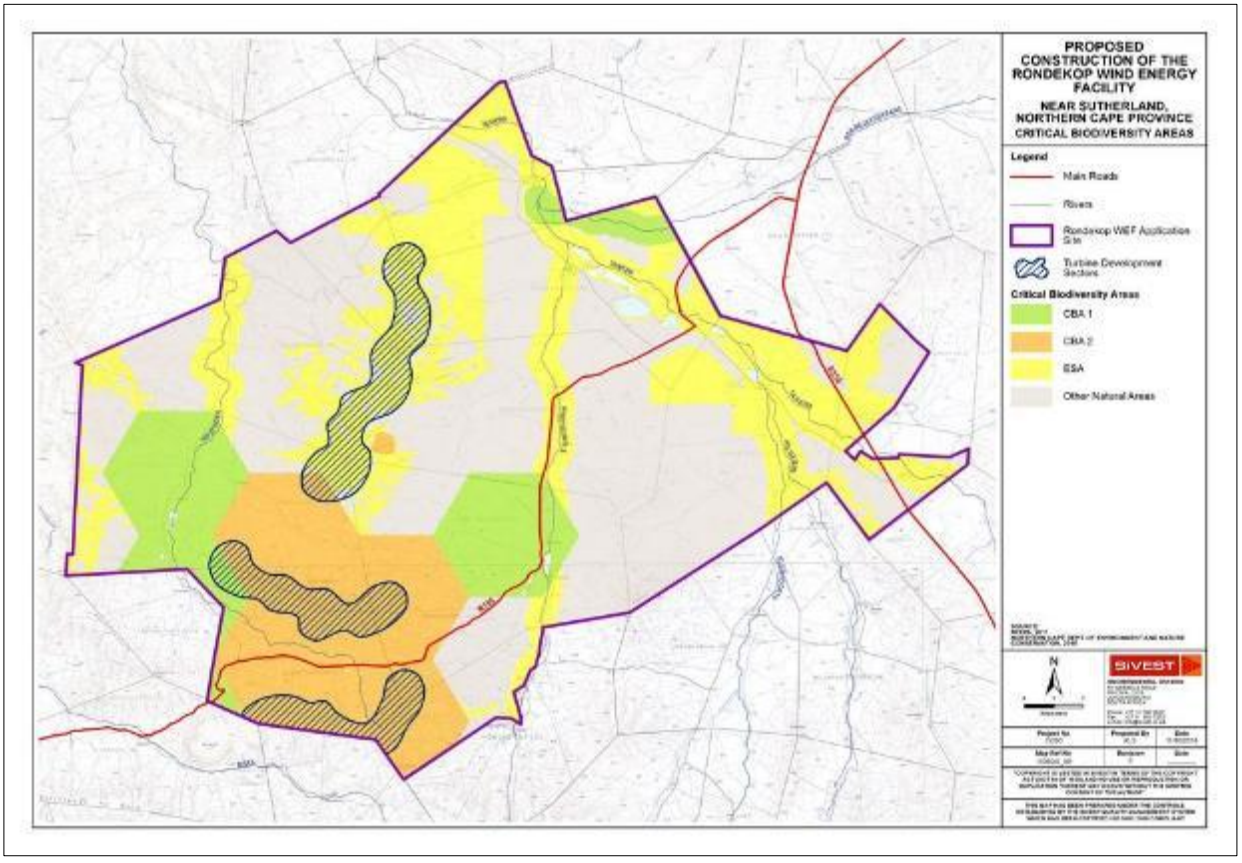

Figure 23: Extract of the Northern Cape Conservation Plan for the study area, showing that there are CBAs within the site

This shows features within the study area within three of these classes, as shown in Figure 7 below:

Critical Biodiversity Areas: The southern half of the site is mostly within a CBA2 area with two patches of CBA1 areas (see Figure 7 on previous page). For the current project, one turbine (turbine 25 and crane pad 25 and small section of an internal road – approximately 300 m) is located in the CBA1. There is also a small localised patch of CBA2 in the northern half that most likely is linked to the local occurrence of a species of concern, but no infrastructure affects this small area. All of the proposed infrastructure in the southern half of the site (the central ridge and the southern ridge) is within a CBA2 area.

Ecological Support Areas: All the higher-lying areas of the northern half of the study area are within ECAs. The dry river running along the eastern side of the study area (outside the study area) is also an ECA. This is relevant because some of the proposed infrastructure, for example access roads, are within this general area.
Other Natural Areas: All remaining parts of the northern half of the site are indicated as being in a natural state.

The presence of CBA areas 1 and 2 in the southern half of the site indicate that these areas are considered important for biodiversity conservation at a regional level. Additionally, the ESAs in the northern half and to the east of the site indicate that the site has importance in a wider ecological context for supporting biodiversity patterns.

The Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008) provides recommended guidelines for land-use activities within different CBA categories and these provide the best indication of the type of development that may or may not be acceptable within these defined units. Those that are relevant to the current project are as follows:

Land use	CBA1	CBA2	ESA	ONA
Major/extensive development projects	N	N	R	R
Linear engineering structures	R	R	R	R

N=No, not permitted, R=Restricted, only when unavoidable, not usually permitted.

According to the Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008), the desired land management objective in CBA1 areas is to maintain the area in a natural state with no biodiversity loss. The Plan does not support developments that result in the significant transformation of natural habitat within CBA1 areas.

According to the Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008), the desired land management objective in CBA2 areas is to maintain the landscape in a near natural state, possibly allowing some loss in ecosystem integrity and functioning. Biodiversity compatible land uses are strongly encouraged, and industries encouraged to adopt and implement acceptable biodiversity management plans (Desmet & Marsh 2008). It is further recommended in the Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008) to restrict expansion of any activity that would cause loss of natural habitat and where possible utilise existing transformation or degraded areas for hard development.

5.7.4 *Overall vegetation composition*

5.7.4.1 Protected areas

According to the National Parks Area Expansion Strategy (NPAES), there are no areas within the study area that have been identified as priority areas for inclusion in future protected areas. The study area is therefore outside the NPAES focus area.

5.7.4.2 Red list plants species in study area

The list contains 28 species listed in an IUCN threat category (Critically Endangered, Endangered or Vulnerable of which 5 have a possibility of occurring in the general area and in the type of habitats available in the study area. This does not mean that they will occur there, only that a literature review has identified that these are species that should be assessed as possibly occurring in the area. These species are as follows: *Cliffortia arborea*, *Helictotrichon barbatum*, *Lachenalia longituba*, *Lotononis venosa*, and *Octopoma nanum*. None of these species were encountered on the Rondekop site or on the neighbouring project (Ekotrust 2018).

There are an additional five (5) species that are listed as Near Threatened that were assessed as having a possibility of occurring on site, two (2) of which have been recorded on the neighbouring project (Ekotrust 2018), namely *Geissorhiza karooica* (Iridaceae) and *Lachenalia whitehillensis* (Hyacinthaceae). Both of these are spring-flowering geophytes, and neither was seen on the current site. The other three (3) species are as follows: *Ehrharta eburnean*, *Pauridia alticola*, and *Romulea unifolia*. None of these three species were found on the Rondekop site.

There are an additional 24 species listed by SANBI as either Rare or Critically Rare, five (5) of which have been recorded on the neighbouring project (Ekotrust 2018), namely *Bulbine torta* (Asphodolaceae), *Cleretum lyratifolium* (Aizoaceae), *Eriocephalus grandiflorus* (Asteraceae), *Moraea contorta* (Iridaceae), and *Pectinaria articulata* (Apocynaceae). These are all late-winter to early spring-flowering plants, none of which were seen on the current site

5.7.4.3 Protected plants

Plant species protected under the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) are listed in Appendix 6 of the Terrestrial Ecology report. One (1) species on this list was found on site, namely *Hoodia gordonii* . This species is also protected according to the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009). There are no other plant species protected according to this legislation that have a geographical distribution that includes the study area.

5.7.4.4 Hoodia gordonii

This species is widespread in the arid parts of South Africa and also occurs in Namibia, Botswana and Angola. It occurs in a wide variety of arid habitats from coastal to mountainous, on gentle to steep ridges and from dry, rocky places to sandy spots in riverbeds. It is harvested indiscriminately for its high economic value nationally and internationally. It can be locally common, but its status is unknown due to high levels of recent decline. It is currently listed as Data Deficient on the Red List of South African Plants (http://redlist.sanbi.org/species.php?species=2705-13, accessed on 10 October 2018). Two clumps were found on site (see Figure 8), but it is probable that a greater number occur there. Any impacts on this species will require a permit from the relevant authorities (DENC). This is the standard TOPS permit for which an application is made from the relevant department to remove / relocate / destroy individuals of this species. A walk-down survey is required to determine whether any plants are affected by the proposed WEF infrastructure and/or to obtain a count of how many plants are affected.

5.7.4.5 Protected plants (Northern Cape Conservation Act)

A number of plant species were found on site that are protected according to the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009). This includes the following: *Aloe microstigma* (Asphodelaceae), Haworthia sp. (Asphodelaceae), *Ruschia intricata* (Aizoaceae) and three other as yet unidentified species from this plant family (Aizoaceae), *Dianthus* sp., *Crassula muscosa* (Crassulaceae), *Crassula* sp. (Crassulaceae), *Tylecodon wallichii* (Crassulaceae), *Cotyledon orbiculare* (Crassulaceae) and other species from this family, an unidentified fern, *Ornithogalum* sp., and two Moraea species (Iridaceae). Despite these species not being threatened, any impacts on these species will require a permit from the relevant authorities. Given the fact that the vegetation has a high proportion of succulent species and that plant families containing succulent species are protected, there is a high likelihood that additional protected species occur on site that were not detected during the field survey.

5.7.4.6 Protected Trees

Tree species protected under the National Forest Act are listed in Appendix 2 of the Terrestrial Ecology Report. There are none with a geographical distribution that includes the region in which the proposed project is located. There is one (1) species that has a geographical distribution that ends south of the study area, namely *Podocarpus latifolius*, but this species does not occur near to the site.

In summary, no species of protected trees were found or are likely to occur in the geographical area that includes the

5.7.5 *Vertebrate animals*

Vertebrate species (mammals, reptiles, amphibians) with a geographical distribution that includes the study area are listed in Appendix 4 of the Terrestrial Ecology Study. All threatened (Critically Endangered, Endangered or Vulnerable) or near threatened vertebrate animals that could occur in the study area and have habitat preference that includes habitats available in the study area are discussed below.

5.7.5.1 Mammals

The site has a relatively moderate to low diversity of mammals compared to other parts of South Africa. Based on the natural state of the study area and surrounding areas, it is considered likely that many of these species could occur on site, especially the smaller species, such as various rodents, insectivores and small predators. Listed species with a geographical range that includes the site are included in the **Table 21** below:

5.7.5.2 Reptiles

There is a fairly high potential diversity compared to average diversity in other parts of the country. Of the reptile species that could potentially occur in the study area, the Karoo Dwarf Tortoise, listed as Near Threatened, has been listed in a threat category **(Table 21)**.

5.7.5.3 Amphibians

The site has a relatively moderate to low diversity of frogs in geographical distribution that includes the general study area in which the site is found (Du Preez & Carruthers 2009). Some of these species are only marginally present in the study area due to the fact that their distribution range ends close to the study area. Of the frog species that could potentially occur in the study area, none are listed in a threat category.

Table 21: Listed species with a geographical range that includes the site

Order	Scientific name	Common name	Status	Likelihood of occurrence
Mammal	*Mellivora capensis*	Honey Badger	Near Threatened, protected	medium
Mammal	*Bunolagus monticularis*	Riverine Rabbit	Critically Endangered, protected	low
Reptile	*Homopus boulengeri*	Karoo Dwarf Tortoise	Near Threatened	high
Reptile	*Ouroborus cataphractus*	Armadillo Girdled Lizard	Protected	medium

5.7.5.4 Protected Animals

There are a number of animal species protected according to the National Environmental Management: Biodiversity Act (Act No. 10 of 2004). Those species protected according to the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) that have a geographical distribution that includes the site are listed in Appendix 6 of the Terrestrial Ecology Study, marked with the letter “N”. This includes the following species: Black Rhinoceros (does not occur on site), Honey Badger, Black-footed Cat, Leopard, Cape Fox, Riverine Rabbit (unlikely to occur on site) and Armadillo Lizard. Due to habitat and forage requirements, and the fact that some species are restricted to game farms and/or conservation areas, only the Honey Badger, Black-footed Cat, Leopard, Cape Fox, Riverine Rabbit and Armadillo Lizard have any likelihood of occurring on site. Some of these species are mobile animals (Honey Badger, Black-footed Cat, Leopard, Cape Fox, Riverine Rabbit) that are likely to move away in the event of any activities on site disturbing them. However, there are some (Riverine Rabbit and Armadillo Lizard) that may be dependent on a small patch of habitat within their range to exist there. They could therefore be affected by the proposed development of the project.

5.8 Avifaunal (Birds)

The Avifauna Impact Assessment and 12-month pre-construction monitoring was conducted by Miguel Mascarenhas from BioInsight and is included as **Appendix 6C**.

5.8.1 *Description of the affected Environment*

At a macro level, there are no nature conservancy areas, to our present knowledge, within a 30 km radius of the proposed development area. The proposed Rondekop WEF site is located approximately

40 km south-east of the Tankwa Karoo National Park, 90 km north-east from Swartberg Mountains Important Bird Area (IBA) (SA106), 50 km east of the Cedarberg – Koue Bokkeveld Complex IBA (SA101) and 61 km north from Anysberg Nature Reserve Important Bird Area (SA108) (Figure 24). Considering that these areas are located at a considerable distance from the proposed WEF area it is not expected that the species using them are affected in any way by the implementation of this project. Nonetheless the analysis of the bird species that are present in these areas, which are of similar nature to the Rondekop WEF proposed area, may provide an indication on the suite of species likely to be present in the study area.

It must be noted that the proposed development area shown in this report (**Figure 24**, onwards) is that representative of the approximate area for turbine placement, and subsequently also represents the core area that has the most relevance/importance in terms of the impacts on the bird community on site. As such, this area will be assessed throughout this specialist impact assessment report. Regardless, it must be noted that associated infrastructures can be inside/outside of this area but is not a limitation to this study – as most of the impacts are likely to occur within the boundaries illustrated from an avifaunal perspective.

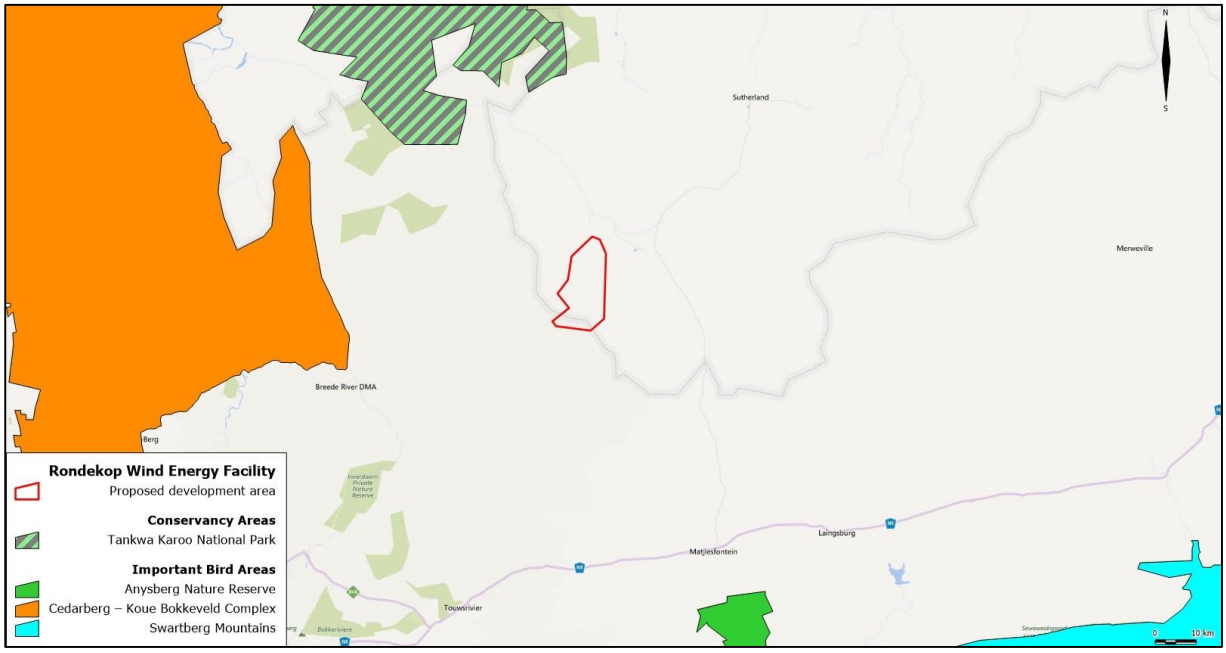

Figure 24: Location of the Rondekop WEF in relation to the surrounding conservancy areas (background image source: Google Earth Street Maps)

5.8.2 *Overview of birds and Rondekop Site*

At the WEF site level, the site falls within the Succulent Karoo and the Fynbos biome, with the occurrence of two main vegetation types (Mucina & Rutherford, 2006 – updated to 2018) (discussed in **Section 5.7** by Terrestrial Ecology Specialist).

The site is characterised by accentuated mountainous areas with very difficult human access and therefore it is in almost pristine natural conditions. Vegetation is adapted to the semi-arid conditions and harsh rocky conditions. Currently the area where Rondekop WEF is proposed shows no signs of intense

disturbance other than that caused by natural impacts on the veld due to a three-year period of drought and grazing. Signs of human disturbance are characterised by the presence of a few farm houses.
Both the Fynbos biome and the Succulent Karoo biome are characteristic of higher altitudes and are present both in the bottom and top of the mountains. There are several species which are dependent on this type of habitat such as: Verreauxs' Eagle *Aquila verreauxii*, Grey-backed Cisticola *Cisticola subruficapilla*, Karoo Prinia *Prinia maculosa* and Grey-winged Francolin *Scleroptila africana*. Apart from the bird species that are naturally associated with the Fynbos and the Succulent Karoo biome, other species with more widespread distributions and less specific habitat requirements may also occur. These species are likely to be attracted by factors such as land-use, topography and the presence of drainage lines and water features in the surroundings of the site. Within the proposed Rondekop WEF site, however, the habitat is mostly reserved as low natural vegetation within a mountainous area, with some mostly dry water features. Regardless, species would still likely make use of these habitats occurring on site **(Figure 25**). For the potential/temporary Vearreaux's Eagle feeding site (**Figure 25**), it was initially determined that this site could be a nesting area for the species (due to white wash on the rocks, and due to the observation of an individual sitting nearby the edge of the ridge – next to the leg of a small mammal). However, upon further monitoring throughout the year, it was determined that this location was far too exposed for a Verreaux's Eagle to nest in, and that due to a lack of actual nesting substrate, the site would not be relevant for the breeding of the species. **Additionally, a lack of evidence to suggest significant use of the area by this species would also be an indication that the site does not hold significant importance. As such, this area is not being considered as a sensitive location.**

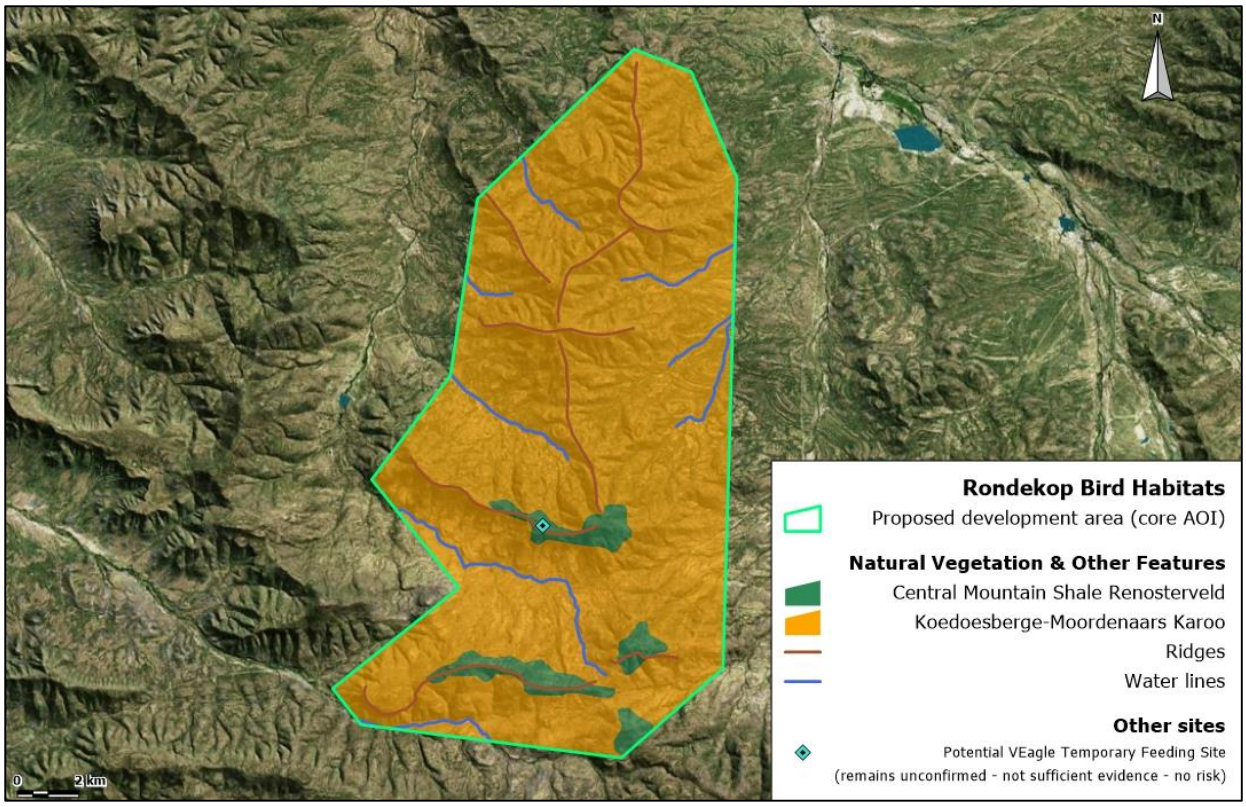

Figure 25: - Bird habitats occurring within the proposed Rondekop WEF

5.8.3 *Results of Field Assessment*

From a total of 131 species potentially occurring in the area (Bioinsight, 2018), 67 bird species were detected within the study area (WEF and surrounding area) across all the survey methodologies implemented through the pre-construction monitoring, including eight species that were not identified to occur at the site during the monitoring campaign. Seventeen of the species identified are considered priority species for the monitoring campaign (**Table 22**).

Out of the total species identified, 6 are of special concern for having an unfavourable conservation status in South Africa: Black Harrier *Circus maurus*, Ludwig's Bustard *Neotis ludwigii*, Martial Eagle *Polemaetus bellicosus* – Endangered; Verreauxs' Eagle *Aquila verreauxii*, Black Stork *Ciconia nigra* – Vulnerable; Greater Flaming *Phoenicopterus roseus* – Near Threatened (Taylor *et al*., 2015). Of these six (6) species, five (5) were observed within the wind farm boundaries. The Verreaux's Eagle was detected in summer, winter and spring, and had individuals gliding at high altitudes. The Black Harrier was observed during winter and spring. Of all observations recorded, three were detected at rotor swept height and demonstrating risk behaviours. Ludwig's Bustard was only observed once during the spring season and was observed using the airspace below the rotor swept zone. Martial Eagle was detected as incidental observations during summer, autumn and winter. About half of all observations were recorded at rotor swept height. Lastly, two individuals of Black Stork were observed during winter and spring, of which both flights occurred within the rotor swept zone.

Eleven species detected during field work are considered to be endemic or near endemic to South Africa including sensitive species such as Jackal Buzzard, Karoo Lark, Black Harrier, Large-billed Lark and Cape Clapper Lark.

The bird community in the study area (67 total bird species) is mostly comprised of passerine and small bird species (43% of the total species), followed by bird species associated with waterbodies (28% of the total bird species), Accipitrids (10% of species) and Ciconids (10% of species). Representing a smaller proportion, 7% of the species found in the study area were Bustards, Falcon or Crow species. From the aforementioned groups, the Raptors (Accipitrids), Falcons, Waterbirds and "Ciconids" are considered most likely to suffer impacts caused by wind farms (Retief *et al*., 2012). Passerines might also be sensitive to impacts and collide with wind turbines, especially those which are known to migrate (AWWI, 2015).

Although the general bird community was surveyed, the experimental protocol was specially directed to a set of 25 species considered to be sensitive to wind energy development impacts (hereafter simply referred to as sensitive species), 11 of which are Accipitrids, Falcons and similar, 8 are Large Terrestrial Birds and 6 are Passerine and other small terrestrial birds (**Table 22**). These species were selected considering those identified as target species throughout the monitoring campaign (Bioinsight, 2018); species considered as priority for inclusion in studies considering wind farms (Retief *et al*., 2012) and lastly species considered prone to impacts caused by WEFs.

Table 22 - Sensitive bird species considered central to the avian impact assessment process for the proposed Rondekop WEF. Global RLCS (WW) (Red List Conservation Status) (IUCN 2016) and South Africa RLCS (SA) (Taylor, Peacock & Wanless 2015): EN – Endangered; VU – Vulnerable; NT – Near threatened; LC – Least Concern; NA – Not Assessed; Endemism in South Africa (BLSA 2016): * –

endemic; (*) – near-endemic; SLS – endemic to South Africa, Lesotho and Swaziland. Likely Impacts: C – Collision; D – Disturbance and/or Displacement; H – Habitat destruction.

Group	Common Name	Scientific Name	Red List Conservation Status (South Africa)	Global Red List Conservation Status (IUCN 2016)	Convention Migratory Species	Endemic to South Africa	Population Trend	Priority species	Likely Impacts
"Ciconids"	Hamerkop	*Scopus umbretta*	-	LC	-	-	Stable	X	D
"Ciconids"	Black Stork	*Ciconia nigra*	VU	LC	II	-	Unknown	X	C, D
"Ciconids"	African Sacred Ibis	*Threskiornis aethiopicus*	-	LC	II (subsp. *aethiopicus*)	-	Decreasing	X	D
"Waterbirds"	Greater Flamingo	*Phoenicopterus roseus*	NT	LC	II	-	Increasing	X	C; D
"Waterbirds"	Cape Shoveler	*Anas smithii*	-	LC	II	-	Increasing	-	D
"Waterbirds"	Maccoa Duck	*Oxyura maccoa*	NT	NT	II	-	Decreasing	-	D
"Nocturnal Raptors"	Spotted Eagle-Owl	*Bubo africanus*	-	LC	-	-	Stable	X	D, H
"Accipitrids"	Verreauxs' Eagle	*Aquila verreauxii*	VU	LC	II	-	Stable	X	C, D, H
"Accipitrids"	Booted Eagle	*Hieraaetus pennatus*	-	LC	II	-	Decreasing	X	C, D, H
"Accipitrids"	Martial Eagle	*Polemaetus bellicosus*	EN	VU	II	-	Decreasing	X	C; D; H
"Accipitrids"	Black-chested Snake Eagle	*Circaetus pectoralis*	-	LC	II	-	Unknown	X	C; D; H
"Accipitrids"	Jackal Buzzard	*Buteo rufofuscus*	-	LC	II	(*)	Stable	X	C, D, H
"Accipitrids"	Pale Chanting Goshawk	*Melierax canorus*	-	LC	II	-	Stable	X	C, D, H
"Accipitrids"	Black Harrier	*Circus maurus*	EN	VU	II	(*)	Stable	X	C, D, H
"Accipitrids"	African Harrier-Hawk	*Polyboroides typus*	-	LC	II	-	Stable	X	C, D, H
"Falcons"	Rock Kestrel	*Falco rupicolus*	-	NA	II	-	NA	-	C, D, H
"Falcons"	Greater Kestrel	*Falco rupicoloides*	-	LC	II	-	Stable	X	C, D, H
"Bustards"	Ludwig's Bustard	*Neotis ludwigii*	EN	EN	-	-	Decreasing	X	D, H
"Bustards"	Karoo Korhaan	*Eupodotis vigorsii*	NT	LC	-	-	Increasing	X	D, H
"Phasianids"	Grey-winged Francolin	*Scleroptila africana*	-	LC	-	SLS	Stable	X	D, H
"Phasianids"	African Snipe	*Gallinago nigripennis*	-	LC	II	-	Unknown	-	D
"Passerines"	Common Swift	*Apus apus*	-	LC	-	-	Decreasing	-	C; H
"Passerines"	Cape Clapper Lark	*Mirafra apiata*	-	LC	-	(*)	Decreasing	-	C, D, H
"Passerines"	Karoo Lark	*Calendulauda albescens*	-	LC	-	(*)	Decreasing	-	C; D; H
"Passerines"	Large-billed Lark	*Galerida magnirostris*	-	LC	-	(*)	Increasing	-	C, D, H

A large portion of the species confirmed in the area were observed in both the proposed wind energy facility site and the surrounding area (33 species – 49% of the total species observed). These species may not be severely impacted by the presence of the wind energy facility as they already use the surrounding area, making it possible for them to therefore have an ability to potentially shift their utilisation area slightly. This includes most of the priority species present at the site (12 out of 17 species), of which 7 are Accipitrids and Falcons species, considered to have a higher vulnerability to collision, especially if using the area of development only (AWWI, 2015).

Thirteen (13) of the remaining species were observed using only the WEF site, with most of them being from the Waterbird, Ciconid and Passerine groups. Of these 13 species, only two (2) are considered sensitive to impacts caused by wind energy facilities.
A similar number of species were detected using only the Control area, with similar group characteristics. Such species are considered to be less likely negatively impacted by the Rondekop WEF as they do not regularly use the area where the WEF will be constructed. They may however be somewhat affected by the disturbance caused by the temporary construction activities which can have repercussions to the broader study area.

In terms of risk analysis, it usually takes into account the movements observed in the area which could lead to future collisions with wind turbines, both considering proposed turbine placement and technical specifications (such as rotor height). With present knowledge of the proposed turbine layouts and dimensions, a preliminary analysis is illustrated below and provides an indication of the location where sensitive species fly relative to rotor height, taking into consideration one year of observations (Figure 26, Figure 27 and Figure 28). One can observe that activity indexes are relatively low at heights **above rotor height**, averaging at <0.05 contacts per hour throughout the year. This value is considered very low and will unlikely cause high collision risk probabilities . Similarly, all sensitive species flights **at rotor swept height** are also relatively low, with activity indexes averaging between 0.05 and 0.1 contacts per hour throughout the year. There were however important flights (Rock Kestrel and Black-chested Snake Eagle individuals) recorded at this height, with high activity indexes (>0.25 contacts/hour) occurring in two 500x500m squares . However, it is important to note that none of these squares occur within the proposed WEF, but rather on the control site. As such, they are not considered significant enough to inform sensitivity of the Rondekop WEF at this stage. Lastly, regarding the flights of sensitive species **below rotor swept height**, we find that there are two areas where activity indexes are relatively high (>0.25 contacts/hour) **(Figure 28).** These two areas would normally be considered as being very highly sensitive due to the relatively higher activity levels. However, upon further analysis we find that these areas were only used by three Grey-winged Francolin individuals – which is a species that is not known to ever fly at rotor swept height (Hockey, Dean & Ryan 2005). As such, due to the low abundances observed and the lack of evidence to suggest turbine blade collision risks, these areas are not to be considered as no-go areas, but rather only as medium-sensitive areas.

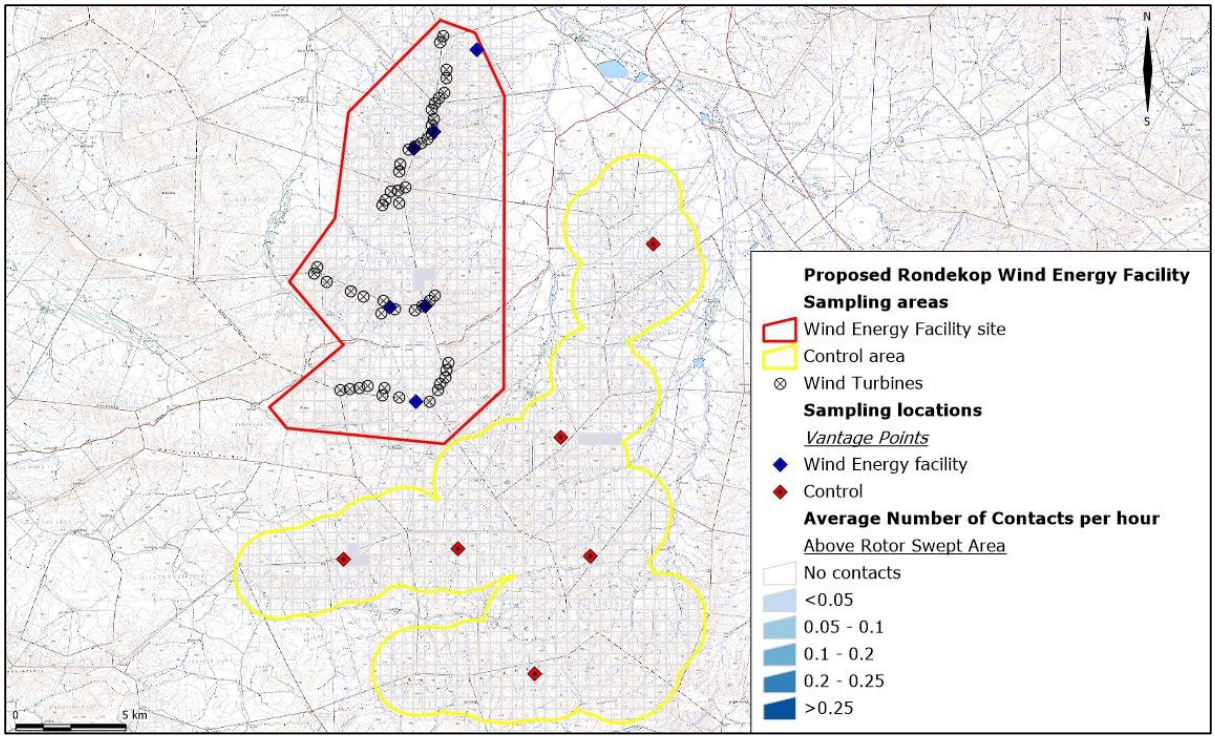

Figure 26: - Average activity of sensitive species recorded above RSA through vantage points during the 12-month pre-construction bird monitoring programme.

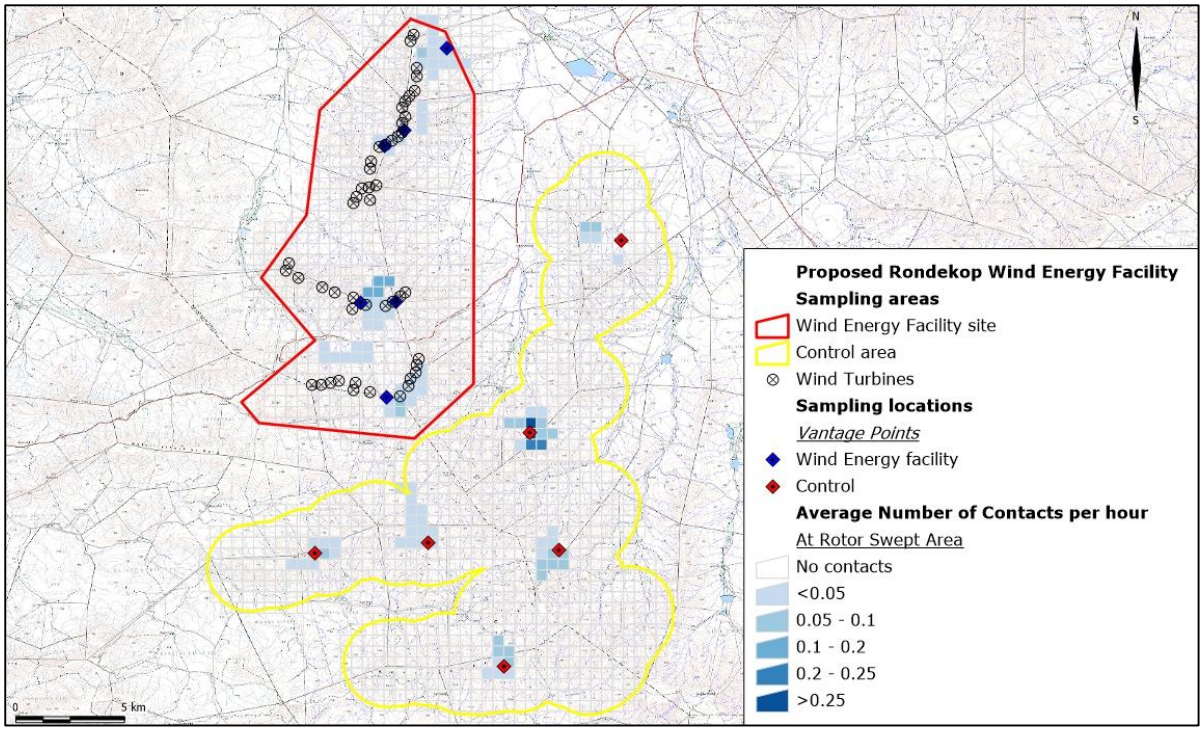

Figure 27- Average activity of sensitive species recorded at RSA through vantage points during the 12-month pre-construction bird monitoring programme.

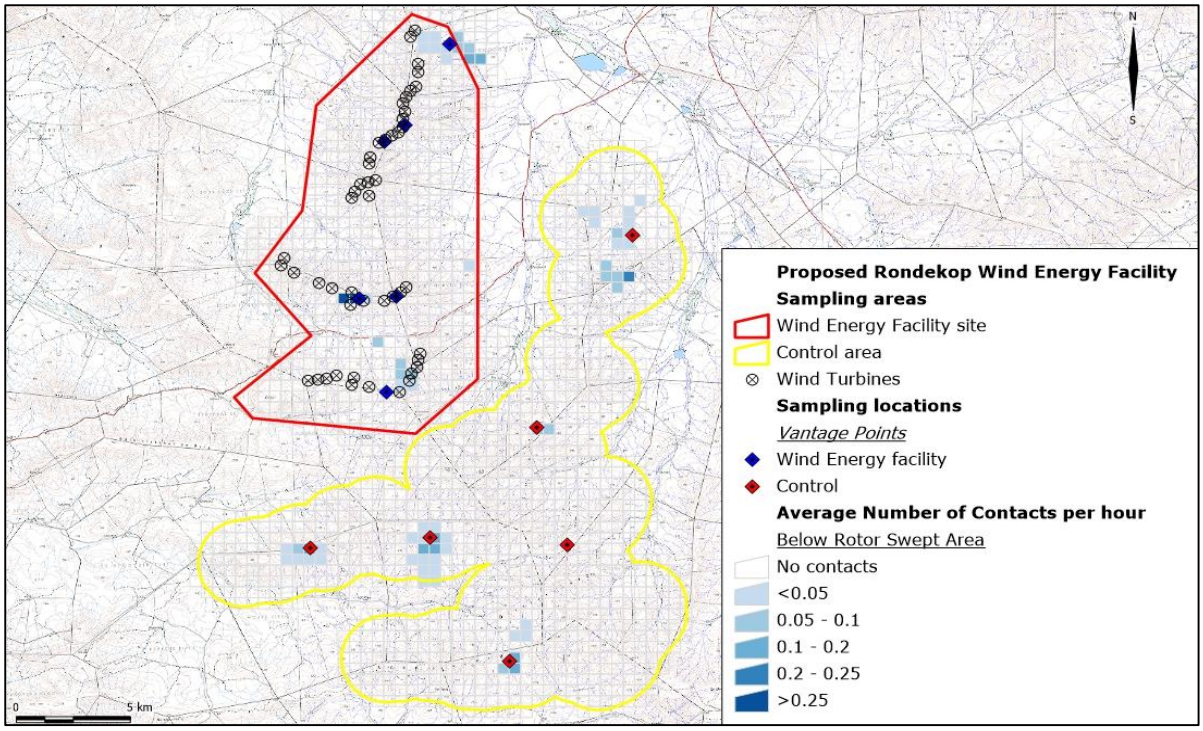

Figure 28 - Average activity of sensitive species recorded below RSA through vantage points during the 12-month pre-construction bird monitoring programme.

Priority species nests from outside of the proposed Rondekop WEF were also mapped relative to the proposed development envelope. As one can see from **Figure 29,** the nearest known priority species nest is that belonging to a Verreaux's Eagle (14.8 km south-east of the nearest turbine). A Martial Eagle nest can be observed 39.9 km east from the nearest turbine, while a Secretarybird nest can be seen 41.1 km north-east of the nearest turbine. As per the most recent Verreaux's Eagle guidelines for impact assessments, monitoring and mitigation (Birdlife South Africa, 2017), no construction is allowed to take place within 1 km of a known nest during its breeding season. Similarly, all active nests (including alternate nests) are to receive a 3 km buffer where no construction is allowed to take place. As the nearest known nest occurs 14.8 km south-east of the nearest turbine, it is noted that this distance is considered acceptable in terms of reducing the likely negative impact on the breeding pair.

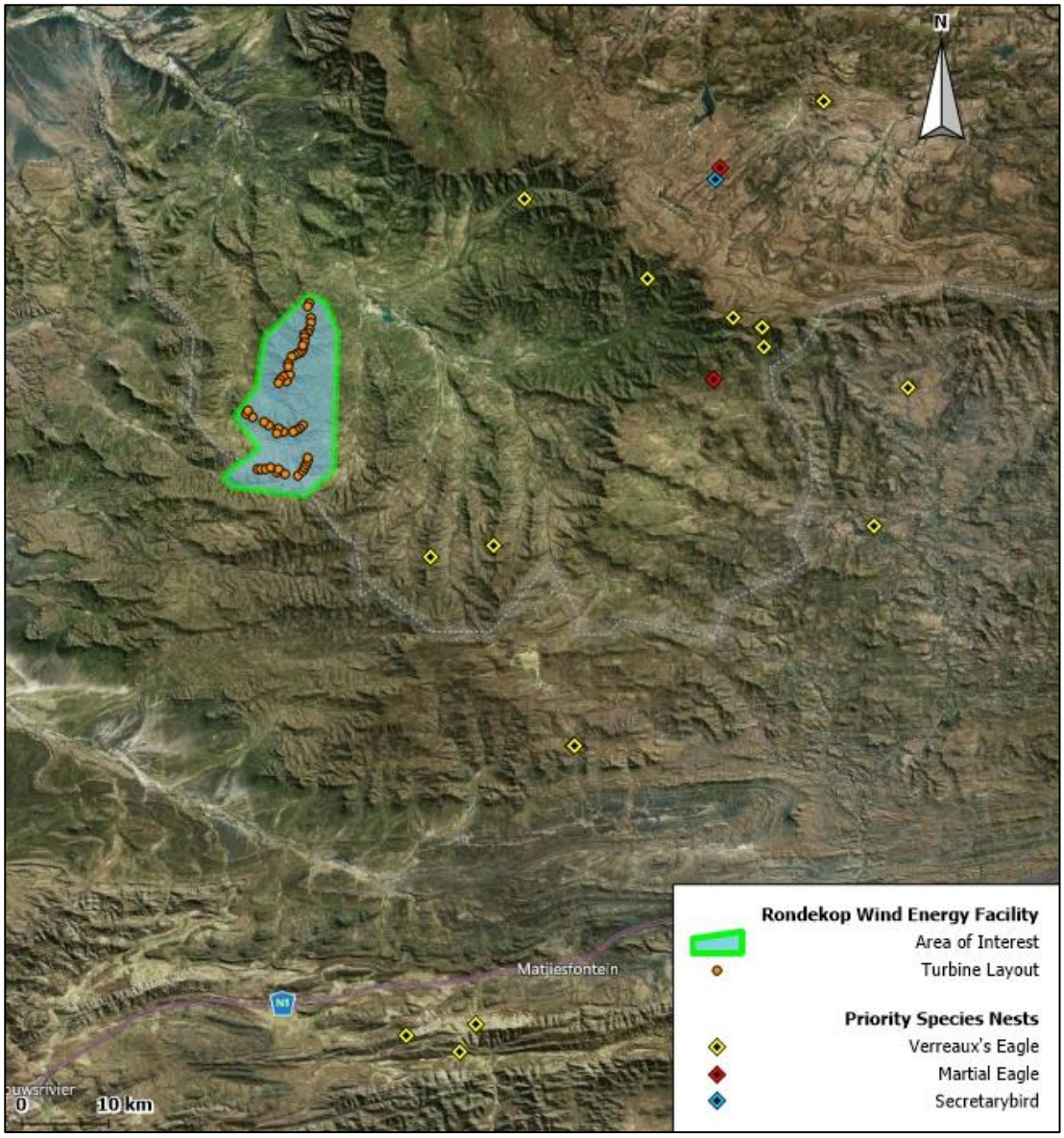

Figure 29 - Priority species nests relative to Rondekop WEF (based on information from surrounding projects).

5.9 Bat

The Bat Impact Assessment and 12-month pre-construction monitoring was conducted by Miguel Mascarenhas from BioInsight and is included as **Appendix 6D**.

5.9.1 *Description of the affected Environment*

At a macro level, there are no nature conservancy areas, to our present knowledge, within a 30 km radius of the proposed development area (**Figure 30**). The proposed Rondekop WEF site is located approximately 40 km south-east of the Tankwa Karoo National Park and 50 km east of the Cedarberg

– Koue Bokkeveld Complex Important Bird Area (SA101). Considering that Tankwa Karoo National Park is located at a considerable distance from the proposed WEF area it is not expected that the species using the National Park are affected in any way by the implementation of this project. Nonetheless the analysis of the bat species presents in the area, which are of similar nature to the Rondekop WEF proposed area, may provide indication on the suite of species likely to be present in the study area. The Cedarberg – Koue Bokkeveld Complex Important Bird Area was not classified as conservancy areas due to bat presence, but rather due to the presence of features deemed important for the occurrence of bird species with a conservation status of concern.

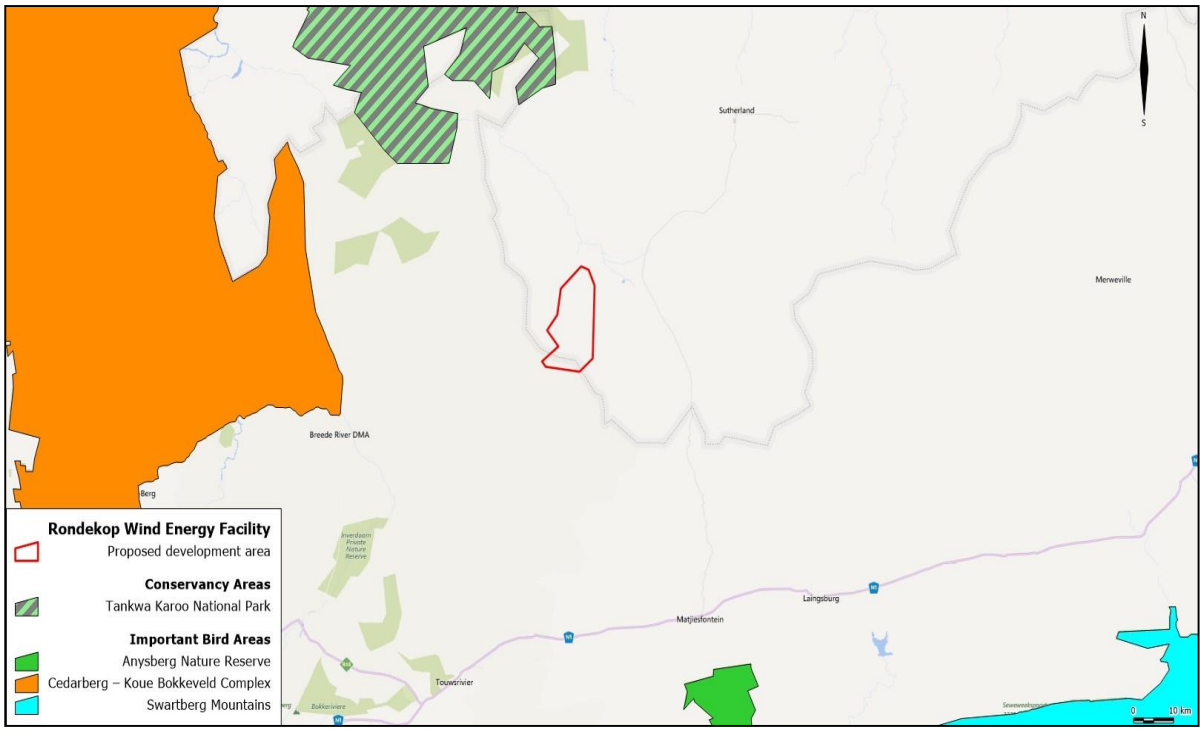

Figure 30 - Location of the Rondekop WEF in relation to the surrounding conservancy areas (background image source: Google Earth Street Maps)

The presence of known roosts was also investigated by means of a desktop analysis. With-in a 100 km radius of the proposed WEF several sources were consulted, and some roosts were identified. The closest known roost to the Rondekop WEF with species confirmation is the Montagu Guano Cave, located approximately 134 km south of the site (Figure 31). The Montagu Guano Cave is a known roost location for *Miniopterus natalensis*, *Myotis tricolor*, *Rhinolophus clivosus* and *Tadarida aegyptiaca*. The Die Hel Cave is other confirmed roost that is located at approximately 127 km west to the proposed WEF. In this roost, the presence of several species was confirmed, namely: *Rhinolophus capensis*, *Rhinolophus clivosus*, *Miniopterus fraterculus*, *Miniopterus natalensis* and *Rousettus aegyptiacus*.

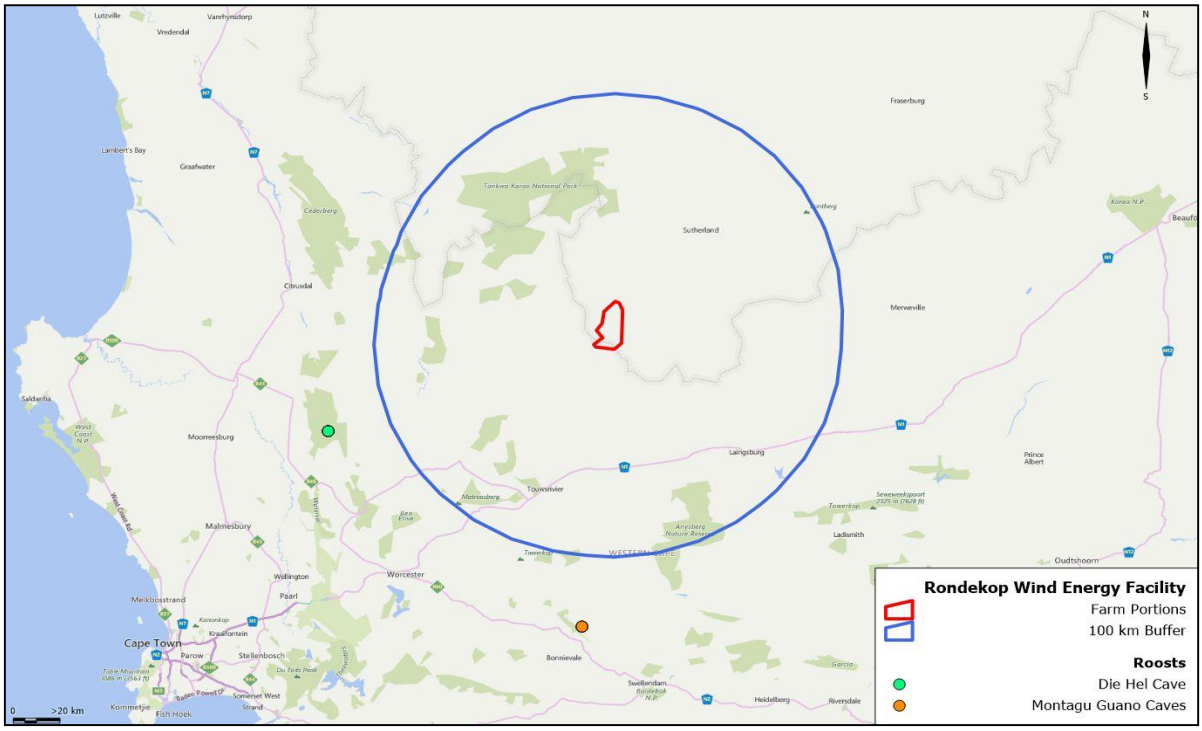

Figure 31 – Confirmed roosts located in the vicinity of the proposed WEF site (background image source: Virtual Earth Street Image).

5.9.2 *Overview of Bats*

Vegetation structure is a determinant key in bat distribution. The proposed Rondekop WEF site is located within the Succulent Karoo biome, where vegetation is adapted to the hot and seasonal climate. Several bat species are however highly associated with the type of habitat characteristics of arid and semi-arid habitats such as the Egyptian slit-faced bat (*Nycteris thebaica*), the Lesueur's wing gland bat (*Cistugo lesueuri*), the Cape horseshoe bat (*Rhinolophus capensis*), or the Egyptian free-tailed bat (*Tadarida aegyptiaca*). Other species may be present in the area not for the vegetation structure but for the terrain features, which include mountains, cliffs and ridges. The Long-tailed serotine (*Eptesicus hottentotus*), the Natal long-fingered bat (*Miniopterus natalensis*) and the Temminck's myotis (*Myotis tricolor*) are examples of species closely tied to mountainous areas, which may occur within the study site.

Apart from the bat species that are naturally associated with the biome, other species, which have a more widespread distribution may also occur, such as the Cape serotine (*Neoromicia capensis*). As aforementioned, the proposed Rondekop WEF is mostly comprised of natural vegetation with large plains and mountain features, without much structural vegetation complexity. Therefore, some bat diversity is expected – mainly associated with the different types of terrain, as opposed to different types of vegetation.

The study area is not abundant in water sources at present, and therefore it is expected that the few water features present will have a high attraction factor for bats, especially during the wet season. Their importance is not restricted only to water availability but also to insect abundance due to the associated vegetation present.

The proposed development area is occupied mainly by natural vegetation. The vegetation provides a very sparse coverage of the soil and does not provide much refuge to any bat species. It is however a good hunting ground for open-air foragers such as the Egyptian free-tailed bat. Natural shrubby vegetation is present both at the top of the mountain ridges and in the slope and flatter plain areas. Vegetation taller than shrubs is very scarce in the study area and is generally associated with watercourse lines. These locations may have two different utilisations by the different bat species potentially present in the area: they may be used as roosts by tree-dwelling or be used as feeding roosts during the night by other bat species, such as the Geoffroy's horseshoe bat, which then roost during the day at separate locations (usually caves or mines).

At a WEF site level, activity in the area is considered to be low at ground and rotor level. The general area of the site is being used by sensitive species, with a medium to high risk of collision with wind turbines (e.g. Egyptian free-tailed bat, Cape serotine, Lesser long-fingered bat and Natal long-fingered bat). The mountains and ridges present throughout the site supply many rock crevices suitable for bat roosts. However, no roosts were identified within the proposed core WEF area. The roosts identified in the surroundings of the proposed Rondekop WEF core area (where associated infrastructures are to be placed) are all buildings and it has been confirmed that six (6) of these nine (9) roosts have bat occupation (**Figure 32**).

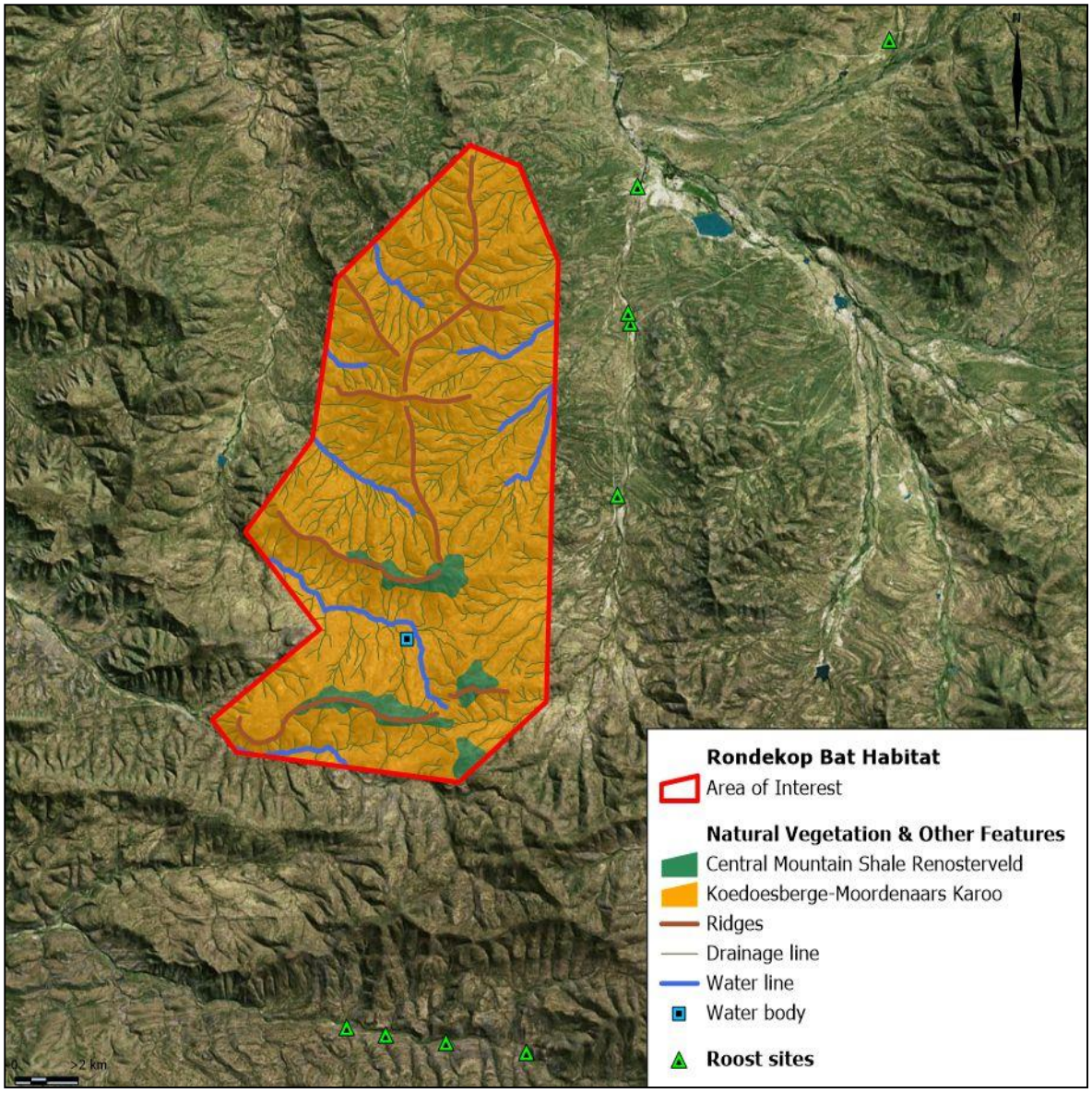

Figure 32 - Bat habitats occurring within the proposed Rondekop WEF

5.9.3 *Main Results of study*

Approximately 67 bat species may occur within South Africa (Monadjem *et al*., 2010) and according to several criteria fifteen (15) bat species have the potential to occur in the immediate vicinity of the Rondekop WEF study area. Of these 15 species, five (5) of them had confirmed occurrence in the study area. Also, of these fifteen (15) species likely to occur within the site, nine (9) of them are considered to be sensitive to the project development.

The confirmed species on site are the Egyptian free-tailed bat (*Tadarida aegyptiaca*), the Cape serotine (*Neoromicia capensis*), the Natal long-fingered bat (*Miniopterus natalensis*), Lesser long-fingered bat (*Miniopterus fraterculus*) and the Egyptian slit-faced bat (*Nycteris thebaica*). These are all “Near Threatened” or “Least Concern” species, according to the South African Red List (Friedmann & Daly, 2004b).

One species with confirmed occurrence is perceived as having a potential high risk of collision with wind turbines (according to Sowler *et al.*, 2017) due to their behaviour, i.e. Egyptian free-tailed bat (*Tadarida aegyptiaca*). Three other species with confirmed presence in the area raise concerns regarding their probability of fatalities, as they have a medium-high risk of collision with wind turbines: Cape serotine (*Neoromicia capensis*), Lesser long-fingered bat (*Miniopterus fraterculus*) and Natal long-fingered bat (*Miniopterus natalensis*). Additionally, *Miniopterus natalensis* is a migrant species that can use air space at rotor level during migration periods being prone to collision during these events.

According to pre-construction monitoring results, the bat activity at the proposed Rondekop WEF area is generally low at ground and rotor level. Although the Rondekop WEF is considered to be classified as having **low bat sensitivity, it is noteworthy that some areas in particular, have a very high sensitivity** due to the presence of specific features and habitat that may have an increased bat activity. These include the presence of watercourse lines, water bodies and associated riverine vegetation which are important for bats, since they are likely to act as commuting routes, providing food resources, and are therefore likely to be associated with higher bat activity.

5.10 Aquatic Ecology

The Aquatic Assessment was conducted by Envirosci. The full report is included in Appendix 6B. The environmental baseline from a surface water perspective is presented below.

5.10.1 *Surface Water Information*

The site was assessed during a two day site visit (25th and 26th September 2018), to confirm the current state of the environment. This coincided with some rain, and the onset of the spring growth season. Due to the nature of the aquatic systems, this was enough to gain an understanding of these, coupled to information collected within the region from 2012 onwards by the report author in other portions of the same catchments.

Although the project site boundary spans several catchments, actual proposed development occurs within the following catchments within the Nama Karoo ecoregion (Figure 33):

1. E23B Windheuwel (Tankwa)
2. E23C Houthoek (Tankwa)
3. E23H Brak (Ongeluks)

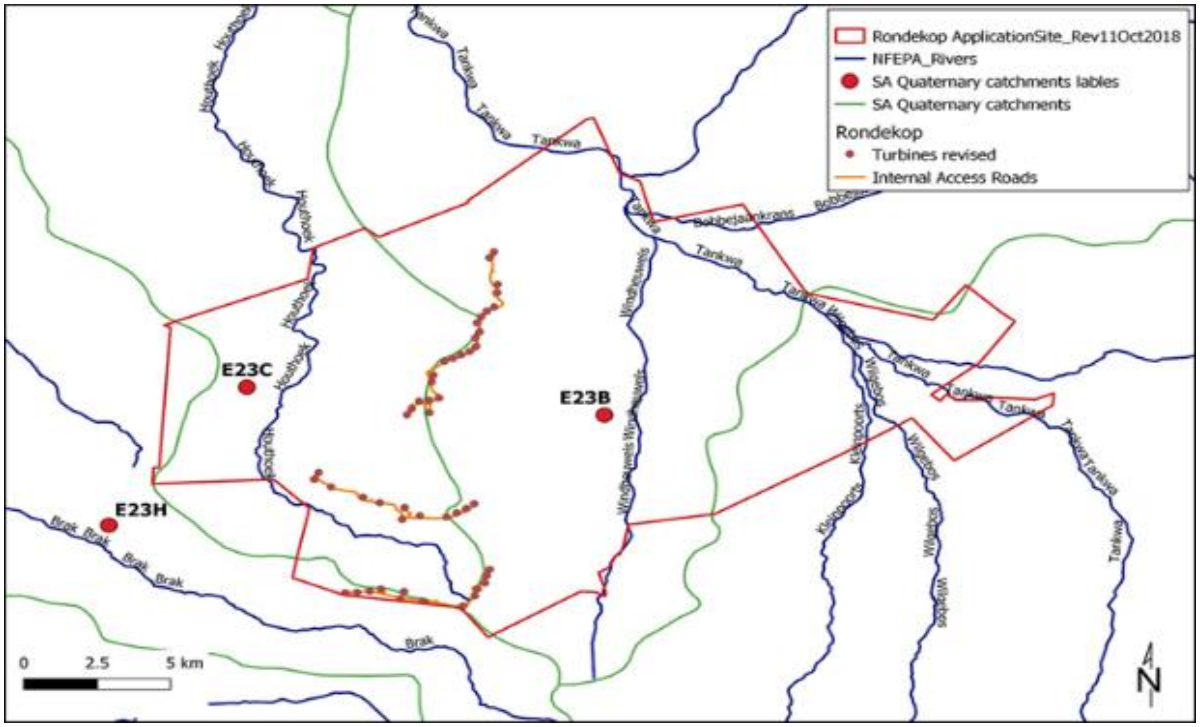

Figure 33 Project locality map indicating the various quaternary catchment boundaries (green line) in relation to the study area (Source DWS and NGI).

These catchments are characterised by several perennial watercourses and drainage lines associated with these mainstem systems listed above and located within the greater Tankwa, Brak or Ongeluks rivers catchments respectively.

Overall, these catchment and subsequent rivers / watercourses are largely in a natural state. Current impacts occur in localised areas and included the following:

- Erosion because of road crossings;
- Several farm dams; and
- Undersized culverts within present day road crossings.

Absent from the study area were the typical Juncus wetlands (valley bottom wetland types – with and without channels) with the closest natural wetland system being more than 3 km from the site boundary. Thus, the systems within the study area are alluvial river systems, characterised as natural sediment transport mechanisms within the regional environment. The lack of any natural wetlands (pans and or valley bottom systems) was also substantiated by the National Wetland Inventory v5.2 spatial data. One small seepage wetland was found during a follow-up walkdown, which coincided with some rainfall and later in the growth season. It was found in close proximity to Centre Ridge Road Alternative 1, and for this reason this option should be avoided. (Figure 34)

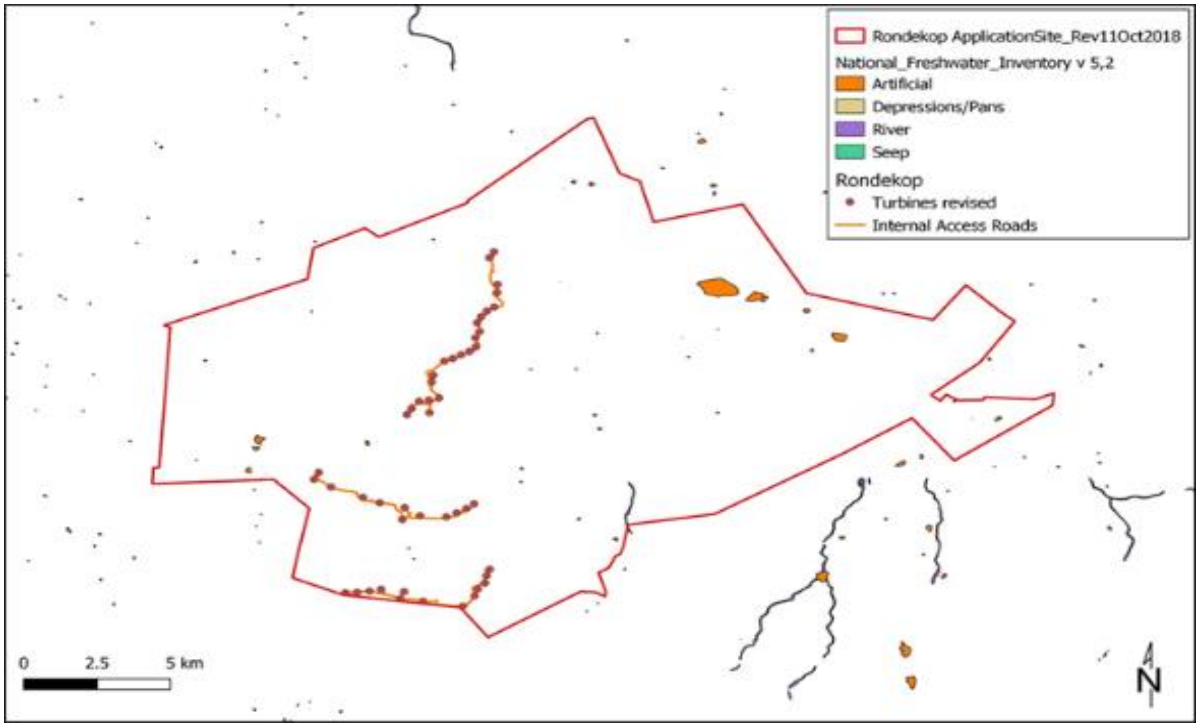

Figure 34 The various dams within or near the property identified in the National Wetland Inventory V5.2 (2018), with no natural wetlands being observed within the 500m of the boundary**.**

In terms of the NFEPA assessment, all of the watercourses within the site have been assigned a condition score of AB (Nel *et al.* 2011), indicating that they are largely intact and of biological significance. This is largely due to these catchments falling within the headwaters of the Brak/ Ongeluks and Tankwa rivers respectively. However, as the study area systems are mostly ephemeral, these don't support any wide riparian zones and the vegetation associated with these watercourses was between 0.5 m and 12 m wide. Species consisted mostly of Searsia species (S. undulata, lancea & crenata) and Vachellia karroo. Where broader river valleys occur, Tamarix usneoides and Galenia africana were observed, while in narrow areas in the higher lying watercourses, Salix mucronata were also noted.

The NFEPA (Nel *et al.,* 2011), also earmarked sub-quaternaries, based either on the presence of important biota (e.g. rare or endemic fish species) or conversely the degree of riverine degradation, i.e. the greater the catchment degradation the lower the priority to conserve the catchment. The important catchments areas are then classified as Freshwater Ecosystems Priority Areas or FEPAs. The survey area falls within Upstream FEPAs, as systems, outside of the project area, such as the Brak, Ongeluks, Houthoek and Tankwa rivers located downstream are important regionally (Figure 35 below) and are supported hydrologically by the study area systems.

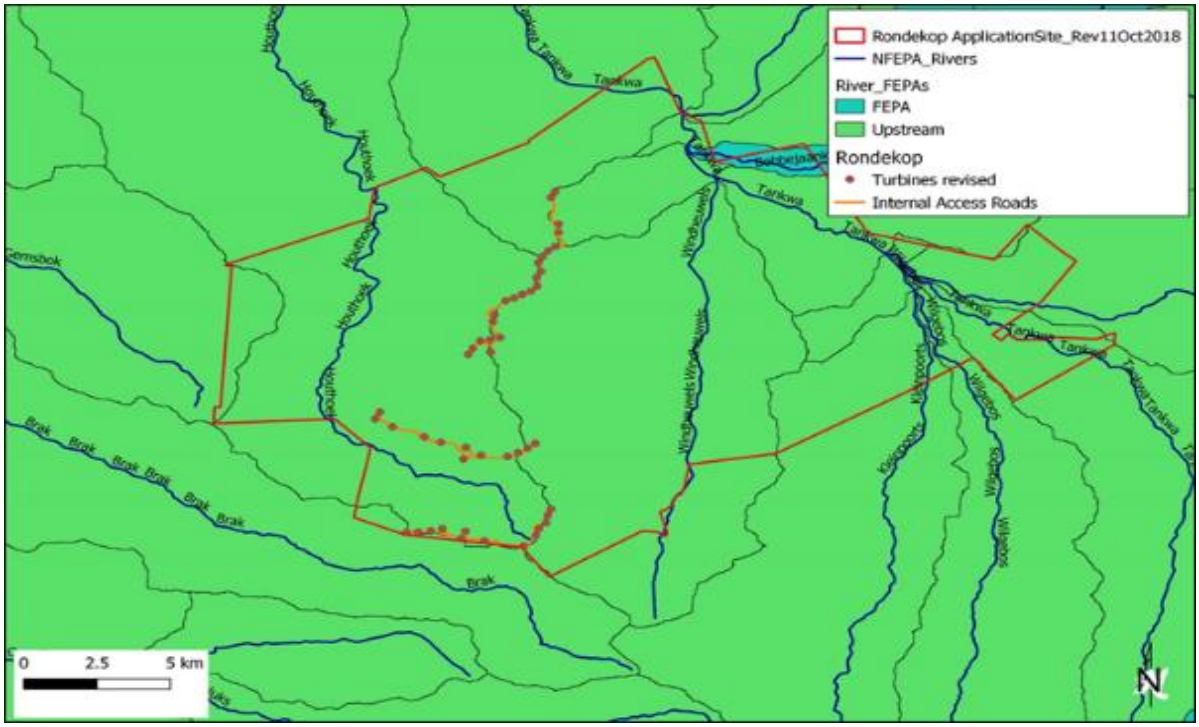

Figure 35: The respective subquaternary catchments rated in terms of Freshwater Ecosystem Priority Areas (FEPAs) in relation to the study area

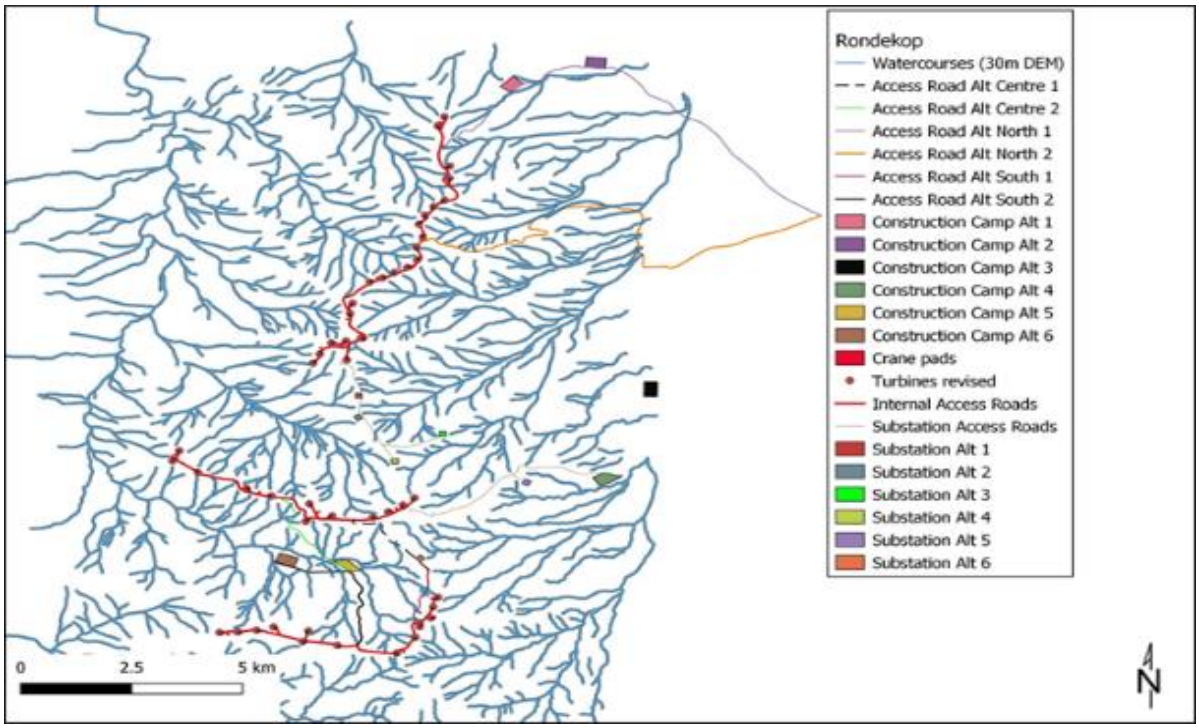

Figure 36: Watercourses within the study area created using 30m data supplied by the USGS and verified using NGI 1:50 000 topo data in relation to the activities, alternatives and the 32m watercourse buffer.

Figure 36 above, indicates significant watercourses within the site. Any activities within these areas or the 32 m buffer will require a WUL (possible GA) under Section 21 c & I of the NWA, 1998.

5.11 Agricultural and Soil

The Soils and Agricultural Potential Assessment was conducted by Johann Lanz. The full report is included in Appendix 6A. The environmental baseline from a soils and agricultural perspective is presented below.

5.11.1 *Soils*

The land type classification is a nationwide survey that groups areas of similar soil, terrain and climatic conditions into different land types. There are five land types across the study area. Most wind farm infrastructure is located on land type Fc269, with some infrastructure on Fc295, Fc300, and Fc274. Land type Ag93 also occurs in the study area, but no WEF infrastructure is proposed on this land type. Soils on all these land types are fairly similar and are predominantly shallow, sandy soils on underlying rock or hard-pan carbonate. Dominant soil forms are Mispah, Glenrosa and Oakleaf (which are deeper than the other soils). The soils would fall into the Lithic and Calcic soil groups according to the classification of Fey (2010).

5.11.2 *Agricultural capability*

Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability classes are suitable as arable land for the production of cultivated crops, while the lower suitability classes are only suitable as non-arable grazing land, or at the lowest extreme, not even suitable for grazing. In 2017 DAFF released updated and refined land capability mapping across the whole of South Africa. This has greatly improved the accuracy of the land capability rating for any particular piece of land anywhere in the country. The new land capability mapping divides land capability into 15 different categories with 1 being the lowest and 15 being the highest. Values of below 8 are generally not suitable for production of cultivated crops. Detail of this land capability scale is shown in **Table 23**.

The project area is classified with land capability evaluation values that range from 1 to 7, with the range between 2 and 5 covering the majority of the area. **The land capability is limited by the very low climatic moisture availability, the rugged terrain, and the shallow, rocky soils.**

Table 23: Details of the 2017 Land Capability classification for South Africa.

Land capability evaluation value	**Description**
1	Very Low
2	
3	Very Low to Low
4	
5	Low
6	Low to Moderate

Land capability evaluation value	Description
7	
8	Moderate
9	Moderate to High
10	
11	High
12	High to Very High
13	
14	Very High
15	

Due to the land capability constraints, agricultural land use is restricted to low intensity grazing only. The natural grazing capacity is given on Cape Farm Mapper as low, at 45 to 55 hectares per large stock unit.

5.11.3 *Land use and development on and surrounding the site*

The WEF is located in a sheep farming agricultural region, and grazing on natural veld is by far the dominant land use, although some cultivation exists along the banks of the Tankwa River in the east of the site and to a lesser extent along the banks of one of its tributaries, the Houthoek River in the west of the site. There is very little agricultural infrastructure in the study area, apart from fencing into camps and wind pumps with stock watering points. There are very few farm buildings across the site.

5.11.4 *Possible land use options for the site*

Due to the extreme aridity constraints as well as the rugged terrain and poor soils, the land is considered unsuitable for agricultural purposes, other than low intensity grazing.

5.11.5 *Agricultural sensitivity*

Agricultural sensitivity is directly related to the capability of the land for agricultural production. This is because a negative impact on land of higher agricultural capability is more detrimental to agriculture than the same impact on land of low agricultural capability. A general assessment of agricultural sensitivity, in terms of loss of agricultural land in South Africa, considers arable land that can support viable production of cultivated crops, to have high sensitivity. This is because there is a scarcity of such land in South Africa, in terms of how much is required for food security. However, there is not a scarcity in the country of land that is only suitable as grazing land and such land is therefore not considered to have high agricultural sensitivity.

In terms of the sensitivity categories used in the REDZ sensitivity analysis, the southern parts of this site, that were included in that study, were assessed as low sensitivity (DEA, 2015).

Agricultural potential and conditions are very uniform across the site and the choice of placement of facility infrastructure, including access roads, and transmission lines therefore has minimal influence on the significance of agricultural impacts. **No agriculturally sensitive areas occur within the study area.** From an agricultural point of view, no parts of the site need to be avoided by the development and there are no required buffers.

5.12 Noise

The Noise Assessment was conducted by Dr Brett Williams of Safetech. The full report is included in Appendix 6F. The environmental baseline from a noise perspective is presented below.

5.12.1 *Description of the Affected Environment*

The proposed Rondekop WEF is to be constructed on farmland. The topography surrounding the site is characterised by steep hills, mountains and valleys.

5.12.2 *Site Location*

The location and position of the various wind turbines are contained in the Noise impact assessment included in appendix 6F.

The positions of the turbines and noise sensitive areas are shown in Figure 37 below.

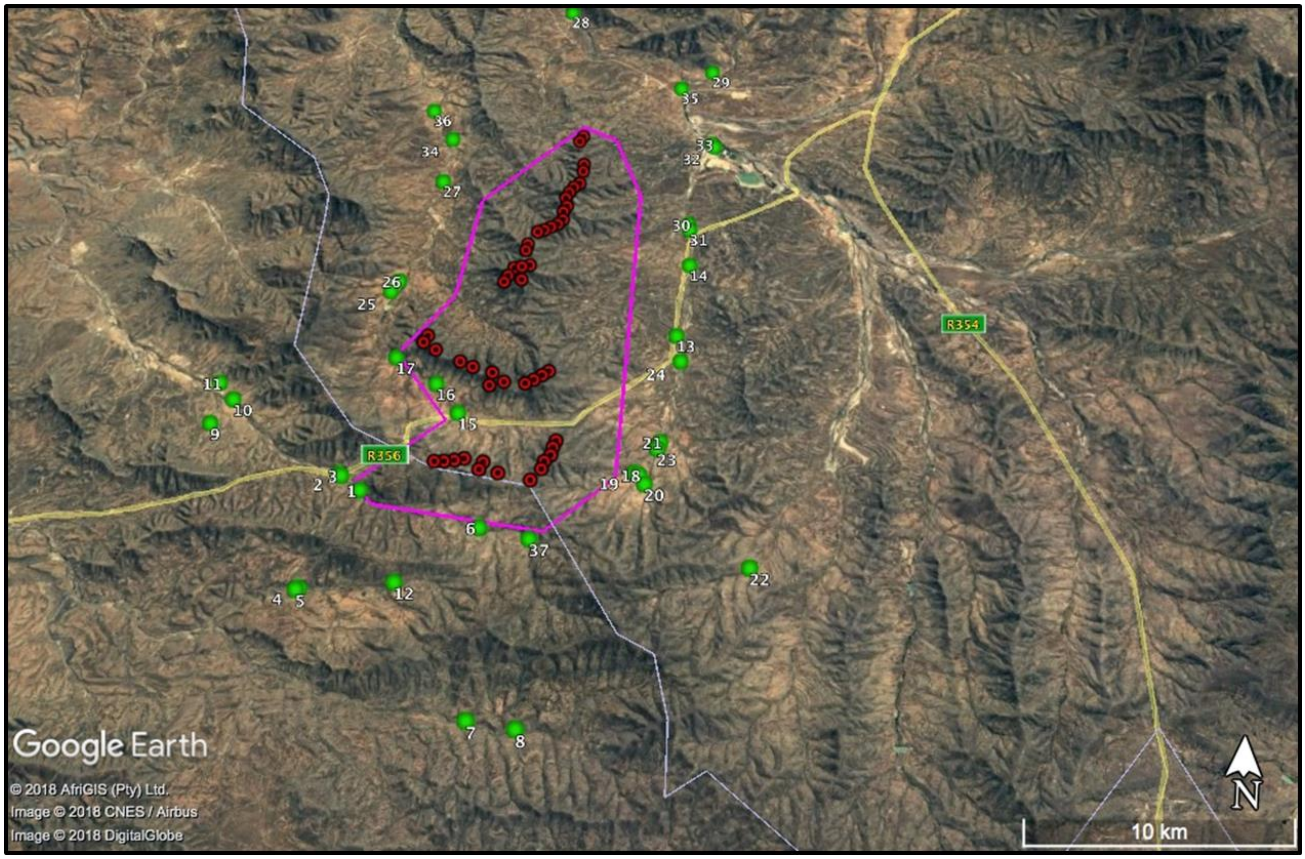

Figure 37: The proposed positions of the wind turbines and Noise Sensitive Areas Wind turbines (red dots) and Noise Sensitive Areas (green dots).

The potential sensitive receptors are discussed below. The main noise sensitive receptors that could be affected by noise pollution are humans, terrestrial fauna and avifauna.

5.12.3 *Noise Sensitive Areas*

The site is situated in a farming community. Several homesteads are located on the properties where the turbines will be erected as well as on neighboring farms. The sensitive noise receptors (homesteads) have been recorded in **Table 24** below.

Table 24: Noise Sensitive Areas in relation to the proposed Rondekop WEF

NSA No	Longitude	Latitude	Within the Project Area
1	20°13'33.90"	32°48'37.88"	No
2	20°12'57.05"	32°48'15.89"	No
3	20°13'00.89"	32°48'18.38"	No
4	20°12'21.65"	32°50'50.89"	No
5	20°12'16.91"	32°50'52.74"	No
6	20°16'47.91"	32°49'23.03"	No
7	20°16'56.26"	32°53'26.68"	No
8	20°18'09.71"	32°53'34.26"	No
9	20°09'17.55"	32°47'11.29"	No
10	20°09'47.07"	32°46'35.35"	No
11	20°09'20.19"	32°46'11.63"	No
12	20°14'46.52"	32°50'39.11"	No
13	20°21'40.94"	32°44'36.19"	No
14	20°21'58.09"	32°42'44.81"	No
15	20°15'55.77"	32°46'45.33"	**Yes**
16	20°15'15.47"	32°46'03.89"	**Yes**
17	20°14'04.25"	32°45'26.49"	No
18	20°20'50.29"	32°48'01.64"	No
19	20°20'43.60"	32°47'58.94"	No
20	20°21'00.01"	32°48'13.86"	No
21	20°21'21.72"	32°47'13.84"	No
22	20°23'46.85"	32°50'01.29"	No
23	20°21'17.46"	32°47'23.73"	No
24	20°21'49.07"	32°45'14.31"	No
25	20°13'39.57"	32°43'44.35"	No
26	20°13'51.11"	32°43'27.67"	No
27	20°14'43.91"	32°40'41.76"	No
28	20°18'04.04"	32°35'26.03"	No
29	20°22'26.47"	32°37'12.58"	No
30	20°21'53.75"	32°41'37.91"	No
31	20°21'55.67"	32°41'46.86"	No
32	20°22'34.16"	32°39'24.64"	No
33	20°22'29.35"	32°39'19.91"	No

NSA No	Longitude	Latitude	Within the Project Area
34	20°14'50.98"	32°39'27.75"	No
35	20°21'31.72"	32°37'42.57"	No
36	20°14'11.41"	32°38'38.33"	No
37	20°18'06.91"	32°49'35.87"	No

The vegetation around the site is characterised by typical Karoo vegetation. The fauna includes bats, birds, commercial livestock, smaller mammals, reptiles and a variety of buck.

5.12.4 *Ambient Noise at Proposed Site*

The ambient noise was measured at several locations as described in the methodology and results thereof are contained in **Table 25** below. The author is confident that this represents the ambient noise at the project site at the noise sensitive receptors.

Table 25: Ambient Noise Results 18th July 2018

DAY

Date:	18/07/2018	18/07/2018	18/07/2018
Position:	NSA 32 (14:30)	Between NSA 4 & 5 (16:05)	Between NSA 6 & 7 (17:00)
Leq dB(A)	50.1	46.0	38.7
Comments	Noise from birds, one car.	Noise from birds, sheep, wind calm.	Noise from birds, consultants' footsteps on gravel. Wind calm

EVENING

Date:	18/07/2018	18/07/2018	18/07/2018
Position:	NSA 32 (20:10)	Between NSA 4 & 5 (18:40)	Between NSA 6 & 7 (19:10)
Leq dB(A)	46.5	45.3	32.7
Comments	Noise from birds, wind calm.	Noise from birds, sheep, wind calm	Noise from birds, consultants' footsteps on gravel. No wind noise.

NIGHT

Date:	18/07/2018	18/07/2018	18/07/2018
Position:	NSA 32 (22:00)	Between NSA 4 & 5 (22:40)	Between NSA 6 & 7 (23:20)
Leq dB(A)	32.5	30.1	28.1
Comments	Noise from birds. Wind calm.	Wind calm	Noise from consultants' footsteps on gravel. Ambient noise almost imperceptible. No wind noise.

The general ambient noise at each location varies as the ambient sound is influenced by human activities, vehicles, wind noise and animal sounds.

5.12.5 *Wind Turbine Generators*

The Wind Turbine Generator (WTG) that was modelled is described in **Table 26** below. This turbine was chosen to represent the worst-case scenario of a wind turbine up to 4.5 MW and up to 140 m hub height. This model of turbine was chosen as it has published noise data in the WindPro catalogue of wind turbines. Furthermore, the noise data has been tested according to the methods described in IEC 61400-11 and are thus traceable. The modelled hub height is 125 m. If a higher or lower final hub height is chosen, the noise impacts could be reduced or increase depending on the sound power of the turbine. Furthermore, if the final turbine that is chosen has a maximum sound power level that is similar or lower than the turbine modelled in this report, it can be assumed that the noise impacts will be similar or lower, irrespective of the turbine manufacturer.

Table 26: Modelled Turbine Specifications

Manufacturer	Nordex
Type / Version	N149/4.0-4.5
Rated Power	4.5 MW
Rotor Diameter	149m
Tower	Tubular
Grid Connection	50 Hz
Maximum Sound Power Level	**108.1 dB**
Hub Height	125m

Sound Power Level dB(A) reference to 1pW from WindPro 3.2 Catalogue

*The specifications of this turbine model were used as the data is available in WindPro. This does not bind the applicant to this specific model, and any turbine model with similar turbine specifications. An equal or lower maximum sound power level would be acceptable for the site without re-modelling.

5.13 Visual

The Visual Assessment was conducted by Kerry Schwartz of SiVEST. The full report is included in Appendix 6J. The environmental baseline from a visual perspective is presented below.

The physical and land use related characteristics are outlined below as they are important factors contributing to the visibility of a development and visual character of the study area. Defining the visual character is an important part of assessing visual impacts as it establishes the visual baseline or existing visual environment in which the development would be constructed. The visual impact of a development is measured according to this visual baseline by establishing the degree to which the development would contrast with or conform to the visual character of the surrounding area. The inherent sensitivity of the area to visual impacts or visual sensitivity is thereafter determined, based on the visual character, the economic importance of the scenic quality of the area, inherent cultural value of the area and the presence of visual receptors.

5.13.1 *Topography*

The site proposed for the Rondekop WEF development is located in the scenic Karoo region of the Northern Cape which is generally associated with wide vistas and mountainous landscapes. The topography in the immediate vicinity of the site is however largely dominated by the mountains/hills of the Klein Roggeveld range, with some flatter land occurring in the northern section of the study area (**Figure 38 and Figure 39**).

Maps showing the topography and slopes within and in the immediate vicinity of the proposed application site are provided in Figure 11 and Figure 12.

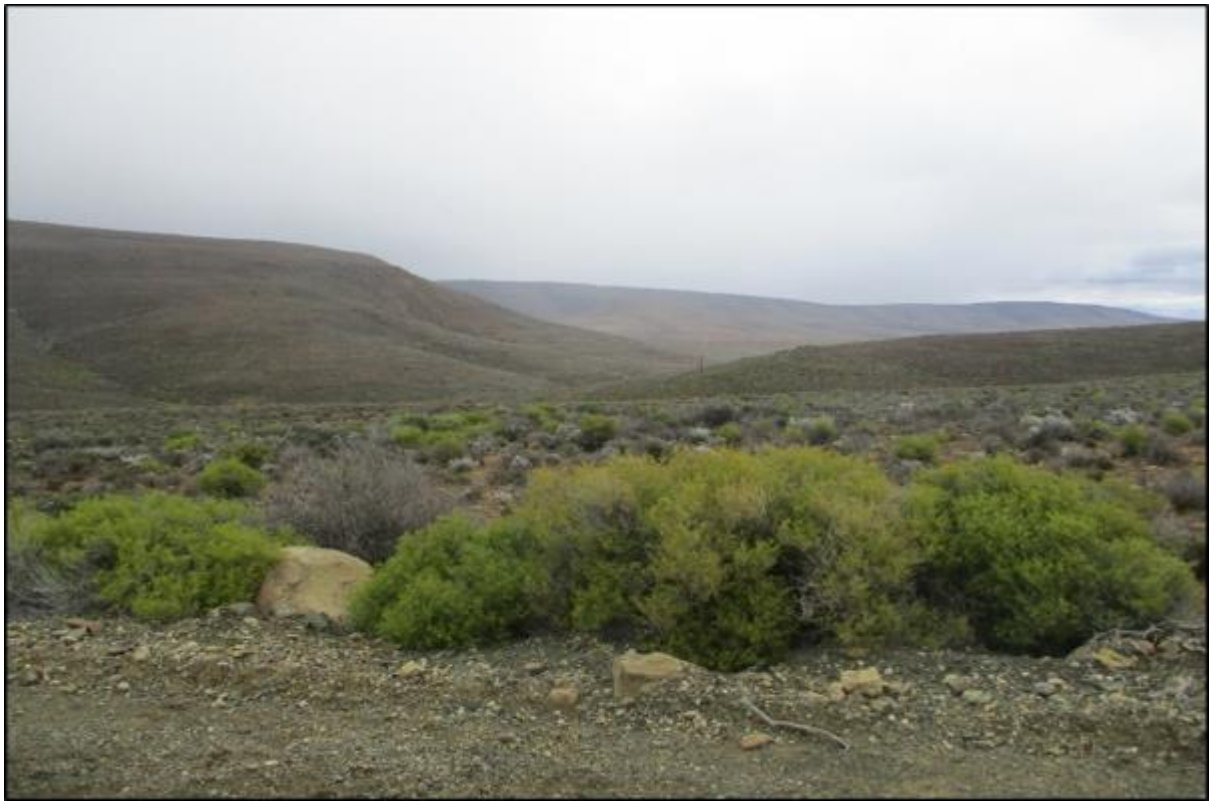

Figure 38: View (SE) across the study area from R356 **(-32.788244S; 20.242131E)** showing typical undulating topography.

Figure 39: View from a high point (**-32.704673; 20.290742E)** on the application area showing high mountains enclosing the visual envelope.

5.13.2 *Vegetation*

As discussed in section 5.7, the vegetation cover across the study area is predominantly short and sparse and thus will not provide any visual screening. In some instances, however, tall exotic trees planted around farmhouses may restrict views from receptor locations (Figure 40).

Figure 40: Example of trees and garden vegetation established around farmhouses in the area

5.13.3 *Land Use*

The sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural rural setting. In addition, there are no towns or settlements in the visual assessment zone and thus, in general there are very low levels of human transformation and visual degradation within the study area

The influence of the level of human transformation on the visual character of the area is described in more detail below.

5.13.4 *Visual Character*

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

As mentioned above, much of the study area is characterised by natural landscapes with rural elements and low densities of human settlement. Livestock grazing is the dominant land use, with only very few isolated patches of cultivation in parts of the study area. These activities have not transformed the natural landscape to any significant degree and as such a large portion of the study area has retained its natural character and is dominated by largely natural, scenic views.

There are no towns or built-up areas in the visual assessment zone influencing the overall visual character and thus there are very low levels of human transformation and visual degradation across much of the study area. The most prominent anthropogenic elements in the study area include telephone poles, windmills, gravel access roads and farm boundary fences. The presence of this infrastructure is an important factor in this context, as the introduction of the proposed WEF would result in less visual contrast where other anthropogenic elements are already present. The scale of the existing elements is however much smaller than that of the proposed WEF and as such the degree of contrast would still be relatively high.

The scenic quality of the landscape is also an important factor contributing to the visual character of an area or the inherent sense of place. Visual appeal is often associated with unique natural features or distinct variations in landform. As such, the hilly / mountainous terrain which occurs in the wider study area is considered to be an important feature that would potentially increase the scenic appeal and visual interest in the area.

The greater area surrounding the development site is an important component when assessing visual character. The area can be considered to be typical of a Karoo or “platteland” landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa’s dry Karoo interior consists of wide open, uninhabited spaces sparsely punctuated by widely scattered farmsteads and small towns. Over the last couple of decades, an increasing number of tourism routes have been established in the Karoo and in a context of increasing urbanisation in South Africa’s major centres, the Karoo is being marketed as an undisturbed getaway. Examples of this may be found in the “Getaway Guide to Karoo, Namaqualand and Kalahari” (Moseley and Naude-Moseley, 2008).

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The typical Karoo landscape can also be considered a valuable ‘cultural landscape’ in the South African context. Although the cultural landscape concept is relatively new, it is becoming an increasingly important concept in terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002).

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

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

The typical Karoo landscape consisting of wide-open plains, and isolated relief, interspersed with isolated farmsteads, windmills and stock holding pens, is an important part of the cultural matrix of the South African environment. The Karoo farmstead is also a representation of how the harsh arid nature of the environment in this part of the country has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction. The presence of small towns, such as Sutherland and Matjiesfontein, engulfed by an otherwise rural environment, form an integral part of the wider Karoo landscape. As such, the Karoo landscape as it exists today has value as a cultural landscape in the South African context. In terms of the types of cultural landscape listed above, the Karoo cultural landscape would fall into the second category, that of an organically evolved, “continuing” landscape.

In light of this, the study area, as visible to the viewer, represents a typical Karoo cultural landscape. This is an important factor in the consideration of potential visual impacts associated with the development of a WEF as introducing this type of development could be a degrading factor in the context of the natural Karoo character of the study area. However, considering the fact that a number of WEFs have been developed or are likely to be developed across the Karoo, it is possible that WEFs may become an integral part of the typical Karoo cultural landscape.

In the broader area around the proposed WEF, visual impacts on the cultural landscape would be reduced by the fact that the area is very remote and there are no significant tourism enterprises attracting visitors into the study area. In addition, the nearest major scenic route, the R354, is outside the 8 km visual assessment zone and is not expected to experience any visual impacts from the proposed WEF.

5.14 Heritage

The Heritage Assessment was conducted by PGS Heritage (Pty) Ltd. The full report is included in **Appendix 6E**. The environmental baseline from a heritage perspective is presented below.

The examination of heritage databases, historical data and cartographic resources represents a critical additional tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Therefore, an Internet literature search was conducted, and relevant archaeological and historical texts were also consulted. Relevant topographic maps and satellite imagery were studied.

Researching the SAHRA APM Report Mapping Project records and the SAHRIS online database (http://www.sahra.org.za/sahris), it was determined that a number of other archaeological or historical studies have been performed within the wider vicinity of the study area.

5.14.1 *Palaeontology*

The following section has been compiled by Banzai Environmental for PGS Heritage. The full report can be viewed in **Appendix 6E**.

5.14.1.1 Ecca Group

Waterford Formation

Fossil remains from this formation usually consists of poorly preserved tetrapod bones that could probably belong to the aquatic temnospondyl amphibians. Scattered fish scales and fish coprolites have been recovered as well as several genera of non-marine bivalves. A low diversity of trace assemblages have been described that may belong to the *Scoyenia ichnofacies*. These trace fossils could possibly have been made by small arthropods, earthworms and even insects. Petrified wood of the Glossopteris flora are commonly found in this formation as well as gymnospermous woods namely, *Prototaxoxylon* and *Australoxylon*.

5.14.1.2 Beaufort Group

The Beaufort Group has been divided into a series of fossil biozones known as fossil assemblage zones (AZ). These AZ are distinguished by their characteristic tetrapod faunas. The Abrahamskraal Formation is represented by the *Eodicynodon, Tapinocephalus* and partially by the *Pristerognathus* Assemblage Zones. The AZ present in the proposed Rondekop WEF development is most probably the *Tapinocephalus* Assemblage Zone.

***Tapinocephalus* Assemblage Zone**

Vertebrate fossils in this assemblage zone is not as abundantly found as in later assemblage zones. Fossils are generally recovered as single specimens and is often covered by brown-weathering calcareous nodular material. Fauna present in this assemblage zone is mostly large bodied dinocephalians and pareiasaurs. Large *Bradysaurus* specimens are found as complete articulated skeletons and in a dorsal-up position while dinocephalian skulls with associated postcrania are extremely uncommon (**Figure 7**). A few isolated carnivore specimens of grogonopsia (also known as sabre toothed reptiles), biarmosuchians and therocephalians have been recovered while pelycosaurus are uncommon.

The *Tapinocephalus* AZ is also known for large disarticulated amphibians as well as palaeoniscoid bony fish, mostly represented by scattered scales. Gastropods are represented by freshwater bivalves. Fragmentary vascular plant remains include roots, twigs and leaves and petrified wood. Trace fossils are also known from this assemblage zone and include traces of arthropod, tetrapod and worm burrows, tetrapod trackways, fossilized faeces or coprolites and stem and plant casts.

Vertebrate fossils found in the Sutherland area include the tapinocephalid and titanosuchid dinocephalians, the pareiasaur *Bradysaurus*, as well as more uncommon dicynodonts, gorgonopsians and therocephalians. Several examples of plant remains have also been documented from this assemblage zone.

A site-specific field survey of the development footprint were conducted on foot and by motor vehicle from the 1st - 3rd October 2018.Exposed rock layers were visually inspected but there were no visible evidence of fossiliferous outcrops. For this reason, an overall low paleontological sensitivity is allocated to the development footprint. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the Rondekop WEF development will be of a low significance in paleontological terms. It is therefore considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the paleontological resources of the area.

5.14.2 *Archaeology*

Heritage resources are unique and non-renewable and as such any impact on such resources must be viewed significant.

Due to the nature of cultural remains, a systematic controlled-exclusive surface survey was conducted on foot and in a vehicle, over a period of four days by two archaeologists from PGS. The fieldwork was conducted on the 20th-24th September 2018.

The archaeological resources identified within the proposed development site comprise a small number of Stone Age surface artefact scatters. These are primarily from the Later Stone Age (LSA), although Middle Stone Age (MSA) material was also identified. All these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered. Based on findings from a range of other heritage reports in the area, these types of sites are to be expected in this region.

The remaining heritage features included buildings and stone walled structures that are likely the result of early European settlement in the area. Most of these features are likely over 60 years of age and for this reason are protected by current heritage law.

Even though heritage features were detected within the development area, serious mitigation measures will not be required except for the implementation of a chance-finds protocol. However, if the development layout is altered, this position will need to be revaluated.

5.15 Social Impact

The Social Impact Assessment was conducted by Dr Neville Bews & Associates (NBA). The full report is included in **Appendix 6G**. The environmental baseline from a socio-economic perspective is presented below.

5.15.1 *Baseline Information*

The purpose of the report is to identify the social baseline conditions in which the proposed project will unfold and to acquire an understanding of the proposed project. Against this background, the primary objective was to identify the issues and concerns associated with the Rondekop WEF and to identify, assess and propose mitigation for the likely social impacts that may occur as a result of the proposed project to inform the EIA.

Although the entire project footprint falls within the Northern Cape, the project can impact on towns located within the Western Cape and therefore both provinces were considered.

5.15.2 *Spatial Context, Regional Linkages and Demographic Profile*

5.15.2.1 Provincial

The Western Cape Province covers an area of 129 462.21 km² and, with a population of 5 82 734, according to Census 2011 (Statistics South Africa, 2011), resulting in a population density of 44.98 people per km² in 2011. The Northern Cape Province covers an area of 372 889.36 km² and, over the same period, had a population of 1 145 861 giving it a population density of 3.07 people per km² (Figure 41).

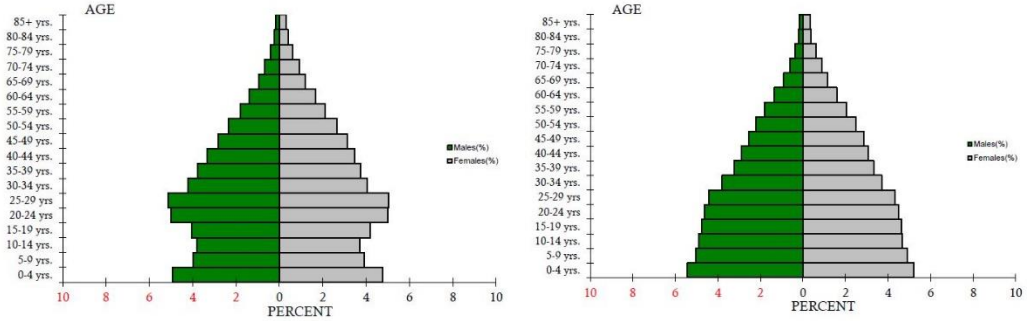

Figure 41: Population pyramids for the Western Cape Province and Northern Cape Province respectively

5.15.2.2 Municipal

The project impacts the two district municipalities of Namakwa and the Central Karoo as well as their respective local municipalities of the Karoo Hooglands and Laingsburg. On a district level Namakwa covers the greatest land area and has the lowest population density at 0.91/km², while at a local municipal level the Karoo Hoogland covers the greatest geographical area and has the lowest population resulting in a population density of 0.39/km². In respect of population grouping, Coloured people are the dominant population group across all districts and local municipalities and Afrikaans is the dominant home language spoken in the area, ranging between 87.18% in the Central Karoo and 96.3% in the Karoo Hoogland LM. In **Table 27** the data pertaining to the district and local municipalities is compared together with that applicable to the Western and Northern Cape Provinces.

The principal towns in the Karoo Hoogland are Williston, home of the municipal head office, Fraserburg and Sutherland. The low population density of the Karoo Hoogland's is as a result of a relatively high proportion of the population living in small, dispersed settlements. This population is relatively poor and, as of 1 July 2017, 818 households within the Karoo Hoogland were recipients of monthly indigent support.

The main towns in the Laingsburg Local Municipality are Laingsburg and Matjiesfontein the latter of which is essentially a village. The economy of the area mainly consists of agriculture, tourism, finance, construction and community services.

Table 27: Geographic and demographic data

	WESTERN CAPE	DC5: Central Karoo	WC051: Laingsburg	NORTHERN CAPE	DC6: Namakwa	NC066: Karoo Hooglands
Geographical Area	129,462.21 km²	38,853.98 km²	8,784.48 km²	372,889.36 km²	126,836.34 km²	32,273.88 km²
Population	5,822,734	71,011	8,289	1,145,861	115,842	12,588
Households	1,634,000	19,076	2,408	301,405	33,856	3,842
Population Density	44.98/km²	1.38/km²	0.94/km²	3.07/km²	0.91/km²	0.39/km²
Household Density	12.62/km²	0.49/km²	0.27/km²	0.81/km²	0.27/km²	0.12/km²
Female	50.91%	51.04%	50.13%	50.69%	49.70%	50.33%
Male	49.09%	48.96%	49.87%	49.31%	50.30%	49.67%
Coloured	48.78%	76.15%	78.97%	40.31%	83.18%	78.92%
Black African	32.85%	12.74%	6.97%	50.35%	6.82%	5.51%
White	15.72%	10.14%	13.31%	7.09%	8.73%	14.55%
Other	1.61%	0.55%	0.51%	1.56%	0.74%	0.36%
Indian/Asian	1.04%	0.42%	0.24%	0.68%	0.53%	0.66%
Home Language	Afrikaans 49.70%	Afrikaans 87.18%	Afrikaans 94.33%	Afrikaans 53.76%	Afrikaans 93.90%	Afrikaans 96.33%
	isiXhosa 24.72%	isiXhosa 7.76%	English 1.69%	Setswana 33.08%	Setswana 1.71%	English 1.33%
	English 20.25%	English 2.60%	isiXhosa 1.21%	isiXhosa 5.34%	isiXhosa 1.55%	isiXhosa 0.90%
	Other 2.24%	Setswana 0.58%	Setswana 0.17%	English 3.36%	English 1.22%	Setswana 0.41%

Source: (Statistics South Africa, 2011)

In the Central Karoo district 30.5% of the population, which amounted to 71 011 people in 2011, were under 16 years of age while 63.3% were between 15 and 64 years and 6.2% were over the age of 64. In the Namakwa district, which had a population of 115 842 people in 2011, 25.8% were under 16 years of age while 66.1% were between 15 and 64 years and 8.1% were over the age of 64.

In the Laingsburg Local Municipality 26.5% of the population of 8 289 people were under 16 years of age, while 66.3% fell between 15 and 64 years and 7.2% were over the age of 64.

Of the population of 12 588 people in the Karoo Hoogland, 27.7% were under 16 years of age in 2011 while 62.3% were between 15 and 64 years and 10% were over the age of 64 years.

The dependency ratio, which indicates the burden of support for children under 16 years and people over 64 years placed on the working population aged between 15–64 years, is highest in the Karoo Hoogland at 60.5 and lowest in Laingsburg at 50.9. In respect of sex ratio Namakwa has a higher proportion of males to females in the population at 101.2 while, at 95.9, the Central Karoo has a higher

proportion of females to males. Between 2001 and 2011 Laingsburg had a population growth of 2.16% with the Karoo Hoogland having a lower population growth of 1.8%. This data is compared across the region in **Table 28.**

Table 28: Age structure, dependency ratio, sex ratio and population growth

Municipality	Age Structure						Dependency Ratio		Sex Ratio		Population Growth (% p.a.)	
	<15		15-64		65+		Per 100 (15-64)		Males per 100 females			
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
WESTERN CAPE	27.3%	25.1%	67.5%	69.0%	5.2%	5.9%	48.2	45.0	94.0	96.4	2.68	2.52
DC5: Central Karoo	32.7%	30.5%	61.4%	63.3%	6.0%	6.2%	62.9	58.0	93.9	95.9	1.50	1.60
WC051: Laingsburg	29.3%	26.5%	63.0%	66.3%	7.7%	7.2%	58.7	50.9	93.4	99.5	2.44	2.16
NORTHERN CAPE	32.1%	30.1%	62.5%	64.2%	5.4%	5.7%	60.1	55.7	93.7	97.3	-0.40	1.44
DC6: Namakwa	29.3%	25.8%	64.0%	66.1%	6.7%	8.1%	56.4	51.2	97.8	101.2	-0.27	0.69
NC066: Karoo Hoogland	29.7%	27.7%	61.1%	62.3%	9.1%	10.0%	63.6	60.5	90.9	98.7	-3.28	1.80

Source: (Statistics South Africa, 2011)

The unemployment rate in the area is highest in the Central Karoo district and Laingsburg local municipalities at 23.7 and 17.9 percent respectively. The level of unemployment in the Namakwa District Municipality was 20.1% in 2011 while in the Karoo Hoogland it was 14.6%. In respect of education, at 6.6% Namakwa has the lowest percentage of the population that has no schooling with the Karoo Hoogland having the highest percentage having no schooling at 18.4%. The Karoo Hoogland has the highest percentage of the population having a matric level of education at 21.6% while the Laingsburg municipality has the highest percentage of the population with an education level higher than matric at 8.6% closely followed by the Karoo Hoogland at 8.5%.

In respect of the local municipalities associated with the project, Laingsburg has the fewest number of households at 2 408 compared to the 3 842 households in the Karoo Hoogland. The average household size is also marginally smaller, at 3.3 persons per household, in the Karoo Hoogland compared to 3,4 in Laingsburg. There is a slightly higher percentage of female headed households in Laingsburg at 30.6% compared to 30.6% in the Karoo Hoogland. Most households in the Karoo Hoogland, 96.9%, and in Laingsburg, 96.6%, live in formal dwellings. Compared across the entire region, both the Karoo

Hoogland and the Laingsburg local municipalities have a relatively low number of households, at 47.36 and 36.2 respectively, who either own or who are paying off their dwellings.

The closest urban areas to the site of the Rondekop Wind Farm Project are the towns of;

- Sutherland;
- Matjiesfontein and:
- Laingsburg.

Sutherland

Sutherland falls within the Karoo Hoogland Local Municipality and lies some 45 km to the north-east of Rondekop. The town, founded in 1857, served as a centre for the sheep farming industry in the area. Recent economic activates in the town have been spurred on by the establishment of the South African Astronomical Observatory in the area. This has resulted in an increase in tourism to the region which in turn has driven up the demand for accommodation and eating establishments such as bars and restaurants. This greater interest being show towards the region has also driven up property values in and around the town.

Matjiesfontein

The town of Matjiesfontein, which falls within the Laingsburg Local Municipality, lies some 52 km south-east of the project and, owing its origins to the railway, was established in the 1880s. Matjiesfontein's Victorian character was preserved and the town was declared a National Monument in 1975 with the railway station and cemetery subsequently being declared National Monuments in 1984 and 1994 respectively. On an economic basis, apart from serving as a centre for farmers in the area, the town also has a high tourist attraction associated with its preserved Victorian charm. This has resulted in the hospitality industry being relatively active in the area with such establishments as The Lord Milner Hotel regarded as an attractive tourist destination.

Laingsburg

The town of Laingsburg, which together with the towns of Matjiesfontein, Bergsig and Goldnerville makes up the Laingsburg Local Municipality, lies some 66 km south-east of the proposed Rondekop WEF. The town is located along the National Road 1 (N1) which runs the entire length of South Africa, between Cape Town and the Beit Bridge border post. On an economic level Laingsburg serves as an agricultural centre for farmers in the region with agricultural activities such as livestock farming (goats and sheep) crops (alfalfa or Lucerne) as well as fruit and vegetables

5.15.3 *Sense of Place, History and Cultural Aspects*

The wind turbines will be highly visible from some distance and will result in the landscape being transformed from that of a rural setting to what would be considered by some to have more of an industrial aura. This issue remains controversial as a sense of place is personal and subjective with some accepting the visual changes to the landscape in support of renewable energy while others may reject it . The subjectivity of the viewer/receptor toward a visual impact is also confirmed in the visual specialist report, (see section 5.12).

The visual environment and noise are both important elements through which a sense of place is constructed, and both these criteria are subject to separate specialist studies in which they will be evaluated and mitigated.

5.16 Traffic Impact Assessment

The Traffic Impact Assessment was conducted by JG Afrika (Pty) Ltd. The full report is included in **Appendix 6I**.

5.16.1 *National Route to Site*

The most suitable port is the Port of Saldanha, which is located 392km travel distance from the proposed WEF site. However, the Port of Ngqura in Coega, Port Elizabeth can also be considered as an alternative. The Port of Ngqura is located approximately 670km travel distance from the proposed WEF site.

The preferred route for abnormal load vehicles will be from the port, heading east on the R45 to Hopefield and onto the R311 at Moorreesburg (see Figure 42). At Hermon, the abnormal load vehicle will travel on the R46 to Ceres, passing Gouda and Tulbagh. The abnormal load vehicle will turn right at the R355/R46 intersection and continue on the R46 towards the N1. At Matjiesfontein on the N1, the vehicle will turn north onto the R354, left at DR02249 and left at R356.

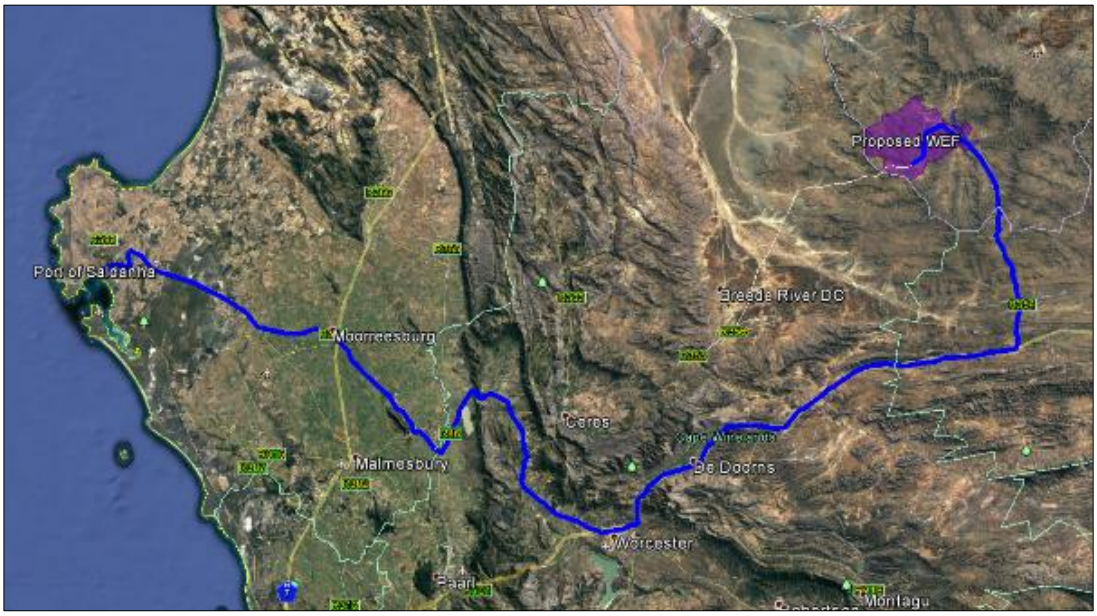

Figure 42:: Preferred route from Port to WEF site

An alternative option exists to access the proposed site via the R355, avoiding the N1 highway, as shown in the Figure 43 below. This route follows the same alignment as the Preferred Route to the R46, turning right onto the R355 and then heading east on the R356 to the R356/MN04469 intersections.

The section of R356 would require upgrading of the road and an assessment of the drainage structures along the route. This route, however, would require extensive upgrading and there is a significant number of drainage structures located along the route. Although the upgrade work would be extensive, this is a potential viable alternative.

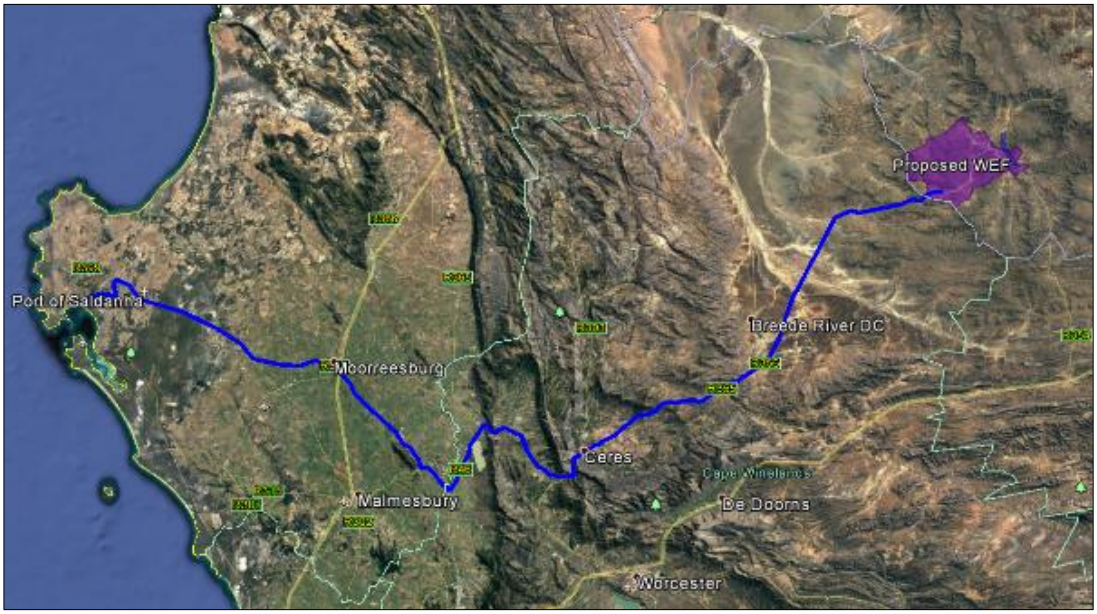

Figure 43: Alternative Route 1

It is critical to ensure that the abnormal load vehicle will be able to move safely and without obstruction along the preferred routes. The preferred route should be surveyed to identify problem areas e.g. intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients that may require modification. After the road modifications have been implemented, it is recommended to undertake a "dry-run" with the largest abnormal load vehicle, prior to the transportation of any turbine components, to ensure that the delivery of the turbines will occur without disruptions.

It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.

5.16.2 *Main Route for the Transportation of the Wind Turbine Components*

The investigation showed that it will be possible to transport the imported wind turbine components by road to the proposed site. The proposed main route will be along the surfaced R354, which connects Matjiesfontein and Sutherland, turning west onto the district gravel road DR02249 and then turning left onto the R356 to the Rondekop WEF (see Figure 44below).

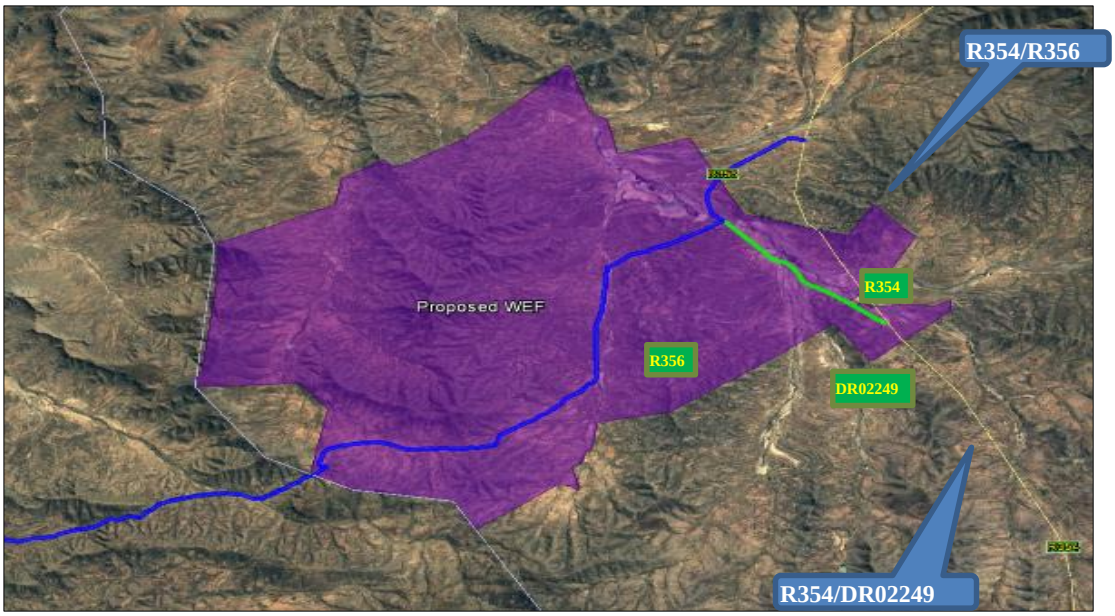

Figure 44: Proposed Main Route

For this option, DR02249 would require upgrading and intersections would have to be widened to accommodate the turning movements of heavy vehicles. The watercourse structures along the route are in a poor condition and the load bearing capacity of these structures would need to be assessed. In all likelihood these structures would have to be replaced or upgraded. In addition, farm gates and cattle grids would have to be widened to accommodate abnormal loads.

Figure 45: Narrow bridge on DR02249

Figure 46: Narrow cattle grid

The R356 could be accessed off the R354, which is approximately 10.8km from the DR02249/R354 intersection, as shown in Figure 44. The section of R356 between the R354/R356 intersection and the R356/DR02249 intersection, however, would also require significant upgrading of the road and the drainage structures along the route. The route was therefore deemed unsuitable as an alternative as the required upgrading would be too extensive.

It should be noted that any low hanging overhead lines (lower than 5.1m) e.g. Eskom and Telkom lines, along the proposed routes would have to be moved to accommodate the abnormal load vehicles.

5.16.3 *Proposed main access road to the proposed WEF*

Access to the proposed WEF will be provided via the R356. Six access road alternatives branch off the R356, connecting it to the road network between the turbines of the proposed WEF. There are three ridges on the proposed site viz - North Ridge, Centre Ridge and South Ridge. Two access roads alternatives are proposed for each of the three ridges.

A minimum required road width of 4 m but up to 12m needs to be kept and all turning radii must conform with the specifications needed for the abnormal load vehicles and haulage vehicles. It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will hence need to be maintained during the additional loading of the construction phase and then reinstated after construction finishes. The gravel roads will require grading with a road grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage. Geometric design constraints might be encountered due to the rolling, hilly topography of the area, as shown in the photographs below. The road designer should take cognizance that the turbines are to be positioned at the top of the hills. Therefore, the roads need to be designed with smooth, relatively flat gradients to allow an abnormal load vehicle to ascend to the top of the hill. It should be noted that there

is no preference between the construction camp and substation alternatives presented as these do not affect or have any impact on the traffic on the surrounding road network.

5.16.4 *Main Route for the Transportation of Materials, Plant and People to the proposed WEF*

The nearest towns in relation to the proposed WEF site are Sutherland, Matjiesfontein and Laingsburg. It is envisaged that most of the materials, plant and labour will be sourced from these towns and transported to the WEF will be via the N1 and R354.

Concrete batch plants and quarries in the vicinity could be contracted to supply materials and concrete during the construction phase, which would reduce the impact on traffic on the surrounding road network. Alternatively, mobile concrete batch plants and temporary construction material stockpile yards could be commissioned on vacant land near the proposed WEF site. Delivery of materials to the mobile batch plant and the stockpile yard could be staggered to minimise traffic disruptions.

It is envisaged that most materials, water, plant, services and people will be procured within a 50 km radius from the proposed WEF, however, this would be informed by the REIPPPP requirements.

6 ENVIRONMENTAL IMPACT ASSESSMENT

6.1 Methodology for Assessing Impacts

The Impact Assessment Methodology assists specialists in evaluating the overall effect of a proposed activity on the environment. The determination of the effect of an environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

It is important to note that while most of the specialists evaluated the entire proposed project site, the avifauna and bat specialist focussed on ridgelines.

6.1.1 *Determination of Significance of Impacts*

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas Intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in **Table 30.**

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

6.1.2 *Impact Rating System*

Impact assessment must take account of the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental).

- Rating System Used to Classify Impacts

Impact assessment must take account of the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into one rating. In assessing the significance of each issue, the following criteria (including an allocated point system) is used:

Table 29: Description of terms

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.

2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible Cumulative Impact	The impact would result in negligible to no cumulative effects
2	Low Cumulative Impact	The impact would result in insignificant cumulative effects
3	Medium Cumulative impact	The impact would result in minor cumulative effects
4	High Cumulative Impact	The impact would result in significant cumulative effects
INTENSITY / MAGNITUDE		
Describes the severity of an impact		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.

4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible, rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

SIGNIFICANCE

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
6 to 28	Low Negative impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

Table 30: Rating of impacts

IMPACT TABLE FORMAT	
Environmental Parameter	A brief description of the environmental aspect likely to be affected by the proposed activity e.g. Surface water
Issue/Impact/Environmental Effect/Nature	A brief description of the nature of the impact that is likely to affect the environmental aspect as a result of the proposed

IMPACT TABLE FORMAT		
	activity e.g. alteration of aquatic biota. The environmental impact that is likely to positively or negatively affect the environment as A result of the proposed activity e.g. oil spill in surface water	
Extent	A brief description indicating the chances of the impact occurring	
Probability	A brief description of the ability of the environmental components recovery after a disturbance as a result of the proposed activity	
Reversibility	A brief description of the environmental aspect likely to be affected by the proposed activity e.g. Surface water	
Irreplaceable loss of resources	A brief description of the degree in which irreplaceable resources are likely to be lost	
Duration	A brief description of the amount of time the proposed activity is likely to take to its completion	
Cumulative effect	A brief description of whether the impact will be exacerbated as a result of the proposed activity	
Intensity/magnitude	A brief description of whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily	
Significance Rating	A brief description of the importance of an impact which in turn dictates the level of mitigation required	
	Pre-mitigation impact rating	**Post mitigation impact rating**
	Pre-mitigation impact rating	
Extent	1	4
Probability	1	4
Reversibility	1	4
Irreplaceable loss	1	4
Duration	1	4
Cumulative effect	1	4
Intensity/magnitude	2	2
Significance rating	-12 (Low Negative)	-48 (Medium Negative)
Mitigation measures	*Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. Describe how the mitigation measures have reduced/enhanced the impact with relevance to the impact criteria used in analysing the significance. These measures will be detailed in the EMPr.*	

The EIA Regulations also specify that alternatives must be compared in terms of impact assessment.

6.2 Environmental Impact Assessment

Specialist studies have been conducted in terms of the stipulations contained within **Appendix 6** of the EIA Regulations. For the Rondekop WEF development, specialist studies were commissioned during the Scoping phase.

As previously mentioned, the following specialist studies have been conducted to assess the site:

- Terrestrial Ecology Assessment;
- Avifauna Assessment;
- Bat Assessment
- Aquatic Ecology Assessment;
- Agriculture and Soils Assessment;
- Noise Assessment
- Visual Impact Assessment.
- Heritage Assessment (including Paleontology, Archaeology & Cultural Landscape);
- Socio-Economic Impact Assessment; and
- Traffic Impact Assessment;

These above studies have been used to identify issues at an environmental impact assessment level. The **Avifauna and Bat** assessments as well as **Terrestrial Ecology** assessment have been supplemented with site specific information and impact ratings during the EIA phase of the project.

The identified impacts thus far, are elaborated on in the sub-sections below.

6.2.1 *Terrestrial Ecological Impacts*

The Terrestrial Ecology Scoping and EIA Assessments were conducted by Dr David Hoare and is included as Appendix 6H. The following impacts are discussed in detail below:

Please note that further to this assessment the layout was revised, and the specialist concluded that the impacts contained in the original assessment are still valid. A copy of this letter can be found in **Appendix 6**.

6.2.1.1 **Planning / Pre-construction**

Loss and/or fragmentation of indigenous natural vegetation due to clearing

Only measures that are implementable at the design phase of the project are discussed and assessed here. Note that the design is an iterative process that takes into account input from various specialists, including those from the study presented in this report. Some proposed modifications to infrastructure locations presented in this report (**Layout Amendment in Section 9.2**) have already been implemented. Please refer to the appropriate section for more detail on the proposed amendments.

Table 31: Loss and/or fragmentation of indigenous natural vegetation.

Environmental Parameter	Indigenous natural vegetation	
Issue/Impact/Environmental Effect/Nature	Loss, degradation or fragmentation of vegetation.	
Extent	The impact will affect natural vegetation on **site**. Poor design could conceivably affect off-site areas, but this is considered unlikely. Design improvements can reduce the extent of areas that will be affected.	
Probability	If the project is authorized then the impact will **definitely** happen, although designing the project will not in itself cause any impacts whatsoever.	
Reversibility	Any design decision is fully reversible.	
Irreplaceable loss of resources	Improved design could conceivably reduce the degree to which biodiversity resources are affected.	
Duration	Construction impacts are assessed in the next section as being **Permanent**. Proposed mitigation measures at the Design Phase will not affect this assessment.	
Cumulative effect	Small design changes are unlikely to reduce the cumulative effect of the current project in combination with similar RE projects in nearby areas.	
Intensity/magnitude	Improved design can possibly reduce the intensity of impacts, although the categorical nature of the impact assessment methodology may be insensitive to incremental improvements in project design.	
Significance Rating	Medium negative impact expected.	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	1	1
Probability	4	4
Reversibility	4	3
Irreplaceable loss	2	2
Duration	4	3
Cumulative effect	3	3
Intensity/magnitude	2	1
Significance rating	**-36 (medium negative)**	**-16 (low negative)**
Mitigation measures	It is not possible to completely avoid impacts on indigenous vegetation for this project, although these will be restricted to a footprint of relatively limited extent. The following mitigation measures implementable at the Design Phase would help to ensure more extensive impacts are avoided and/or minimised: • Keep footprint as small as possible by selecting options that affect a smaller overall area of habitat. This measure has already been implemented through interaction between the design team and specialists. • Where possible, cluster infrastructure, rather than dispersing it widely. • As far as possible, locate infrastructure within areas that have been previously disturbed or in areas with	

Environmental Parameter	Indigenous natural vegetation
	lower sensitivity scores, taking the ecological sensitivity map into account. This measure has already been implemented through interaction between the design team and specialists. • Wherever technically possible, avoid sensitive features and habitats when locating infrastructure. This has already been implemented. • Cross streams and other linear features at right angles, where possible, and also near their end-points or where there are natural breaks in the feature. This has been taken into account with the road layouts. • Where possible, access roads should be located along existing farm, access and district roads, even if these require upgrading. • Where possible, avoid construction of any infrastructure within CBA1 areas. Where it is unavoidable, minimise the footprint area within the CBA1 area.

6.2.1.2 **Construction Phase**

Loss and/or fragmentation of indigenous natural vegetation due to clearing

The regional vegetation type in the broad study area is primarily Koedoesberge-Moordenaars Karoo, classified in the scientific literature as Least Threatened (Mucina *et al.*, 2008) and not listed in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011). Any areas of natural habitat within this regional vegetation type are therefore considered to have moderate conservation value. Some infrastructure is located within Critical Biodiversity Areas for the Northern Cape, but the effect of this is assessed separately below.

Vegetation on site is within a very arid region and consists of slow-growing dwarf shrubs, many of which are partially succulent. These species are slow to grow, and individuals are probably much older than they appear from their size. Disturbed areas are not likely to recover to any natural state and clearing must therefore be kept to an absolute minimum to avoid habitat degradation issues.

Habitat loss refers to physical disturbance of habitats through clearing, grading and other permanent to semi-permanent loss or degradation. Loss of habitat on site could lead to loss of biodiversity as well as habitat important for the survival of populations of various species. Habitat fragmentation will occur primarily through the construction of roads. Edge effects related to roads are difficult to quantify or predict, but anything within 50 m of a road is almost certain to be affected by the changed physical conditions.

All infrastructure components will require clearing of vegetation prior to construction. However, the access roads, internal access roads, construction camps and crane pads will cause the greatest extent of vegetation loss. The substations and wind turbines will also require vegetation clearing, but this will be much smaller areas in comparison to the other components. **For all infrastructure components,**

loss of habitat will occur, but this will be relatively insignificant in comparison to the total area of the vegetation types concerned.

Table 32: Loss and/or fragmentation of indigenous natural vegetation.

Environmental Parameter	Indigenous natural vegetation
Issue/Impact/Environmental Effect/Nature	Loss, degradation or fragmentation of vegetation.
Extent	The impact will affect natural vegetation on **site**.
Probability	If the project is authorized then the impact will **definitely** happen.
Reversibility	Within the immediate footprint of the infrastructure (turbine foundations, roads, and substation infrastructure), the impact is effectively **Irreversible** in human timeframes, since construction of roads and other hard surfaces completely remove vegetation and modify the substrate upon which it grows. In other areas (crane pads, construction camp and disturbed areas adjacent to construction activities) the impact is partially reversible in the sense that secondary vegetation in disturbed areas will probably never resemble the original vegetation found on site.
Irreplaceable loss of resources	In the context of the vegetation type concerned, which is fairly widespread and has undergone little overall transformation to date, **marginal** loss of resources will occur and this will be within the footprint of the proposed infrastructure.
Duration	Within the immediate footprint of the permanent infrastructure (turbine foundations, roads and substation) the impact will be **Permanent** (mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient). In other areas (crane pads, construction camp and disturbed areas adjacent to construction activities) the impact will be of long-term duration. The assessment here is for the permanently affected areas.
Cumulative effect	Medium cumulative impact. Added to existing impacts on natural habitat from activities in the general region as well as the nearby similar RE projects, the current project will cause additional loss of vegetation, the cumulative effect of which will be **medium** (it will not be negligible, nor insignificant, therefore assessed as medium).
Intensity/magnitude	Assessing the magnitude of the impact depends on the scale at which it is assessed – if considered at the scale of the constructed infrastructure, then the impact appears to be highly destructive (High intensity), but at the scale of the entire vegetation type, it is virtually insignificant (Low intensity). Taking local vegetation patterns into account, the intensity of the impact is assessed here as being of **Medium** intensity – the functional integrity of vegetation on site will be compromised to some degree, which can be limited to some extent by implementation of mitigation measures. Proposed mitigation measures will limit the extent of destruction in

Environmental Parameter	Indigenous natural vegetation	
	the sense that areas not permanently altered (crane pads, construction camp and disturbed areas adjacent to construction activities) will be expected to recover to a stable ecological state with time.[5]	
Significance Rating	Medium negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	4	4
Reversibility	4	3
Irreplaceable loss	2	2
Duration	4	3
Cumulative effect	3	3
Intensity/magnitude	2	1
Significance rating	**-36 (medium negative)**	**-16 (low negative)**
Mitigation measures	It is not possible to completely avoid impacts on indigenous vegetation for this project, although these will be restricted to a footprint of relatively limited extent. The following mitigation measures would help to ensure more extensive impacts are avoided and/or minimised: • Restrict impact to development footprint only and limit disturbance spreading into surrounding areas. • Footprints of turbines, crane pads, construction sites and substation sites should be clearly demarcated. • Construct adequate structures at points where roads cross watercourses, either proper stabilized dips in the road or culverts that do not limit the width of natural channels or the natural hydrological function. • Ensure all possible steps are taken to limit erosion of surfaces, including proper management of storm-water runoff. • Compile a Rehabilitation Plan prior to the commencement of construction. • Compile an Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas. • Access to sensitive areas outside of development footprint should be strictly limited during construction.	

<u>Impacts on listed or protected plant species</u>

[5] Note that the impact assessment methodology requires placing a potential impact within a category of extent, probability, duration, etc. There are many cases where mitigation measures will have a clear effect on reducing an impact, but not to the degree that it would result in an assessed impact being placed in a lower category. The impact assessment methodology is categorical in nature and incremental improvements in design and implementation may possibly not lead to a change in the category in which a potential impact is placed. In the current case, mitigation measures can potentially reduce by approximately half the extent of the potential impact (loss of vegetation), which is a significant reduction, but the extent remains "Site", because there is no lower category. This does not reduce the value of proposed measures, even if it gives the appearance in the assessment that no improvement is realized.

Plant species are especially vulnerable to infrastructure development due to the fact that they cannot move out of the path of the construction activities but are also affected by overall loss of habitat within which metapopulation dynamics occur (dispersal, recruitment, pollination, etc.).

There is one (1) species protected according to the National Environmental Management: Biodiversity Act, *Hoodia gordonii*, two (2) clumps of which were found on site during the field survey. No additional clumps or individuals were found on site during the detailed walk-through survey of all infrastructure. Neither clump is directly affected by the proposed project.

There are a number of species protected according to the Northern Cape Nature Conservation Act that were recorded on site during the walk-through survey. None of these are threatened species but are protected according to Provincial legislation. These are listed in a section above in this report (Protected Plants [Northern Cape Nature Conservation Act] on pages 53 – 54).

Table 33: Loss of individuals occurring within the footprint of construction.

Environmental Parameter	**Protected plants, as per NEM:BA or NCNCA or listed plants**	
Issue/Impact/Environmental Effect/Nature	Loss of individuals occurring within the footprint of construction.	
Extent	The impact will affect local populations or individuals of the affected species, which is at the **site** scale.	
Probability	Based on the list of species that are protected or listed, the impact will **definitely** happen.	
Reversibility	**Partly reversible**. Where necessary, individuals can be rescued or else cultivated to replace lost specimens, but in many cases the plants are from widespread and/or common species.	
Irreplaceable loss of resources	**Marginal** loss of resources could occur. The species that are likely to occur on site are likely to be relatively common throughout their range and they have very wide geographical ranges.	
Duration	The impact will be **medium-term**.	
Cumulative effect	**Low** cumulative impact. Cumulative effects will not be significant.	
Intensity/magnitude	Low. Loss of a small number of individuals will be insignificant compared to the number that probably occur in nearby natural areas as well as across the entire geographical range of the species.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	1	1
Probability	4	4
Reversibility	2	2
Irreplaceable loss	2	1
Duration	2	2
Cumulative effect	2	1
Intensity/magnitude	1	1
Significance rating	**-13 (low negative)**	**-11 (low negative)**
Mitigation measures	A number of protected species were found on site. The following mitigation measures would help to avoid and limit impacts:	

Environmental Parameter	Protected plants, as per NEM:BA or NCNCA or listed plants
	• **It is a legal requirement to obtain permits for specimens that will be lost.** • A detailed pre-construction walk-through survey will be required during a favourable season to locate any additional individuals of protected plants. This survey must cover the footprint of all approved infrastructure, including internal access roads (final infrastructure layout). • It is possible that some plants lost to the development can be rescued and planted in appropriate places in rehabilitation areas, but the description and appropriateness of such measures must be included in a Plant Rescue Plan. Any such measures will reduce the irreplaceable loss of resources as well as the cumulative effect. Note that Search and Rescue is only appropriate for some species. • A Plant Rescue Plan must be compiled to be approved by the appropriate authorities.

Loss of faunal habitat and refugia

Construction activities will lead to direct loss of habitat favourable for various faunal species, including sites where mobile fauna would obtain refuge and sedentary fauna would have permanent homes. The total loss of habitat will be a relatively small proportion of the available habitat on site. Loss of habitat could potentially affect all animal species occurring on site, although threatened and protected species are of greater concern. There are two (2) animal species of particular concern for this project, namely the Karoo Dwarf Tortoise and the Armadillo Girdled Lizard, neither of which were seen on site, although they have been assessed as having a probability of occurring there. There are also other more mobile species that are protected by legislation, including the Honey Badger, Black-footed Cat, Leopard and Cape Fox.

Table 34: Loss of faunal habitat and refugia.

Environmental Parameter	Mobile fauna of conservation concern (Honey Badger, Black-footed Cat, Leopard, Riverine Rabbit (project site unsuitable due to lack of food plains) and Cape Fox)	
Issue/Impact/Environmental Effect/Nature	Displacement of individuals.	
Extent	The impact will affect individuals on site and possibly in immediately surrounding areas.	
Probability	The impact may possibly happen.	
Reversibility	Partly reversible with time.	
Irreplaceable loss of resources	No or low loss of resources will occur.	
Duration	The impact will be short-term (construction phase).	
Cumulative effect	Low cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Low. May impact on population processes.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	3	3

Environmental Parameter	Mobile fauna of conservation concern (Honey Badger, Black-footed Cat, Leopard, Riverine Rabbit (project site unsuitable due to lack of food plains) and Cape Fox)	
Reversibility	3	3
Irreplaceable loss	2	2
Duration	4	3
Cumulative effect	2	2
Intensity/magnitude	2	1
Significance rating	**-30 (medium negative)**	**-14 (low negative)**
Mitigation measures	1. Restrict impact to development footprint only and limit disturbance spreading into surrounding areas. 2. Limit clearing of natural habitat designated as sensitive, especially rocky outcrops, cliffs and riparian habitats, where possible. This has already been applied during the Design phase of the project where attempts have been made to avoid sensitive habitats. *3.* All mitigation measures that apply to "Loss and/or fragmentation of indigenous natural vegetation" also apply here.	

Direct mortality of fauna due to machinery, construction and increased traffic

There is a possibility that animals will be killed by machinery during construction, especially sedentary or relatively sedentary species, and those that move too slowly to move out of the path of construction. This will inevitably lead to mortality of individuals of such animals. There is also a possibility of collisions with vehicles due to increased traffic along roads and within the project area. Faunal mortalities may also be caused by electric fences, ingestion of waste material and/or accidental ensnarement.

Table 35: Mortality of fauna

Environmental Parameter	Fauna	
Issue/Impact/Environmental Effect/Nature	Loss of individuals.	
Extent	The impact will affect individuals on site.	
Probability	The impact will probably happen to some extent.	
Reversibility	Completely reversible. Impact is reversible with mitigation measures.	
Irreplaceable loss of resources	Marginal loss of resources will occur.	
Duration	The impact will be short-term (during construction phase only).	
Cumulative effect	Negligible cumulative impact.	
Intensity/magnitude	Low. Barely perceptible impact on population processes.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	1	1
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	1	1

Environmental Parameter	Fauna	
Intensity/magnitude	1	1
Significance rating	**-9 (low negative)**	**-8 (low negative)**
Mitigation measures	The following mitigation measures would help to avoid or limit impacts: 1. Access to sensitive areas outside of development footprint should not be permitted during construction. 2. Speed limits should be set for all roads on site, as well as access roads to the site. Strict enforcement of speed limits should occur – install speed control measures, such as speed humps, if necessary. 3. Night driving should be strictly limited and, where absolutely required, lower speed limits should apply for night driving. 4. Pre-construction walk-through in front of construction must be undertaken to move any individual animals, such as tortoises, prior to construction. 5. No dogs or other pets should be allowed on site, except those confined to landowners' dwellings. 6. Personnel on site should undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas. 7. If electric fences are to be constructed at construction camp sites, these should be erected according to the standards of Nature Conservation authorities. *8.* Proper waste management must be implemented, ensuring no toxic or dangerous substances are accessible to wildlife. This should also apply to stockpiles of new and used materials to ensure that they do not become a hazard.	

Displacement of mobile terrestrial fauna

Construction activities, loss of habitat, noise, dust and general activity associated with the construction phase of the project are likely to cause all mobile species to move away from the site. Mobile species of conservation concern that could potentially be affected by the proposed project are as follows:

1. Honey Badger,
2. Black-footed Cat,
3. Leopard,
4. Cape Fox, and
5. Grey Rhebok.

All these species are mobile terrestrial species with a large home range and the ability to travel long distances in short periods of time. Individuals may be locally displaced, but this will have little effect on the overall range of the species nor is it expected that any overall impacts will result from local displacement.

Table 36: Displacement of terrestrial fauna.

Environmental Parameter	Mobile fauna of conservation concern (Honey Badger, Black-footed Cat, Leopard, Cape Fox and Grey Rhebok)
Issue/Impact/Environmental Effect/Nature	Displacement of individuals.

Environmental Parameter	Mobile fauna of conservation concern (Honey Badger, Black-footed Cat, Leopard, Cape Fox and Grey Rhebok)	
Extent	The impact will affect individuals on site and possibly in immediately surrounding areas.	
Probability	The impact may possibly happen.	
Reversibility	Partly reversible with time.	
Irreplaceable loss of resources	No or low loss of resources will occur.	
Duration	The impact will be short-term (construction phase).	
Cumulative effect	Low cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Low. May impact on population processes.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	2	2
Reversibility	2	2
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-8 (low negative)**	**-8 (low negative)**
Mitigation measures	• Restrict impact to development footprint only and limit disturbance spreading into surrounding areas. • Access to sensitive areas outside of development footprint should not be permitted during construction. • Adhere to speed limits – install speed control measures, such as speed humps, if necessary • No hunting of protected species. • Personnel to be undergo induction and be educated about protection status of species, including distinguishing features to be able to identify protected species. • Report any mortality of protected species to conservation authorities (Northern Cape Nature Conservation, Tel.: 053 807 7300)	

<u>Increased poaching and/or illegal collecting due to increased access to the area</u>

The site is in a relatively remote area with moderately low access to the public. More importantly, access to mountainous areas is limited due to it being on private land. There is therefore a relatively low risk of opportunistic or targeted poaching of plants or animals. The construction of roads into the project area and the increased amount of traffic from outside areas will increase the opportunity for poaching or illegal collecting.

From a botanical perspective, there are a number of plants in succulent or geophyte groups that are attractive to collectors. There are also animals, such as lizards and tortoises that may be attractive to collectors or vulnerable to opportunistic collection. Many of these groups are protected under national and/or provincial legislation, but this does not necessarily prevent ill-informed or determined collectors.

Poaching of animals or plants for meat or medicinal purposes is a separate risk that is also more likely to occur where physical access is created.

Table 37: Increased poaching and illegal collecting.

Environmental Parameter	**Any plants and/or animals that are attractive to collectors and/or poachers**	
Issue/Impact/Environmental Effect/Nature	Loss of individuals / populations.	
Extent	The impact will affect individuals on site.	
Probability	The impact may possibly happen.	
Reversibility	Partly reversible with time.	
Irreplaceable loss of resources	Low to marginal loss of resources will occur.	
Duration	The impact will be permanent (duration of the life of the roads).	
Cumulative effect	Medium cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Medium. May impact on population processes.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	2	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	4	4
Cumulative effect	2	1
Intensity/magnitude	2	1
Significance rating	**-26 (low negative)**	**-12 (low negative)**
Mitigation measures	• Personnel to be educated about protection status of species, including distinguishing features, to be able to identify protected species. • Implement strict access control for the site. • No hunting / collecting of protected species. • Report any illegal collection to conservation authorities (Northern Cape Nature Conservation, Tel.: 053 807 7300).	

Effects on physiological functioning of vegetation due to dust deposition

There is a high probability during construction that dust will be created that will settle on surrounding vegetation. This will be due to earth-moving equipment as well as vehicles moving around on site as well as into and out of the site. There will be a definite increase in the amount of traffic on access roads to the site that will also affect surrounding areas.

Dust deposited on vegetation directly screens incoming radiation as well as affects stomatal gas-exchange. The combined effect is a reduction in fitness of affected vegetation which will lead to reduced potential growth rates, damage to leaves, and possibly reduced ability to resist pathogens.

In addition to direct effects on the vegetation, there is also a possibility that grazing animals will be affected through a reduction in palatability of plants, and increased silica on surfaces of edible plants that will possibly affect dental wear-and-tear.

Table 38: Vegetation damage due to dust deposition.

Environmental Parameter	Vegetation	
Issue/Impact/Environmental Effect/Nature	Dust deposition, resulting in reduced physiological fitness of plants / vegetation.	
Extent	The impact will affect vegetation on site and in all areas with access roads leading to site.	
Probability	The impact will almost certainly happen.	
Reversibility	Partly reversible with time.	
Irreplaceable loss of resources	Low to marginal loss of resources will occur.	
Duration	The impact will be permanent (duration of the life of the roads) for access roads (although only subject to high traffic volumes during construction, and short-term for construction areas.	
Cumulative effect	Medium cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Medium. May impact on population processes.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	2	2
Probability	4	3
Reversibility	2	2
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	3	2
Intensity/magnitude	2	1
Significance rating	**-28 (low negative)**	**-12 (low negative)**
Mitigation measures	• No speeding on access roads – install speed control measures, such as speed humps, if necessary, and penalties for non-compliance. • Excessive dust can be controlled by using appropriate dust-control measures.	

- Impact on integrity of Critical Biodiversity Areas

Significant proportions of the site are included in Critical Biodiversity Areas for the Northern Cape. This includes two small areas within CBA1 (Irreplaceable) areas that, according to the layout plan, will be minimally affected by the project, and a significant part of the site that is within a CBA2 (Important) area. Currently, a single turbine (Turbine 25) and less than 300 m of road is proposed on the very edge of one CBA1 area – this is not excessive and will have no discernible effect on the functioning of the CBA1 area. There are also some infrastructure options within another CBA1 area, namely Substation 5 (on very edge), Construction Camp 3 and Construction Camp 4 (both next to existing gravel road). These options have all been considered on the basis of local ecological patterns and recommendations made on that basis.

The Northern Cape Critical Biodiversity Area Map, published in 2016 (Holness & Oosthuysen 2016) derives CBAs from the earlier Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008). On the basis that there was limited biodiversity information for some parts of the province, including the current site, general correlations between biophysical parameters and known biodiversity patterns were used to define the CBAs. This included the fact that there is a perceived general increase in local diversity, as well as increased likelihood of encountering plant species of special concern, as elevation increases. This means that higher elevation areas generally have higher biodiversity value, although the specific location of such areas of high value were not known with great confidence. To accommodate this pattern and the low certainty, a proportion of all higher elevation areas were allocated by regional planners to CBA2 areas according to an algorithm that seeks a least-cost outcome for preserving biodiversity, i.e. the least amount of land space for preserving the greatest amount of area of biodiversity importance, as well as meeting specific conservation targets. The net result is that CBA2 areas on site may be identical in character to other natural areas on site that are not included in a CBA based on limited biodiversity information available for the site. Data collected in the field for this project (at the location of all turbines, substation options, and construction camp options) support the observation that there is no significant floristic difference on site between areas included within CBA2 areas and those outside of these designated areas. Since no particular unique features have been targeted for protection, rather a general pattern in the landscape, complete exclusion of the project from CBA2 areas is not justified. If necessary, similar habitat on other ridges within the general area could be targeted for conservation purposes.

All infrastructure components will require clearing of vegetation prior to construction. However, the access roads, internal access roads, substation and turbine bases (foundations) will cause local permanent loss of vegetation, although not of significant extent in comparison to the entire extent of affected regional vegetation.

Table 39: Loss and/or fragmentation of indigenous natural vegetation.

Environmental Parameter	Critical Biodiversity Area
Issue/Impact/Environmental Effect/Nature	Loss, degradation or fragmentation of vegetation.
Extent	The impact will affect natural vegetation on site, but affects defined CBAs that extend regionally.
Probability	If the project is authorised then the impact will definitely happen.
Reversibility	As discussed for “Loss of natural vegetation”, irreversible in human timeframes against the currently mapped target areas. If it is assumed that adequate areas of similar habitat will remain after construction of the project (which has been suggested for this project from the data that has been collected in the field) then there is a possibility that CBAs could be redefined to include new areas that are not currently included within CBAs. On the basis of this assumption, it is possible (but difficult) to reverse some of the loss of areas within CBAs. It should also be taken into account that the absolute area (in hectares) is very small compared to the overall amount of area included within CBAs.

Environmental Parameter	Critical Biodiversity Area	
Irreplaceable loss of resources	**Marginal** loss of resources will occur within the footprint of the proposed infrastructure since vegetation clearing is required prior to installation of infrastructure, but the overall loss of resources relative to the entire CBA is less significant.	
Duration	Within the immediate footprint of the permanent infrastructure (turbine foundations, roads and substation) the impact will be **Permanent** (mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient). In other areas (crane pads, construction camp and disturbed areas adjacent to construction activities) the impact will be of long-term duration. The assessment here is for the permanently affected areas.	
Cumulative effect	Medium cumulative impact. Added to existing impacts on natural habitat from activities in the general region as well as the nearby similar RE projects, the current project will cause additional loss of vegetation, the cumulative effect of which will be medium.	
Intensity/magnitude	Medium. Taking local vegetation patterns into account, the intensity of the impact is assessed here as being of Medium intensity – the functional integrity of vegetation on site will be compromised to some degree, which can be limited to some extent by implementation of mitigation measures. (See more detailed commentary	
Significance Rating	Medium negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	4	4
Reversibility	3	3
Irreplaceable loss	2	2
Duration	4	4
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	**-34 (medium negative)**	**-32 (medium negative)**
Mitigation measures	The following mitigation measures are proposed to reduce the potential impact on areas of conservation value on site (CBAs): • Minimise area of construction within CBA1 areas (this has already been done as much as possible as part of the project design process in **Section 10**). • All mitigation measures suggested for Impact 1 (Loss and/or fragmentation of indigenous natural vegetation apply to this potential impact.	

Establishment and spread of declared weeds and alien invader plants due to the clearing and disturbance of indigenous vegetation

Major factors contributing to invasion by alien invader plants includes inter alia high disturbance (such as clearing for construction activities) and negative grazing practices (Zachariades et al. 2005). Exotic

species are often more prominent near infrastructural disturbances than further away (Gelbard & Belnap 2003, Watkins et al., 2003). Consequences of this may include:

1. loss of indigenous vegetation;
2. change in vegetation structure leading to change in various habitat characteristics;
3. change in plant species composition;
4. change in soil chemical properties;
5. loss of sensitive habitats;
6. loss or disturbance to individuals of rare, endangered, endemic and/or protected species;
7. fragmentation of sensitive habitats;
8. change in flammability of vegetation, depending on alien species;
9. hydrological impacts due to increased transpiration and runoff; and
10. impairment of wetland function.

No existing populations of alien plants were seen on site, but areas of farm infrastructure were not investigated during the field survey. There is a high possibility that alien plants could be introduced to areas within the footprint of the proposed activities from surrounding areas in the absence of control measures. The potential consequences may be of moderate seriousness for affected natural habitats. Control measures could prevent the impact from occurring. These control measures are relatively standard and well-known.

Table 40: Establishment and spread of declared weeds.

Environmental Parameter	**Vegetation and habitat**	
Issue/Impact/Environmental Effect/Nature	Loss of habitat due to invasion by alien plants	
Extent	The impact will affect habitat on site and possibly in immediately surrounding areas.	
Probability	The impact will probably happen in the absence of control measures.	
Reversibility	Partly reversible in the absence of control measures. Completely reversible if mitigation measures applied. Preventative measures will stop the impact from occurring.	
Irreplaceable loss of resources	Marginal to significant loss of resources will occur. Uncontrolled invasion can affect all nearby natural habitats.	
Duration	The impact will be long-term.	
Cumulative effect	Medium cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Medium. Severe invasion can alter the functioning of natural ecosystems.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	2	2

Environmental Parameter	Vegetation and habitat	
Irreplaceable loss	3	2
Duration	3	3
Cumulative effect	3	2
Intensity/magnitude	2	1
Significance rating	**-30 (medium negative)**	**-12 (low negative)**
Mitigation measures	It is possible to avoid impacts due to alien plant invasions by undertaking the following mitigation measures: • Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. • Undertake regular monitoring to detect alien invasions early so that they can be controlled, as per the Alien Management Plan. • Implement control measures, as per the Alien Management Plan.	

Changes to behavioural patterns of animals, including possible migration away or towards the project area

The increased human presence and/or construction operations will increase noise levels as well as light levels at night. The increased human presence, elevated noise and light levels, loss of animal habitat and compaction of soils may alter the behavioural patterns of some animals. Some of these changes may favour certain species and negatively affect others and consequently change the composition of the animal communities. Some of these changes could possibly increase levels of predation. Territorial species such as steenbok, grey duiker and klipspringer will be negatively affected as well as species that live or move in the soil. These species might undergo a local reduction in their population size.

Table 41: Changes in behavioural patterns of animals.

Environmental Parameter	Mobile fauna	
Issue/Impact/Environmental Effect/Nature	Displacement of individuals or changes to community structure.	
Extent	The impact will affect individuals on site and possibly in immediately surrounding areas.	
Probability	The impact may possibly happen.	
Reversibility	Partly reversible with time.	
Irreplaceable loss of resources	No or low loss of resources will occur.	
Duration	The initial impact will be short-term (construction phase).	
Cumulative effect	Low cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Low. May impact on population processes.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	2	2
Reversibility	2	2

Environmental Parameter	Mobile fauna	
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-8 (low negative)**	**-8 (low negative)**
Mitigation measures	• Access to sensitive areas outside of development footprint should not be permitted during construction. • Personnel to be educated about environmental sensitivities and issues on site. • Appropriate lighting should be installed to minimize impacts on nocturnal animals, as per visual specialist assessment. • Construction activities should not be undertaken at night. • Noise and light pollution should be managed according to guidelines from the noise specialist study and SANS noise standards.	

Increased runoff and erosion due to clearing of vegetation, construction of hard surfaces and compaction of surfaces, leading to changes in downslope areas

Increased erosion (water and wind) and water run-off will be caused by the clearing of indigenous vegetation, creation of new hard surfaces and compaction of soil. The internal access roads will be the main source of disturbance and erosion if not properly constructed and provided with water run-off structures. The construction site, substation site and crane pads will furthermore be levelled and compacted causing additional run-off and erosion. Increased run-off and erosion could affect hydrological processes in the area and will change water and silt discharge into drainage lines and streams.

Table 42: Increased runoff and erosion.

Environmental Parameter	Vegetation and habitat	
Issue/Impact/Environmental Effect/Nature	Runoff and erosion	
Extent	The impact will affect habitat on site.	
Probability	The impact will probably happen in the absence of control measures.	
Reversibility	Partly reversible in the absence of control measures. Completely reversible if mitigation measures applied. Preventative measures will stop the impact from occurring.	
Irreplaceable loss of resources	Marginal to significant loss of resources will occur. Uncontrolled erosion can affect all downslope natural habitats.	
Duration	The impact will be long-term.	
Cumulative effect	Medium cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Medium. Severe erosion can locally alter the functioning of natural ecosystems and cause additional loss of vegetation.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	3	2

Environmental Parameter	Vegetation and habitat	
Reversibility	2	2
Irreplaceable loss	3	2
Duration	3	3
Cumulative effect	3	2
Intensity/magnitude	2	1
Significance rating	**-30 (medium negative)**	**-12 (low negative)**
Mitigation measures	It is possible to avoid impacts due to erosion by undertaking the following mitigation measures: • Compile and implement a stormwater management plan, which highlights control priorities and areas and provides a programme for long-term control. • Undertake regular monitoring to detect erosion features early so that they can be controlled. • Implement control measures. • Construct proper culverts, bridges and/or crossings at drainage-line crossings, and other attenuation devices to limit overland flow, where necessary.	

6.2.1.3 **Operational Phase**

Continued disturbance to natural habitats due to general operational activities and maintenance

During the operational phase of the project, there will be continuous activity on site, including normal operational activities, maintenance and monitoring. There may also be minor additional construction. Rehabilitation of various sites, such as the construction camps, will also take place. These activities all have the potential to cause additional direct and/or indirect damage to natural habitat and vegetation.

Table 43: Continued disturbance of indigenous natural vegetation.

Environmental Parameter	Indigenous natural vegetation
Issue/Impact/Environmental Effect/Nature	Loss or degradation of vegetation.
Extent	The impact will affect natural vegetation on site.
Probability	Continued disturbance will probably happen.
Reversibility	Partly reversible, on condition no additional vegetation clearing takes place unless for maintenance purposes.
Irreplaceable loss of resources	Marginal loss of resources will occur adjacent to the footprint of the proposed infrastructure since this is the most likely location of operational activities.
Duration	The impact will be long-term (will continue or last for the entire operational life of the project)
Cumulative effect	Medium cumulative impact. Added to existing impacts on natural habitat from activities on site, will cause additional loss of vegetation, the cumulative effect of which will be medium.
Intensity/magnitude	Medium. The quality, use and integrity of vegetation on site will be compromised to some degree, which can be limited to some extent by implementation of mitigation measures.

Environmental Parameter	Indigenous natural vegetation	
Significance Rating	Medium negative impact expected.	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	1	1
Probability	3	3
Reversibility	2	2
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	3	3
Intensity/magnitude	2	1
Significance rating	**-28 (low negative)**	**-14 (low negative)**
Mitigation measures	The following mitigation measures would help to limit impacts: • No additional clearing of vegetation should take place without a proper assessment of the environmental impacts and authorization from relevant authorities, unless for maintenance purposes, in which case all reasonable steps should be taken to limit damage to natural areas. • No driving of vehicles off-road. • Implement Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas. • Access to sensitive areas outside of development footprint should not be permitted during operation. • Surface runoff and erosion must be properly controlled and any issues addressed as quickly as possible.	

Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with infrastructure

There are various animal species of particular concern for this project, including the Karoo Dwarf Tortoise and the Armadillo Girdled Lizard. There are also other more mobile species that are protected by legislation, including the Honey Badger, Black-footed Cat, Leopard and Cape Fox. It is possible that individuals of these species may suffer mortality or removal of individuals through road kills, encounters with infrastructure, illegal hunting, illegal collecting (especially for the tortoise and lizard) and possible damage to habitats.

Table 44: Mortality of fauna during operation.

Environmental Parameter	Fauna, including those of conservation concern (Honey Badger, Black-footed Cat, Leopard, and Cape Fox)
Issue/Impact/Environmental Effect/Nature	Mortality of individuals due to secondary effects.
Extent	The impact will affect individuals on site and possibly in immediately surrounding areas.
Probability	The impact may possibly happen.
Reversibility	Partly reversible with time.
Irreplaceable loss of resources	Low loss of resources will occur.
Duration	The impact will be long-term (operation phase).
Cumulative effect	Low cumulative impact. Cumulative effects will be minor.

Environmental Parameter	Fauna, including those of conservation concern (Honey Badger, Black-footed Cat, Leopard, and Cape Fox)	
Intensity/magnitude	Medium. May impact on population processes.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	1	1
Probability	2	2
Reversibility	2	2
Irreplaceable loss	2	1
Duration	3	3
Cumulative effect	2	2
Intensity/magnitude	2	1
Significance rating	**-24 (low negative)**	**-11 (low negative)**
Mitigation measures	• Personnel and vehicles should be restricted to access, internal roads and no off-road driving should occur. • No speeding on access roads – install speed control measures, such as speed humps, if necessary • No illegal collecting of any individuals, particularly the Armadillo Girdled Lizard. • No hunting of protected species or hunting of any other species without a valid permit. • Personnel to be educated about protection status of species, including distinguishing features to be able to identify protected species. • Prevent unauthorised access to the site – project roads provide access to remote areas that were not previously easily accessible for illegal collecting or hunting.	

<u>Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors</u>

The presence of disturbed surfaces on site creates ecological edges and corridors along which alien species can travel and become established.

Table 45: Continued establishment and spread of declared weeds.

Environmental Parameter	Vegetation and habitat
Issue/Impact/Environmental Effect/Nature	Loss of habitat due to invasion by alien plants
Extent	The impact will affect habitat on site and possibly in immediately surrounding areas.
Probability	The impact will probably happen in the absence of control measures.
Reversibility	Partly reversible in the absence of control measures. Completely reversible if mitigation measures applied. Preventative measures will stop the impact from occurring.
Irreplaceable loss of resources	Marginal to significant loss of resources will occur. Uncontrolled invasion can affect all nearby natural habitats.
Duration	The impact will be long-term.
Cumulative effect	Medium cumulative impact. Cumulative effects will be minor.

Environmental Parameter	Vegetation and habitat	
Intensity/magnitude	Medium. Severe invasion can alter the functioning of natural ecosystems.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	2	1
Irreplaceable loss	3	2
Duration	3	3
Cumulative effect	3	2
Intensity/magnitude	2	1
Significance rating	**-30 (medium negative)**	**-11 (low negative)**
Mitigation measures	It is possible to avoid impacts due to alien plant invasions by undertaking the following mitigation measures: • Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. • Undertake regular monitoring to detect alien invasions early so that they can be controlled. • Implement control measures. • Do NOT use any alien plants during rehabilitation.	

Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape

Increased erosion (water and wind) and water run-off will be caused by the clearing of indigenous vegetation, creation of new hard surfaces and compaction of soil. The internal access roads will be the main source of disturbance and erosion if not properly constructed and provided with water run-off structures. The construction site, substation site and crane pads will furthermore be levelled and compacted causing additional run-off and erosion. Increased run-off and erosion could affect hydrological processes in the area and will change water and silt discharge into drainage lines and streams.

Table 46: Increased runoff and erosion.

Environmental Parameter	Vegetation and habitat
Issue/Impact/Environmental Effect/Nature	Runoff and erosion
Extent	The impact will affect habitat on site.
Probability	The impact will probably happen in the absence of control measures.
Reversibility	Partly reversible in the absence of control measures. Completely reversible if mitigation measures applied. Preventative measures will stop the impact from occurring.
Irreplaceable loss of resources	Marginal to significant loss of resources will occur. Uncontrolled erosion can affect all downslope natural habitats.

Environmental Parameter	Vegetation and habitat	
Duration	The impact will be long-term.	
Cumulative effect	Medium cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Medium. Severe erosion can locally alter the functioning of natural ecosystems and cause additional loss of vegetation.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	3	2
Duration	3	3
Cumulative effect	3	2
Intensity/magnitude	2	1
Significance rating	**-30 (medium negative)**	**-12 (low negative)**
Mitigation measures	It is possible to avoid impacts due to erosion by undertaking the following mitigation measures: • Compile and implement a stormwater management plan, which highlights control priorities and areas and provides a programme for long-term control. • Undertake regular monitoring to detect erosion features early so that they can be controlled. • Implement control measures. • Construct proper culverts, bridges and/or crossings at drainage-line crossings, and other attenuation devices to limit overland flow.	

Changes to behavioural patterns of animals, including possible migration away or towards the project area

The increased human presence and/or construction operations will increase noise levels as well as light levels at night. The increased human presence, elevated noise and light levels, loss of animal habitat and compaction of soils may alter the behavioural patterns of some animals. Some of these changes may favour certain species and negatively affect others and consequently change the composition of the animal communities. Some of these changes could possibly increase levels of predation. Territorial species such as steenbok, grey duiker and klipspringer will be negatively affected as well as species that live or move in the soil. These species might undergo a local reduction in their population size.

Table 47: Changes in behavioural patterns of animals.

Environmental Parameter	Mobile fauna
Issue/Impact/Environmental Effect/Nature	Displacement of individuals or changes to community structure.

Environmental Parameter	Mobile fauna	
Extent	The impact will affect individuals on site and possibly in immediately surrounding areas.	
Probability	The impact may possibly happen.	
Reversibility	Partly reversible with time.	
Irreplaceable loss of resources	No or low loss of resources will occur.	
Duration	The impact will be long-term (duration of the project).	
Cumulative effect	Low cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Low. May impact on population processes.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	2	2
Reversibility	2	2
Irreplaceable loss	1	1
Duration	3	3
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-10 (low negative)**	**-10 (low negative)**
Mitigation measures	• Personnel to be educated about environmental sensitivities and issues on site. • Appropriate lighting should be installed to minimize impacts on nocturnal animals, as per assessment by visual specialist. • Routine maintenance activities should not be undertaken at night. • Noise and light pollution should be managed according to guidelines from the noise specialist study and visual specialist assessment respectively.	

6.2.1.4 **Decommissioning Phase**

Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites

During the decommissioning phase of the project, there will be a flurry of activity on site over a period of time, similar to during the construction phase, including dismantling and removal of equipment and rehabilitation. There may also be minor additional construction. Rehabilitation of various sites will also take place. These activities all have the potential to cause additional direct and/or indirect damage to natural habitat and vegetation

Table 48: Disturbance of indigenous natural vegetation.

Environmental Parameter	Indigenous natural vegetation
Issue/Impact/Environmental Effect/Nature	Loss or degradation of vegetation.

Environmental Parameter	Indigenous natural vegetation	
Extent	The impact will affect natural vegetation on site.	
Probability	Continued disturbance will probably happen.	
Reversibility	Partly reversible, on condition no additional vegetation clearing takes place.	
Irreplaceable loss of resources	Marginal loss of resources will occur adjacent to the footprint of the proposed infrastructure since this is the most likely location of operational activities.	
Duration	The impact will be medium-term (until rehabilitation has succeeded in establishing perennial vegetation cover)	
Cumulative effect	Medium cumulative impact. Added to existing impacts on natural habitat from activities on site, will cause additional loss of vegetation, the cumulative effect of which will be medium.	
Intensity/magnitude	Medium. The quality, use and integrity of vegetation on site will be compromised to some degree, which can be limited to some extent by implementation of mitigation measures.	
Significance Rating	Medium negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	3	3
Reversibility	2	2
Irreplaceable loss	2	2
Duration	2	2
Cumulative effect	3	2
Intensity/magnitude	2	1
Significance rating	**-26 (low negative)**	**-12 (low negative)**
Mitigation measures	The following mitigation measures would help to limit impacts: • No additional clearing of vegetation should take place without a proper assessment of the environmental impacts and authorization from relevant authorities. • No driving of vehicles off-road. • Implement Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas. • Access to sensitive areas outside of development footprint should not be permitted during operation. • Surface runoff and erosion must be properly controlled and any issues addressed as quickly as possible.	

Direct mortality of fauna due to machinery, decommissioning and increased traffic

It is possible that individuals of species of concern, as well as other species, may suffer mortality or removal of individuals through road kills, encounters with infrastructure, illegal hunting, illegal collecting (especially for the tortoise and lizard) and possible damage to habitats. The animal species of particular concern for this project include the Karoo Dwarf Tortoise and the Armadillo Girdled Lizard. There are also other more mobile species that are protected by legislation, including the Honey Badger, Black-footed Cat, Leopard and Cape Fox.

Table 49: Mortality of fauna during decommissioning.

Environmental Parameter	**Fauna, including those of conservation concern (Honey Badger, Black-footed Cat, Leopard, and Cape Fox)**	
Issue/Impact/Environmental Effect/Nature	Mortality of individuals due to secondary effects.	
Extent	The impact will affect individuals on site and possibly in immediately surrounding areas.	
Probability	The impact may possibly happen.	
Reversibility	Partly reversible with time.	
Irreplaceable loss of resources	Low loss of resources will occur.	
Duration	The impact will be short-term (decommissioning phase).	
Cumulative effect	Low cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Low. May impact on population processes, but is likely to be barely perceptible.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	2	2
Reversibility	2	2
Irreplaceable loss	2	1
Duration	1	1
Cumulative effect	2	2
Intensity/magnitude	1	1
Significance rating	**-10 (low negative)**	**-9 (low negative)**
Mitigation measures	• Personnel and vehicles to avoid sensitive habitats. • No speeding on access roads – install speed control measures, such as speed humps, if necessary • No illegal collecting of any individuals, particularly the Armadillo Girdled Lizard. • No hunting of protected species or hunting of any other species without a valid permit. • Personnel to be educated about protection status of species, including distinguishing features to be able to identify protected species. • Report any siting's to conservation authorities. • Prevent unauthorised access to the site – project roads provide access to remote areas that were not previously easily accessible for illegal collecting or hunting.	

<u>Displacement and/or disturbance of fauna due to increased activity and noise levels</u>

Decommissioning and rehabilitation activities may lead to loss of habitat, noise, dust and general activity that are likely to cause all mobile species to move away from the site. Mobile species of conservation concern that could potentially be affected by the proposed project are as follows:

1. Honey Badger,
2. Black-footed Cat,
3. Leopard,
4. Cape Fox,
5. Grey Rhebok.

All these species are mobile terrestrial species with a large home range and the ability to travel long distances in short periods of time. Individuals may be locally displaced, but this will have little effect on the overall range of the species nor is it expected that any overall impacts will result from local displacement.

Table 50: Displacement of terrestrial fauna.

Environmental Parameter	**Mobile fauna of conservation concern (Honey Badger, Black-footed Cat, Leopard, Cape Fox and Grey Rhebok**)	
Issue/Impact/Environmental Effect/Nature	Displacement of individuals.	
Extent	The impact will affect individuals on site and possibly in immediately surrounding areas.	
Probability	The impact may possibly happen.	
Reversibility	Partly reversible with time.	
Irreplaceable loss of resources	No or low loss of resources will occur.	
Duration	The impact will be short-term (decommissioning phase).	
Cumulative effect	Low cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Low. May impact on population processes.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	2	2
Reversibility	2	2
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-8 (low negative)**	**-8 (low negative)**
Mitigation measures	• Restrict impact to development footprint only and limit disturbance spreading into surrounding areas. • No speeding on access roads – install speed control measures, such as speed humps, if necessary • No hunting of protected species. • Personnel to be educated about protection status of species, including distinguishing features to be able to identify protected species. • Report any sitings to conservation authorities.	

Effects on physiological functioning of vegetation due to dust deposition

There is a moderate risk during decommissioning that dust will be created that will settle on surrounding vegetation. This will be due to earth-moving equipment as well as vehicles moving around on site as well as into and out of the site. There will be a definite increase in the amount of traffic on access roads to the site that will also affect surrounding areas.

Table 51: Vegetation damage due to dust deposition.

Environmental Parameter	**Vegetation**	
Issue/Impact/Environmental Effect/Nature	Dust deposition, resulting in reduced physiological fitness of plants / vegetation.	
Extent	The impact will affect vegetation on site and in all areas with access roads leading to site.	
Probability	The impact will almost certainly happen.	
Reversibility	Partly reversible with time.	
Irreplaceable loss of resources	Low to marginal loss of resources will occur.	
Duration	The impact will be of short-term duration for access roads (only subject to high traffic volumes during decommissioning).	
Cumulative effect	Medium cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Medium. May impact on population processes.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	2	2
Probability	4	3
Reversibility	2	2
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	3	2
Intensity/magnitude	2	1
Significance rating	**-28 (low negative)**	**-12 (low negative)**
Mitigation measures	• No speeding on access roads – install speed control measures, such as speed humps, if necessary, and penalties for non-compliance. • Excessive dust can be controlled by using appropriate dust-control measures.	

<u>Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors</u>

The presence of disturbed surfaces on site creates ecological edges and corridors along which alien species can travel and become established.

Table 52: Continued establishment and spread of declared weeds.

Environmental Parameter	**Vegetation and habitat**
Issue/Impact/Environmental Effect/Nature	Loss of habitat due to invasion by alien plants
Extent	The impact will affect habitat on site and possibly in immediately surrounding areas.
Probability	The impact will probably happen in the absence of control measures.

Environmental Parameter	Vegetation and habitat	
Reversibility	Partly reversible in the absence of control measures. Completely reversible if mitigation measures applied. Preventative measures will stop the impact from occurring.	
Irreplaceable loss of resources	Marginal to significant loss of resources will occur. Uncontrolled invasion can affect all nearby natural habitats.	
Duration	The impact will be short-term.	
Cumulative effect	Medium cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Medium. Severe invasion can alter the functioning of natural ecosystems.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	3	2
Duration	3	1
Cumulative effect	3	2
Intensity/magnitude	2	1
Significance rating	**-30 (medium negative)**	**-9 (low negative)**
Mitigation measures	It is possible to avoid impacts due to alien plant invasions by undertaking the following mitigation measures: • Implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. • Undertake regular monitoring to detect alien invasions early so that they can be controlled. Post-decommissioning monitoring should continue for an appropriate length of time to ensure that future problems are avoided. The required time-period should be indicated in the Alien Invasive Management Plan. • Do NOT use any alien plants during any rehabilitation that may be required.	

Changes to behavioural patterns of animals, including possible migration away or towards the project area

The increased human presence and/or decommissioning operations will increase noise levels as well as light levels at night. The increased human presence, elevated noise and light levels, loss of animal habitat and compaction of soils may alter the behavioural patterns of some animals. Some of these changes may favour certain species and negatively affect others and consequently change the composition of the animal communities. Some of these changes could possibly increase levels of predation. Territorial species such as steenbok, grey duiker and klipspringer will be negatively affected as well as species that live or move in the soil. These species might undergo a local reduction in their population size.

Table 53: Changes in behavioural patterns of animals.

Environmental Parameter	Mobile fauna	
Issue/Impact/Environmental Effect/Nature	Displacement of individuals or changes to community structure.	
Extent	The impact will affect individuals on site and possibly in immediately surrounding areas.	
Probability	The impact may possibly happen.	
Reversibility	Partly reversible with time.	
Irreplaceable loss of resources	No or low loss of resources will occur.	
Duration	The initial impact will be short-term (decommissioning phase).	
Cumulative effect	Low cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Low. May impact on population processes.	
Significance Rating	Low negative impact expected.	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	1	1
Probability	2	2
Reversibility	2	2
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-8 (low negative)**	**-8 (low negative)**
Mitigation measures	• Access to sensitive areas outside of infrastructure footprint should not be permitted during decommissioning. • Personnel to be educated about environmental sensitivities and issues on site. • Appropriate lighting should be installed to minimize impacts on nocturnal animals. • Project decommissioning activities should not be undertaken at night. • Noise and light pollution should be managed according to guidelines from the noise specialist study and visual specialist respectively. • No dangerous pits, trenches, etc. should remain on site after rehabilitation.	

6.2.1.5 **No-Go Alternative**

The no development alternative option assumes the site remains in its current state, i.e. there is no construction of a WEF and associated infrastructure in the proposed project area and the status quo would prevail.

6.2.2 *Avifauna Impacts*

The Avifauna Impact Assessment and 12-month pre-construction monitoring was conducted by Miguel Mascarenhas from BioInsight and is included as **Appendix 6C**. The following Avifauna impacts are discussed in detail below:

Please note that further to this assessment the layout was revised, and the specialist concluded that the impacts contained in the original assessment are still valid. A copy of this letter can be found in **Appendix 6**.

6.2.2.1 **Planning / Pre-construction**

No impacts are expected during planning.

6.2.2.2 **Construction Phase**

Habitat Loss

Destruction of natural vegetated areas due to platforms construction, workstation and substation construction, internal access roads construction, and turbines, underground cabling and overhead power lines installation and other infrastructure

The minimisation of this impact is mainly achieved in the project design phase through the avoidance of new infrastructure siting (especially wind turbines and substations) in very high (no-go) areas. Additionally, in affected areas, activities of clearance and removal of vegetation should be kept to a minimum. The use of existing access roads should be used to the maximum extent possible. If large portions of very high sensitive areas are affected during the construction phase, then measures should be taken to restore vegetation as soon as possible after construction has completed. The area of intervention should be identified and delimitated prior to the beginning of the work.

Table 54: Displacement of individuals or changes to community structure.

Environmental Parameter	**Mobile fauna**	
Issue/Impact/Environmental Effect/Nature	Habitat Loss	
Extent	Destruction of important habitat areas (natural vegetation & water features etc.) due to the construction of wind turbines and associated infrastructures.	
Probability	Site	
Reversibility	Probable	
Irreplaceable loss of resources	Partly Reversible	
Duration	Marginal loss of resource	
Cumulative effect	Long term	
Intensity/magnitude	Negligible Cumulative Impact	
Significance Rating	Medium	
	Pre-mitigation impact rating	Pre-mitigation impact rating

Extent	1	1
Probability	3	3
Reversibility	2	2
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	1	1
Intensity/magnitude	2	2
Significance rating	-24 (low negative)	-24 (low negative)
Mitigation measures	• Avoidance of new infrastructure siting (especially wind turbines) in high sensitivity areas. Clearance and removal of vegetation should be kept to a minimum. Clearance and removal of vegetation should be kept to a minimum. Vegetation restoration should take place after construction, if significant sensitive areas are affected.	

Disturbance / Displacement Effects

Disturbance / displacement of the bird community due to the increase of people and vehicles in the area – In order to minimise this impact, certain measures can be taken, such as to avoid or minimise the presence of people and vehicles in the very high (no-go) areas as much as possible. Noise levels should be kept to a minimum as far as possible.

Table 55: Disturbance/displacement of the bird community due to the increase of people and vehicles in the area

. **Environmental Parameter**	**Disturbance/Displacement Effects**	
Issue/Impact/Environmental Effect/Nature	Disturbance/displacement of the bird community due to the increase of people and vehicles in the area.	
Extent	Local/district	
Probability	Probable	
Reversibility	Partly Reversible	
Irreplaceable loss of resources	Marginal loss of resource	
Duration	Long Term	
Cumulative effect	Medium Cumulative Impact	
Intensity/magnitude	Medium	
Significance Rating	The project will have a moderate negative effect on disturbance/displacement effects and will require moderate mitigation measures.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	2
Reversibility	2	1
Irreplaceable loss	2	1
Duration	2	2
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	**-30 (medium negative)**	**-18 (low negative)**

Mitigation measures	• Avoid/minimise the presence of people and vehicles in highly sensitive areas as much as possible. • Low levels of noise disturbance are recommended wherever possible. • An avifaunal monitoring campaign is recommended for at least one year during the construction phase.

6.2.2.3 **Operational Phase**

Fatalities due to collision

Fatality of individuals due to collision with turbine blades or associated infrastructure. The minimisation of fatalities is mainly achieved through planning during the layout definition phase. For example: Avoidance of turbine installation in very high sensitive areas for birds, and avoidance of overhead powerlines being built to run perpendicularly to known bird flight paths / migratory routes. These powerlines are however allowed to be built within sensitive buffered locations, as long as they only run parallel to bird flight paths. This is to be further assessed for approval by the avifaunal specialist once the powerline layout becomes available which will be subject to a separate environmental process. Powerlines and guyed wires from meteorological masts should be fitted with bird flight diverters, to allow them to be more visible to bird species. All above-ground powerline infrastructure must be signed off as "bird-friendly" by the avifaunal specialist prior to construction. Considering the bird movements observed, it is recommended that the turbine minimum height of the rotor swept area is not lower than 40 m. In addition to that, all turbines should be treated as having a 200 m 'area of influence' buffer around them. This buffer is merely to illustrate an area where birds are likely to show behavioural changes in relation to the distance to wind turbines. However, it must be noted that the more relevant distance to influence turbine placement would be an area of 90m (maximum length of a turbine blade) around each wind turbine (the impact zone). As such, all turbines sited outside of no-go areas, should also not be located within a distance of 90m of these sensitive areas. Lastly, a monitoring plan is recommended during the construction and operational phase to improve the understanding of the real impact caused by the WEF on local bird populations, as well as to validate the success of the mitigation measures proposed.

Table 56: Fatalities due to collision

Environmental Parameter	**Fatalities due to collision**
Issue/Impact/Environmental Effect/Nature	Fatalities due to collision with wind turbine blades or associated infrastructures.
Extent	Site
Probability	Probable
Reversibility	Irreversible
Irreplaceable loss of resources	Significant loss of resources
Duration	Long Term
Cumulative effect	Medium Cumulative Impact
Intensity/magnitude	High
Significance Rating	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.

Environmental Parameter	Fatalities due to collision	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	2	1
Reversibility	3	2
Irreplaceable loss	3	2
Duration	3	3
Cumulative effect	3	2
Intensity/magnitude	3	2
Significance rating	**-45 (medium negative)**	**-22 (low negative)**
Mitigation measures	• Avoid turbine placement in no-go areas. • Overhead powerlines must be fitted with bird flight diverters and may not run perpendicularly to any known bird flight paths. • All above-ground powerline infrastructure must be signed off as "bird-friendly" by the avifaunal specialist, prior to construction. • Lower blade tip should not be lower than 40m. A monitoring programme (including carcass searches and bias/scavenger trials) is recommended for a minimum of two years during the operational.	

Disturbance / Displacement Effects

Disturbance / displacement of the bird community due to noise and movement generated by turbines, as well as an increase of people and vehicles in the area during maintenance activities

The disturbance due to operational turbines and people / vehicles in the area is considered to be an impact of medium significance. Generally, the people/vehicles on site (for maintenance activities) are not expected to cause a significant increased effect with regards to disturbance, as the area already has some movement through the site due to the presence of a major national gravel road, as well as farm roads & houses coupled with existing farming activities. However, the more relevant disturbance effect would be that which is derived from the newly sited wind turbines. These are structures that the local bird community will not be familiar with, and as such, some degree of impact is expected.

Table 57 Disturbance/displacement of the bird community due to noise and movement generated by turbines and people/vehicles operating in the area.

Environmental Parameter	Disturbance/Displacement Effects
Issue/Impact/Environmental Effect/Nature	Disturbance/displacement of the bird community due to noise and movement generated by turbines and people/vehicles operating in the area.
Extent	Local/district
Probability	Probable
Reversibility	Partly Reversible
Irreplaceable loss of resources	Marginal loss of resource
Duration	Long Term
Cumulative effect	Medium Cumulative Impact
Intensity/magnitude	Medium

Environmental Parameter	Disturbance/Displacement Effects	
Significance Rating	The project will have a moderate negative effect on disturbance/displacement effects and will require moderate mitigation measures.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	2
Reversibility	2	1
Irreplaceable loss	2	1
Duration	3	2
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	**-30 (medium negative)**	**-18 (low negative)**
Mitigation measures	Lower the noise levels and traffic movement as far as possible.	

Decommissioning Phase

Disturbance / Displacement Effects

Disturbance / displacement of the bird community due to the increase of people and vehicles in the area, while dismantling wind turbines and associated infrastructures

In order to minimise this impact, certain measures can be taken. Lower levels of noise disturbance are recommended whenever possible and adhere to speed limits of 40km/h (maximum). Keep decommissioning phase as short as possible.

Table 58 Disturbance/displacement of the bird community due to the increase of people and vehicles in the area, when dismantling wind turbines and associated infrastructures.

Environmental Parameter	Disturbance/Displacement Effects	
Issue/Impact/Environmental Effect/Nature	Disturbance/displacement of the bird community due to the increase of people and vehicles in the area, when dismantling wind turbines and associated infrastructures.	
Extent	Site	
Probability	Probable	
Reversibility	Partly Reversible	
Irreplaceable loss of resources	Marginal loss of resource	
Duration	Short term	
Cumulative effect	Low Cumulative Impact	
Intensity/magnitude	Medium	
Significance Rating	Disturbance/Displacement effects will have negligible negative effects and will require little to no mitigation.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	2
Reversibility	2	1
Irreplaceable loss	2	1
Duration	1	1
Cumulative effect	2	1

Environmental Parameter	Disturbance/Displacement Effects	
Intensity/magnitude	2	1
Significance rating	**-22 (low negative)**	**-14 (low negative)**
Mitigation measures	Lower the noise levels and traffic movement as far as possible. No off-road driving. Adhere to speed limits on site (40 km/h). Keep decommissioning phase as short as possible.	

6.2.2.4 **No-Go Alternative**

Table 59 Disturbance/Displacement Effects; Habitat Loss; Fatalities due to Collision

Environmental Parameter	Disturbance/Displacement Effects; Habitat Loss; Fatalities due to Collision (although these impacts will not occur if the facility is not built)	
Issue/Impact/Environmental Effect/Nature	Disturbance/displacement of the bird community due to the presence of wind turbines and the increase of people and vehicles in the areas, when operating the facilities. Habitat loss as a result of the removal of natural vegetation when constructing the facilities. Fatalities when each facility experiences bird collisions with wind turbines. (although these impacts will not occur if the facility is not built)	
Extent	Site (although it will not have any extent due to the absence of the facility)	
Probability	Unlikely (as the facility would not be built)	
Reversibility	Completely Reversible (although the impacts would not occur in the first place)	
Irreplaceable loss of resources	No loss of resource (as the facility will not exist, and impacts will not occur)	
Duration	Short term (as impacts will not occur)	
Cumulative effect	Negligible Cumulative Impact (as the facility will not exist – meaning that no impacts can exacerbate the impacts experienced in surrounding projects)	
Intensity/magnitude	Low (as impacts will not exist, and therefore the quality, use and integrity of the system will not be affected in any way)	
Significance Rating	As the project will not exist, the significance would be that of a neutral nature with no actual “impact” occurring (i.e. not a positive or negative impact).	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	N/A
Probability	1	N/A
Reversibility	1	N/A
Irreplaceable loss	1	N/A
Duration	1	N/A
Cumulative effect	1	N/A
Intensity/magnitude	1	N/A
Significance rating	6 (neutral)	
Mitigation measures	No-go alternatives can’t properly be assessed in this context. Regardless, if the project does not get constructed, then impacts are expected to remain completely unchanged than what they presently are in their current state (no impacts). Therefore, the significance would be of a neutral nature. No mitigation measures would be required to be implemented for the absence of this facility.	

6.2.3 *Bat Impacts*

The Bat Impact Assessment and 12-month pre-construction monitoring was conducted by Miguel Mascarenhas from BioInsight and is included as Appendix 6D. The following bat impacts are discussed in detail below:

Please note that further to this assessment the layout was revised, and the specialist concluded that the impacts contained in the original assessment are still valid. A copy of this letter can be found in **Appendix 6**.

6.2.3.1 **Planning / Pre-construction**

No impacts are expected during planning.

6.2.3.2 **Construction Phase**

Habitat Loss

Destruction of natural vegetated areas due to platforms construction, workstation and substation construction, internal access roads construction, and turbines, underground cabling and overhead power lines installation. The minimisation of this impact is mainly achieved in the project design phase through the avoidance of new infrastructure siting (especially wind turbines) in very high (no-go) areas. Additionally, in affected areas, activities of clearance and removal of vegetation should be kept to a minimum. The use of existing access roads should be used to the maximum extent possible. If large portions of very high sensitive areas are affected during the construction phase, then measures should be taken to restore vegetation as soon as possible after construction has completed. The area of intervention should be identified and delimitated prior to the beginning of the work.

Table 60 - Destruction of important habitat areas (natural vegetation & water features etc.) due to the construction of wind turbines and associated infrastructures.

Environmental Parameter	Habitat Loss
Issue/Impact/Environmental Effect/Nature	Destruction of important habitat areas (natural vegetation & water features etc.) due to the construction of wind turbines and associated infrastructures.
Extent	Site
Probability	Definite
Reversibility	Irreversible
Irreplaceable loss of resources	Significant loss of resource
Duration	Permanent
Cumulative effect	Low Cumulative Impact
Intensity/magnitude	Medium
Significance Rating	Habitat loss will have moderate negative effects and will require moderate mitigation measures.

	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	1
Reversibility	4	3
Irreplaceable loss	3	2
Duration	4	4
Cumulative effect	2	1
Intensity/magnitude	2	2
Significance rating	**-36 (medium negative)**	**-24 (low negative)**
Mitigation measures	Avoidance of new infrastructure siting (especially wind turbines) in high sensitivity areas. Clearance and removal of vegetation should be kept to a minimum. Clearance and removal of vegetation should be kept to a minimum. Vegetation restoration should take place after construction, if significant sensitive areas are affected.	

Disturbance / Displacement Effects

Disturbance / displacement of the bat community due to the increase of people and vehicles in the area. In order to minimise this impact, certain measures can be taken, such as to avoid or minimise the presence of people and vehicles in the very high (no-go) areas as much as possible. Noise levels should be kept to a minimum as far as possible in accordance with the noise specialist recommendations. Avoid construction works during the night and avoid the destruction or disturbance of potential roosting sites. Movement of machinery, vehicles and persons should be restricted to the existing or new roads and avoid the existing natural areas.

Table 61 - Disturbance/displacement of the bat community due to the increase of people and vehicles in the area.

Issue/Impact/Environmental Effect/Nature	**Disturbance/Displacement Effects**	
Extent	Disturbance/displacement of the bat community due to the increase of people and vehicles in the area.	
Probability	Site	
Reversibility	Possible	
Irreplaceable loss of resources	Partly reversible	
Duration	Marginal loss of resource	
Cumulative effect	Short Term	
Intensity/magnitude	Low Cumulative Impact	
Significance Rating	Medium	
Issue/Impact/Environmental Effect/Nature	The project will have a negligible negative effect on disturbance/displacement effects and will require little to no mitigation.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1

Issue/Impact/Environmental Effect/Nature	Disturbance/Displacement Effects	
Probability	2	2
Reversibility	2	1
Irreplaceable loss	2	1
Duration	1	1
Cumulative effect	2	1
Intensity/magnitude	2	1
Significance rating	**-20 (low negative)**	**-7 (low negative)**
Mitigation measures	Avoid/minimise the presence of people and vehicles in highly sensitive areas as much as possible. Low levels of noise disturbance are recommended wherever possible. Avoid dismantling works during the night and disturbance of roosts. Movement of machinery, vehicles and persons should be restricted to the existing roads or new roads. A bat monitoring campaign is recommended for at least one year during the construction phase.	

6.2.3.3 **Operation Phase**

Fatalities Events

Fatality of individuals due to collision with turbine blades or barotrauma caused by turbines operation

The minimisation of fatalities is mainly achieved through planning during the layout definition phase. For example: Avoidance of turbine installation in very high sensitive areas for bats. Additionally, it is recommended that no tall vegetation should be allowed within the 200 m buffer around the wind turbines to reduce the suitability of the areas for bat foragers. A construction and operational phase bat monitoring program should be implemented to determine the actual impacts of the wind energy facility on the bat community, as well as the implementation of mitigation measures, such as the utilisation of red lights in the turbines, instead of white, to minimise insect attraction and bat foraging behaviors near the turbines if permissible by the civil aviation authority. Also, a monitoring plan is recommended during operation phase and, if high levels of mortality are observed during operational phase, management actions should be put into action to mitigate fatality

Table 62 - Fatalities due to collision with wind turbine blades or barotrauma.

Issue/Impact/Environmental Effect/Nature	Fatalities due to collision
Extent	Fatalities due to collision with wind turbine blades or barotrauma.
Probability	Local/district
Reversibility	Probable
Irreplaceable loss of resources	Irreversible
Duration	Significant loss of resources
Cumulative effect	Permanent
Intensity/magnitude	Medium Cumulative Impact

Issue/Impact/Environmental Effect/Nature	Fatalities due to collision	
Significance Rating	Medium	
Issue/Impact/Environmental Effect/Nature	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	2
Reversibility	4	3
Irreplaceable loss	3	2
Duration	4	3
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	**-38 (medium negative)**	**-26 (low negative)**
Mitigation measures	Avoid turbine placement in no-go areas. A monitoring programme (including carcass searches and bias/scavenger trials) is recommended for a minimum of two years during the operational. If high levels of mortality are observed, management actions should be put into action to mitigate fatality. No tall vegetation should be allowed within the 200m buffer around the wind turbines. Utilisation of red lights in the turbines, instead of white or whatever is in line with the requirements of the CAA	

Disturbance / Displacement Effects

Disturbance / displacement of the bat community due to noise and movement generated by turbines, as well as an increase of people and vehicles in the area during maintenance activities

In order to minimise this impact, certain measures can be taken. Lower levels of traffic and noise disturbance is recommended whenever possible, and speed limits of 40km/h (maximum) should always be adhered to.

Table 63 - Disturbance/displacement of the bat community due to noise and movement generated by turbines and people/vehicles operating in the area.

Issue/Impact/Environmental Effect/Nature	Disturbance/Displacement Effects
Extent	Disturbance/displacement of the bat community due to noise and movement generated by turbines and people/vehicles operating in the area.
Probability	Local/district
Reversibility	Probable
Irreplaceable loss of resources	Partly Reversible
Duration	Marginal loss of resource
Cumulative effect	Long Term
Intensity/magnitude	Medium Cumulative Impact
Significance Rating	Medium

Issue/Impact/Environmental Effect/Nature	Disturbance/Displacement Effects	
Issue/Impact/Environmental Effect/Nature	The project will have a moderate negative effect on disturbance/displacement effects and will require moderate mitigation measures.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	2
Reversibility	2	1
Irreplaceable loss	2	1
Duration	3	2
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	**-30 (medium negative)**	**-20 (low negative)**
Mitigation measures	Lower the noise levels and traffic movement as far as possible.	

6.2.3.4 **Decommissioning Phase**

Disturbance / Displacement Effects

Disturbance / displacement of the bat community due to the increase of people and vehicles in the area, while dismantling wind turbines and associated infrastructures.

In order to minimise this impact, certain measures can be taken. Lower levels of noise disturbance are recommended whenever possible and adhere to speed limits of 40km/h (maximum). Avoid dismantling works during the night and avoid the disturbance of identified roosting sites. Movement of machinery, vehicles and persons should be restricted to the existing roads and avoid the existing natural areas.

Table 64 - Disturbance/displacement of the bat community due to the increase of people and vehicles in the area, when dismantling wind turbines and associated infrastructures.

Issue/Impact/Environmental Effect/Nature	Disturbance/Displacement Effects
Extent	Disturbance/displacement of the bat community due to the increase of people and vehicles in the area, when dismantling wind turbines and associated infrastructures.
Probability	Site
Reversibility	Possible
Irreplaceable loss of resources	Partly reversible
Duration	Marginal loss of resource
Cumulative effect	Short Term
Intensity/magnitude	Low Cumulative Impact
Significance Rating	Medium

Issue/Impact/Environmental Effect/Nature	Disturbance/Displacement Effects	
Issue/Impact/Environmental Effect/Nature	The project will have a negligible negative effect on disturbance/displacement effects and will require little to no mitigation.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	2	2
Reversibility	2	1
Irreplaceable loss	2	1
Duration	1	1
Cumulative effect	2	1
Intensity/magnitude	2	1
Significance rating	**-20 (low negative)**	**-7 (low negative)**
Mitigation measures	Lower the noise levels and traffic movement as far as possible. Avoid dismantling works during the night and disturbance of roosts. Movement of machinery, vehicles and persons should be restricted to the existing roads or new roads.	

6.2.3.5 **No-Go Alternative**

Table 65 - Disturbance/Displacement Effects; Habitat Loss; Fatalities due to Collision or Barotrauma (although these impacts will not occur if the facility is not built)

Issue/Impact/Environmental Effect/Nature	Disturbance/Displacement Effects; Habitat Loss; Fatalities due to Collision or Barotrauma (although these impacts will not occur if the facility is not built)
Extent	Disturbance/displacement of the bat community due to the presence of wind turbines and the increase of people and vehicles in the areas, when operating the facilities. Habitat loss as a result of the removal of natural vegetation when constructing the facilities. Fatalities when each facility experiences bat collisions with wind turbines or barotrauma. (although these impacts will not occur if the facility is not built)
Probability	Site (although it will not have any extent due to the absence of the facility)
Reversibility	Unlikely (as the facility would not be built)
Irreplaceable loss of resources	Completely Reversible (although the impacts would not occur in the first place)
Duration	No loss of resource (as the facility will not exist, and impacts will not occur)
Cumulative effect	Short term (as impacts will not occur)

Issue/Impact/Environmental Effect/Nature	**Disturbance/Displacement Effects; Habitat Loss; Fatalities due to Collision or Barotrauma (although these impacts will not occur if the facility is not built)**	
Intensity/magnitude	Negligible Cumulative Impact (as the facility will not exist – meaning that no impacts can exacerbate the impacts experienced in surrounding projects)	
Significance Rating	Low (as impacts will not exist, and therefore the quality, use and integrity of the system will not be affected in any way)	
Issue/Impact/Environmental Effect/Nature	As the project will not exist, the significance would be that of a neutral nature with no actual "impact" occurring (i.e. not a positive or negative impact).	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	1	1
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**6 (neutral)**	**6 (neutral)**
Mitigation measures	No-go alternatives can't properly be assessed in this context. Regardless, if the project does not get constructed, then impacts are expected to remain completely unchanged than what they presently are in their current state (no impacts). Therefore, the significance would be of a neutral nature. No mitigation measures would be required to be implemented for the absence of this facility.	

6.2.4 *Aquatic Ecology Impacts*

The Aquatic Assessment was conducted by Dr Brian Colloty from EnviroSci and is included as Appendix 6B. The following aquatic impacts are discussed in detail below:

Please note that further to this assessment the layout was revised, and the specialist concluded that the impacts contained in the original assessment are still valid. A copy of this letter can be found in **Appendix 6**.

During the impact assessment undertaken as part of this EIA a number of potential key issues / impacts were identified and these were assessed based on the methodology supplied by SiVEST.
The following direct impacts were assessed with regard the riparian areas and watercourses, .i.e. any areas with wetlands would be avoided:

- Impact 1: Loss of riparian systems and disturbance of the alluvial watercourses in the construction, operational and decommissioning phases

- Impact 2: Impact on riparian systems through the possible increase in surface water runoff on riparian form and function during the operational and decommissioning phases
- Impact 3: Increase in sedimentation and erosion in the construction, operational and decommissioning phases
- Impact 4: Potential impact on localised surface water quality during the construction and decommissioning phases
- Impact 5: The No-go Alternative
- Impact 6: Cumulative impacts for the overall project due to the high number of projects surrounding this application

The impacts were assessed as follows, noting that the impact statements are based on post mitigation activities:

6.2.4.1 **Planning / Pre-construction Phase**

No impacts are expected during planning.

6.2.4.2 **All Phases of the Development - Construction, Operation and Decommissioning**

The following impacts were identified for the proposed WEF development with regards to surface water assessment.

Table 66: Loss of Riparian systems and disturbance to alluvial watercourses

Environmental Parameter	**Loss of riparian systems and disturbance to alluvial watercourses during construction, operations and decommissioning phases**
Issue/Impact/Environmental Effect/Nature	The physical removal of the riparian zones and disturbance of any alluvial watercourses by new road crossings or upgrades of existing roads are likely within the watercourses within the site. These disturbances will be the greatest during the construction and again in the decommissioning phases as the related disturbances could result in loss and/or damaged vegetation, while to a lesser degree in the operation phase (i.e. as and when maintenance of roads occur).
Extent	Local
Probability	Definite
Reversibility	Completely reversible
Irreplaceable loss of resources	A marginal loss in resources

Environmental Parameter	Loss of riparian systems and disturbance to alluvial watercourses during construction, operations and decommissioning phases	
Duration	With mitigation and completion of the construction phase the impacts would be minimal, however the duration would be long term.	
Cumulative effect	The increase in surface run-off velocities and the reduction in the potential for groundwater infiltration is likely to occur considering that the site is near the main drainage channels, however the annual rainfall figures are low and this impact is not anticipated if the mitigation measures listed are properly implemented.	
Intensity/magnitude	The overall intensity of the impact would be Low when compared to scale of the impact and the remaining habitat within the catchment, coupled to the overall avoidance of creating high numbers of new crossings.	
Significance Rating	Impact would be considered LOW with mitigations in place based on the intensity of the impact described above.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	4	3
Reversibility	1	1
Irreplaceable loss	2	2
Duration	3	1
Cumulative effect	2	1
Intensity/magnitude	1	1
Significance rating	**-14 (Low Negative)**	**-9 (Low Negative)**
Mitigation measures	1. Where new water course crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (reduce footprint as much as possible). 2. During the construction and operational /decommissioning phase, monitor culverts to see if erosion issues arise and if any erosion control is required. 3. Where possible culvert bases must be placed as close as possible with natural levels in mind so that these don't from additional steps / barriers.	

Environmental Parameter	Loss of riparian systems and disturbance to alluvial watercourses during construction, operations and decommissioning phases
	4. Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. 5. It is also advised that an Environmental Control Officer (ECO), with a good understanding of the local flora be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas within aquatic environment, using selected species detailed in this report. *6.* All alien plant re-growth must be monitored, and should it occur these plants should be eradicated. The scale of the operation does however not warrant the use of a Landscape Architect and / or Landscape Contractor.

Table 67: Impact on riparian systems through the possible increase in surface water runoff on downstream riparian form and function

Environmental Parameter	Impact on riparian systems through the possible increase in surface water runoff on downstream riparian form and function, due to impacts to the hydrological regime such as alteration of surface run-off patterns
Issue/Impact/Environmental Effect/Nature	This could occur within the operational and decommissioning phases. when any of the hard or compacted surfaces (roads or hard stand areas) increase the volume and velocity of the surface runoff increases. This could impact the hydrological regime through the increase in flows that are concentrated in area, and as most plants are drought tolerant an increase in water will allow for other species to develop and outcompete typical plant species found within the

Environmental Parameter	Impact on riparian systems through the possible increase in surface water runoff on downstream riparian form and function, due to impacts to the hydrological regime such as alteration of surface run-off patterns	
	region. This then affects the structure (i.e. larger taller grasses / shrubs / trees) and function (greater attenuation of flows, restricting any runoff from reaching downstream areas). The opposite can also happen. If flows are too concentrated with high velocities, scour and erosion results, with a complete reduction or disturbance of riparian habitat.	
Extent	Local	
Probability	Probable	
Reversibility	Completely reversible – water courses can be reinstated and over a period the riparian functionality / species composition will recover	
Irreplaceable loss of resources	A marginal loss in resources	
Duration	With mitigation the impacts would be minimal however the duration would be long term.	
Cumulative effect	Downstream alteration of hydrological regimes due to the increased run-off from the area. However due to low mean annual runoff within the region this is not anticipated due to the nature of the development together with the proposed layout.	
Intensity/magnitude	The overall intensity of the impact would be Low when compared to scale of the impact and the remaining habitat within he catchment, coupled to the overall avoidance of creating high numbers of new crossings.	
Significance Rating	Impact would be considered LOW with mitigations in place based on the intensity of the impact described above.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	3
Reversibility	1	1
Irreplaceable loss	2	2
Duration	4	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-13 (Low Negative)**	**-9 (Low Negative)**

Environmental Parameter	Impact on riparian systems through the possible increase in surface water runoff on downstream riparian form and function, due to impacts to the hydrological regime such as alteration of surface run-off patterns
Mitigation measures	1. Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. 2. Any storm-water within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities. 3. No stormwater runoff must be allowed to discharge directly into any water course along roads, and flows should thus be allowed to dissipate over a broad area covered by natural vegetation. *4.* Stormwater from hard stand areas, buildings and substation must be managed using appropriate channels and swales when located within steep areas or have steep embankments.

Table 68: Increase in sedimentation and erosion within the development footprint

Environmental Parameter	Increase in sedimentation and erosion within the development footprint
Issue/Impact/Environmental Effect/Nature	Impacts include changes to the hydrological regime such as alteration of surface run-off patterns which could occur during the construction, operational and decommissioning phases.
Extent	Local
Probability	Probable
Reversibility	Completely reversible – as the scale and nature of soils the erosion can be halted and over time through alluvial deposition any erosion can be remediated.
Irreplaceable loss of resources	A marginal loss in resources
Duration	With mitigation and completion of the construction phase the impacts would be minimal however the duration would be long term.
Cumulative effect	Erosion and sedimentation of the downstream systems and farming operations could result in cumulative impacts. However due to low mean annual runoff within the region this is not anticipated due to the nature of the development together with the proposed layout.

Environmental Parameter	Increase in sedimentation and erosion within the development footprint	
Intensity/magnitude	The overall intensity of the impact would be Low when compared to scale of the impact and the remaining habitat within he catchment, coupled to the overall avoidance of creating high numbers of new crossings.	
Significance Rating	Impact would be considered LOW with mitigations in place based on the intensity of the impact described above.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	4	3
Reversibility	3	1
Irreplaceable loss	3	2
Duration	4	1
Cumulative effect	1	1
Intensity/magnitude	2	1
Significance rating	**-34 (Medium Negative)**	**-9 (Low Negative)**
Mitigation measures	*1.* Any storm-water within the site must be handled in a suitable manner, i.e. trap sediments and reduce flow velocities. Any management actions must be dealt with in the Stormwater Management Plan (SWMP) typically submitted post EA, forming part of any WULA.	

Table 69: Impact on localised surface water quality

Environmental Parameter	Impact on localised surface water quality
Issue/Impact/Environmental Effect/Nature	During construction and to a limited degree the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope via the ephemeral systems
Extent	Local
Probability	Probable
Reversibility	Completely reversible
Irreplaceable loss of resources	A marginal loss in resources
Duration	With mitigation and completion of the construction phase the impacts would be minimal however the duration of the impacts would be long term
Cumulative effect	However due to low mean annual runoff within the region this is not anticipated due to the nature of the

Environmental Parameter	Impact on localised surface water quality	
	development together with the proposed layout, i.e. except for the new crossings, any pollutants would not be transported significant distances downstream.	
Intensity/magnitude	The overall intensity of the impact would be Low when compared to scale of the impact and the remaining habitat within the catchment, coupled to the overall avoidance of creating high numbers of new crossings	
Significance Rating	Impact would be considered LOW with mitigations in place based on the intensity of the impact described above.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	4	2
Reversibility	2	1
Irreplaceable loss	1	1
Duration	4	1
Cumulative effect	1	1
Intensity/magnitude	2	1
Significance rating	**-28 (Low Negative)**	**-7 (Low Negative)**
Mitigation measures	1. Strict use and management of all hazardous materials used on site in line with the specific material safety data sheets, e.g. fuels must be stored within a contained / bunded site with the necessary and spill kits available. 2. Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.). 3. Containment of all contaminated water by means of careful run-off management on the development site. 4. Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. 5. Strict control over the behaviour of construction workers, with regard littering, use and storage of chemicals. 6. Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.	

Environmental Parameter	Impact on localised surface water quality
	Additional details in this regard in contain in Section 9 of this report and have also been considered in the mitigation assessment process.

6.2.4.3 **Decommissioning Phase**

Should the proposed development need to be decommissioned, the same impacts as identified for the construction phase of the proposed development can be anticipated. Similar impacts are therefore expected to occur and the stipulated mitigation measures where relevant and appropriate must be employed as appropriate to minimise impacts.

6.2.4.4 **No-go Alternative**

Table 70: Impact of no-go alternative

Environmental Parameter	No-go alternative	
Issue/Impact/Environmental Effect/Nature	The no-go alternative assumes that no change in land use or additional activities will occur and that the status quo will persist. This includes agricultural activates along with the impact of existing roads crossing watercourses and low level of erosion	
Extent	Local	
Probability	Probable	
Reversibility	Completely reversible	
Irreplaceable loss of resources	A marginal loss in resources	
Duration	Permanent	
Cumulative effect	Cumulative impacts can be avoided by implementing the mitigation measures by the farmers in the region. However, if the no-go alternative is implemented the mitigation measures will not be implemented as part of this project.	
Intensity/magnitude	The overall intensity of the impact would be Low when compared to scale of the impact and the remaining habitat within he catchment, coupled to the overall avoidance of creating high numbers of new crossings	
Significance Rating	Impact would be considered LOW based on the intensity of the impact described above	
	Pre-mitigation impact rating	
Extent	2	
Probability	4	
Reversibility	2	
Irreplaceable loss	3	
Duration	4	
Cumulative effect	1	

Environmental Parameter	No-go alternative	
Intensity/magnitude	2	
Significance rating	-**32 (Medium Negative)**	
Mitigation measures	1. No mitigation measures will be implemented with the no-go alternative	

6.2.5 *Agricultural and Soils Impacts*

The Agricultural and Soils Assessment was conducted by Johann Lanz and is included as Appendix 6A. The following agricultural and soils impacts are discussed in detail below:

Please note that further to this assessment the layout was revised, and the specialist concluded that the impacts contained in the original assessment are still valid. A copy of this letter can be found in **Appendix 6**.

The ways in which the project can impact on soils, agricultural resources and productivity are:

Disturbance and changes to the land surface characteristics (particularly the establishment of roads), which may lead to erosion and land degradation.

The significance of all potential agricultural impacts is kept low by three important factors.

- The actual footprint of disturbance of the WEF (including associated infrastructure and roads) is very small in relation to the surface area of the affected farms. The WEF infrastructure will only occupy approximately 2% of the surface area, according to the typical surface area requirements of wind farms in South Africa (DEA, 2015). Therefore, the impact of erosion and degradation will not be widespread and can at worse only affect a very limited proportion of the surface area. All grazing will be able to continue unaffectedly across the farms.
- The proposed site is on land of extremely limited agricultural potential that is only viable for low intensity grazing. Grazing can continue in tandem with the WEF.
- The infrastructural footprint is likely to be concentrated on the crests of ridges, which are the rockiest parts of the landscape and the least suitable for any agricultural use.

6.2.5.1 **Planning / Pre-construction Phase**

No impacts are expected during planning.

6.2.5.2 **All Phases of the Development - Construction, Operation and Decommissioning**

The following potential impact has been identified for the proposed wind power facility development.

Table 71: Soil Erosion and Degradation

Environmental Parameter	**Soil Erosion and Degradation**	
Issue/Impact/Environmental Effect/Nature	Erosion and degradation resulting from disturbance and changes to the land surface and run-off characteristics, particularly due the use of roads and hard stands. Changes to the surface that lead to accumulation and channelling of run-off water can cause erosion. Because of the slopes, the aridity and the shallow soils, erosion risk is high.	
Extent	Site	
Probability	Probable / Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal	
Duration	Long term	
Cumulative effect	Negligible	
Intensity/magnitude	Medium / Low	
Significance Rating	Low Negative	
	Pre-mitigation	**Post-mitigation**
Extent	1	1
Probability	3	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	1	1
Intensity	2	1
Significance rating	**-24 (Low Negative)**	**-11 (Low Negative)**
Mitigation measures:	1. Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. 2. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there.	

6.2.5.3 **Operational Phase**

The following impact occurs only during the operational phase:

Table 72: Farm Economic Stability

Environmental Parameter	**Farm economic sustainability**	
Nature	Generation of additional land use income through rental to energy facility. This is a positive impact for agriculture. It will provide the farming enterprises on site with increased cash flow and rural livelihood, and thereby improve their financial sustainability.	
Extent	Site	
Probability	Definite	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss	
Duration	Long term	
Cumulative effect	Negligible	
Intensity/magnitude	Low	
Significance Rating	Low positive	
	Pre-mitigation	**Post-mitigation**
Extent	1	n/a
Probability	4	n/a
Reversibility	1	n/a
Irreplaceable loss	1	n/a
Duration	3	n/a
Cumulative effect	1	n/a
Intensity	1	n/a
Significance rating	**11 Low positive**	**n/a**
Mitigation measures:	1. None possible	

6.2.5.4 **No-go Alternative**

The no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. The one identified potential such impact is that due to climate variability and consequent low rainfall in the area, in addition to other economic and market pressures on farming, the agricultural enterprises will come under increased pressure in terms of economic viability.

Because of the Low Negative impact of the development of the WEF and its positive economic impact (also low significance), the development is assessed, from an agricultural impact perspective, as the preferred alternative over the no-go alternative (assessed in Agricultural and Soils Impact Report).

Table 73: No- Go Assessment for Agricultural and Soils Impact

Environmental Parameter	**agricultural land (grazing)**	
Nature	The one identified potential such impact is that due to climate variability and consequent low rainfall in the area, in addition to other economic and market pressures on farming, the agricultural enterprises will come under increased pressure in terms of economic viability.	
Extent	Site	
Probability	Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal	
Duration	Long term	
Cumulative effect	Medium	
Intensity/magnitude	Medium	
Significance Rating	Low Negative	
	Pre-mitigation	**Post-mitigation**
Extent	1	n/a
Probability	2	n/a
Reversibility	2	n/a
Irreplaceable loss	2	n/a
Duration	3	n/a
Cumulative effect	3	n/a

Environmental Parameter	agricultural land (grazing)	
Intensity	2	n/a
Significance rating	**-26 Low Negative**	**n/a**
Mitigation measures: It makes no sense to propose mitigation measures for the no-go alternative. Who would be responsible for implementing mitigation measures in the case of the no-go alternative?		

6.2.6 *Noise Impacts*

The Noise Assessment was conducted by by Dr Brett Williams of Safetech. The full report is included in Appendix 6F. The following noise impacts are discussed in detail below:

Please note that further to this assessment the layout was revised, and the specialist concluded that the impacts contained in the original assessment are still valid. A copy of this letter can be found in **Appendix 6**.

There will be a short-term increase in noise in the vicinity of the site during the construction phase as the ambient noise level will be exceeded. The impact during the construction phase will be difficult to mitigate. The significance of the construction noise impact is predicted to be low

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6.2.6.1 **Planning / Pre-construction Phase**

No impacts are expected during planning.

6.2.6.2 **Construction Phase**

Table 74: Noise emissions during the **Construction Phase**

Environmental Parameter	Noise emissions during the Construction Phase	
Issue/Impact/Environmental Effect/Nature	Noise impacts could affect human receptors negatively and cause a noise disturbance.	
Extent	The impact will only affect the site	
Probability	Unlikely	
Reversibility	Reversible	
Irreplaceable loss of resources	No loss of resource	
Duration	Short term	
Cumulative effect	Negligible Cumulative Impact	
Intensity/magnitude	Low	
Significance Rating	6 – Low Negative impact	
	Pre-mitigation	Post mitigation

Environmental Parameter	Noise emissions during the Construction Phase	
	impact rating	impact rating
Extent	1	1
Probability	1	1
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-7 (Low Negative)**	**-7 (Low Negative)**
Mitigation measures	*1.* All construction operations should only occur during daylight hours, if possible. *2.* Staff to receive noise sensitivity training; *3.* Monitoring of noise: Ambient noise monitoring to be conducted at NSA' 15 and 16 as per the requirements of SANS 10103 for four times during the construction phase *4.* Conduct noise sensitivity training for all construction staff. *5.* No construction piling should occur at night. Piling should only occur during the hottest part of the day to take advantage of unstable atmospheric conditions *6.* Limit high noise activities to daytime operations when possible, noting that operational requirements might not allow this due to various factors e.g. Crane use optimization, weather conditions etc.	

6.2.6.3 **Operational Phase.**

Table 75: Noise emissions during the Operational Phase

Environmental Parameter	Noise emissions during the Operational Phase
Issue/Impact/Environmental Effect/Nature	Noise impacts could affect human receptors negatively and cause a noise disturbance.
Extent	Will affect the local area
Probability	Unlikely
Reversibility	Reversible
Irreplaceable loss of resources	No loss of resource
Duration	Long term
Cumulative effect	Negligible Cumulative Impact
Intensity/magnitude	Low
Significance Rating	-10 Low Negative impact

Environmental Parameter	Noise emissions during the Operational Phase	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	1	1
Reversibility	1	1
Irreplaceable loss	1	1
Duration	3	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-10 (Low Negative)**	**-7 (Low Negative)**
Mitigation measures:	1. Ambient noise monitoring to be conducted at NSA 15 & 16 when operations commence to verify the noise emissions meet the noise rating limit. Mitigation measures to be implemented if the noise impact exceeds the 35dB(A) noise rating limit. Monitoring to be undertaken as per the requirements of SANS 10103 once off during project operations	

6.2.6.4 **No-Go Alternative**

The no-go alternative was not assessed as there will be no noise impact if the site is not developed.

6.2.7 *Visual Impacts*

The Visual Assessment was conducted by Kerry Schwartz of SiVEST and peer reviewed by Scott Masson from SRK. The full report is including the peer review report is included in Appendix 6J. The following visual impacts are discussed in detail below:

Please note that further to this assessment the layout was revised, and the specialist concluded that the impacts contained in the original assessment are still valid. A copy of this letter can be found in **Appendix 6**.

6.2.7.1 **Planning / Pre-construction Phase**

No visual impacts are expected during the pre-construction phase.

6.2.7.2 **Construction Phase**

Rating of direct visual impacts of the proposed Rondekop WEF during construction:

Table 76: Rating of direct visual impacts of the proposed Rondekop WEF during construction.

Environmental Parameter	**Visual Impact**	
Issue/Impact/Environmental Effect/Nature	Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment. Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	
Extent	Local / District (2)	
Probability	Probable (3)	
Reversibility	Completely reversible (1)	
Irreplaceable loss of resources	Marginal loss (2)	
Duration	Short term (1)	
Cumulative effect	Medium cumulative effects (3)	
Intensity/magnitude	Medium (2)	
Significance Rating	**Prior to mitigation measures:** Low Negative impact **After mitigation measures:** Low Negative impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	2
Reversibility	1	1
Irreplaceable loss	2	1
Duration	1	1
Cumulative effect	3	3
Intensity/magnitude	2	2
Significance rating	**-24 (Low Negative)**	**-20 (Low Negative)**

Environmental Parameter	Visual Impact
Mitigation measures	1. Carefully plan to mimimise the construction period and avoid construction delays. 2. Inform the identified potentially sensitive visual receptors of the construction programme and schedules. 3. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 4. Vegetation clearing should take place in a phased manner. 5. Maintain a neat construction site by removing rubble and waste materials regularly. 6. Make use of existing gravel access roads where possible. 7. Limit the number of vehicles and trucks travelling to and from the proposed site, where possible. 8. Ensure that dust suppression techniques are implemented: o on all access roads; o in all areas where vegetation clearing has taken place; o on all soil stockpiles.

** Please note in the context of the visual environment 'resources' are defined as scenic / natural views that are almost impossible to replace.*

Table 77: Rating of **direct** impacts of the infrastructure associated with the Rondekop WEF during construction (road network, construction camp, substation and cabling).

Environmental Parameter	Visual Impact
Issue/Impact/Environmental Effect/Nature	Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. Surface disturbance during construction would expose bare soil which could visually contrast with the surrounding environment.

Environmental Parameter	Visual Impact	
	Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust emissions which would have a visual impact.	
Extent	Local/district (2)	
Probability	Probable (3)	
Reversibility	Completely reversible (1)	
Irreplaceable loss of resources	Marginal (2)	
Duration	Short term (1)	
Cumulative effect	Medium cumulative effects (3)	
Intensity/magnitude	Medium (2)	
Significance Rating	**Prior to mitigation measures:** Low Negative impact **After mitigation measures:** Low Negative impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	2
Reversibility	1	1
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	3	3
Intensity/magnitude	2	2
Significance rating	**-24 (Low Negative)**	**-22 (Low Negative)**
Mitigation measures	1. Carefully plan to mimimise the construction period and avoid construction delays. 2. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 3. Vegetation clearing should take place in a phased manner. 4. Maintain a neat construction site by removing rubble and waste materials regularly. 5. Make use of existing gravel access roads where possible. 6. Limit the number of vehicles travelling to and from the proposed site, where possible. 7. Ensure that dust suppression techniques are implemented o on all access roads; o in all areas where vegetation clearing has taken place; o on all soil stockpiles.	

** Please note in the context of the visual environment 'resources' are defined as scenic / natural views that are almost impossible to replace.*

6.2.7.3 **Operation Phase**

Table 78: Rating of **direct** visual impacts of the proposed Rondekop WEF during operation

Environmental Parameter	**Visual Impact**	
Issue/Impact/Environmental Effect/Nature	The proposed WEF will alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts. The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. The night time visual environment will be altered as a result of operational and security lighting as well as navigational lighting on top of the wind turbines.	
Extent	Local/district (2)	
Probability	Definite (4)	
Reversibility	Partly reversible (2)	
Irreplaceable loss of resources	Marginal (2)	
Duration	Long term (3)	
Cumulative effect	High cumulative effects (4)	
Intensity/magnitude	Medium (2)	
Significance Rating	**Prior to mitigation measures:** Negative Medium impact **After mitigation measures:** Negative Medium impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	2	2
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	4	3
Intensity/magnitude	2	2
Significance rating	**-34 (Medium Negative)**	**-32 (Medium Negative)**
Mitigation measures	1. Where possible, fewer but larger turbines with a greater output should be utilised rather than a	

Environmental Parameter	Visual Impact
	larger number of smaller turbines with a lower capacity. 2. Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work). 3. If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale, if economically and technically feasible. 4. Dust suppression techniques are to be implemented on all access roads. 5. Light fittings for security at night should reflect the light toward the ground and prevent light spill, unless the CAA require different lighting systems.

** Please note in the context of the visual environment 'resources' are defined as scenic / natural views that are almost impossible to replace.*

Table 79: Rating of **direct** visual impacts of the infrastructure associated with the Rondekop WEF during operation (road network, construction camp, substation and cabling).

Environmental Parameter	Visual Impact
Issue/Impact/Environmental Effect/Nature	The on-site infrastructure required by the WEF could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts. The on-site infrastructure may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. The night time visual environment could be altered by operational and security lighting emanating from the on-site substation and the operation and maintenance buildings.
Extent	Local / District (2)
Probability	Probable (3)
Reversibility	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)
Duration	Long term (3)

Environmental Parameter	Visual Impact	
Cumulative effect	Low cumulative effect (2)	
Intensity/magnitude	Medium (2)	
Significance Rating	**Prior to mitigation measures:** Low Negative impact **After mitigation measures:** Low Negative impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	3
Reversibility	2	2
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	2	2
Intensity/magnitude	2	1
Significance rating	**-28 (Low Negative)**	**-14 (Low Negative)**
Mitigation measures	1. Light fittings for security at night should reflect the light toward the ground and prevent light spill. 2. The operation and maintenance buildings should not be illuminated at night with the exception of security lighting. 3. The operation and maintenance buildings should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible. 4. Where possible, underground cabling should be utilised. 5. Where overhead power lines are required, these should be aligned parallel to existing power lines and other linear features where possible. 6. Dust suppression techniques are to be implemented on all access roads.	

** Please note in the context of the visual environment 'resources' are defined as scenic / natural views that are almost impossible to replace.*

6.2.7.4 **Decommissioning Phase**

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

6.2.7.5 **No-Go Alternative**

The 'No Go' alternative is essentially the option of not developing a WEF in this area. The area would thus retain its visual character and sense of place and there would be no visual impacts.

6.2.8 *Heritage and Palaeontology Impacts*

The Heritage Assessment was conducted by PGS Heritage (Pty) Ltd. The Paleontology Assessment was conducted by Banzai Environmental (Pty) Ltd. The full reports can be viewed in Appendix 6E. The following heritage and paleontology impacts are discussed in detail below:

Please note that further to this assessment the layout was revised, and the specialist concluded that the impacts contained in the original assessment are still valid. A copy of this letter can be found in **Appendix 6**.

Paleontology Impacts

6.2.8.1 **Planning / *Pre-construction Phase***

No paleontology impacts are expected during the pre-construction phase.

6.2.8.2 **Construction Phase**

The following impacts have been identified for the proposed WEF development.

Table 80: Palaeontological Impact Rating-Construction phase

Environmental Parameter	**Prevent the loss of Palaeontological Heritage**
Issue/Impact/Environmental Effect/Nature	Destroy or permanently seal-in fossils at or below the ground surface that are then no longer available for scientific study.
Extent	Excavation of the ground surface *of the **site** (1)*
Probability	As fossil heritage is known from these formations the probability of impacts on palaeontological heritage during the construction phase is probable (3).
Reversibility	Impacts on fossil heritage are usually **irreversible**. (4)
Irreplaceable loss of resources	By taking a precautionary approach, an insignificant loss of fossil resources is expected (**No Loss**). (1)
Duration	The expected duration of the impact is assessed as potentially permanent to **long term**. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent (4).
Cumulative effect	The cumulative effect of the development of the WEF and associated infrastructure within the proposed location is

Environmental Parameter	Prevent the loss of Palaeontological Heritage	
	considered to be **low**. This is as a result of the broader Sutherland area not being considered as fossiliferous. (1)	
Intensity/magnitude	The intensity of the impact on fossil heritage is rated as **low (1)**.	
Significance rating	Low	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	1
Reversibility	4	4
Irreplaceable loss	1	1
Duration	4	4
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-14 (Low Negative)**	**-12 (Low Negative)**
Mitigation measures	Monitoring of major excavations for fossil material by the ESO on an on-going basis during construction phase. Significant fossil finds to be reported to SAHRA for recording and sampling by a professional palaeontologist Chance find procedure must be followed. • When a chance find is made the person must instantly stop all work near the find. • The site must be secured to protect it from any additional damage • The finder of the fossil heritage must immediately report the find to his/her direct supervisor, according to the reporting protocols instituted by the Mine/development management. The supervisor must in turn report the find to his/her manager and the ECO. The ECO must report the find to the relevant Authorities and a relevant palaeontologist. • The ECO must appoint a relevant palaeontologist to investigate and access the chance find and site. • Both ECO and palaeontologist must ensure that accurate records and documentation are kept. The documentation must start with the initial chance find report, including records of all actions taken, persons involved and contacted, comments received and findings. • These documents will be necessary to request authorizations and permits from the relevant Authorities to continue with the work on site	

Environmental Parameter	Prevent the loss of Palaeontological Heritage
	• The reports and all other documents will be submitted to SAHRA by the palaeontologist. • The report will include recommendations for additional specialist work if necessary, or request approval to continue with the development. • Once the required approvals have been issued, the Mine/development may carry on with the development. • The ECO will close off the chance find procedure and would be required to implement any requirements issued by the Authority and to add it to the operational management plan.

Table 81: Chance finds impact rating

Environmental Parameter	Prevent the loss of Palaeontological Heritage not identified during the site survey.	
Issue/Impact/Environmental Effect/Nature	Due to the size of the project and the design method requiring surveying before identification of the layout, there is a possibility to come across fossil heritage not surveyed.	
Extent	*Site (1)*	
Probability	Possible (3)	
Reversibility	Irreversible (4)	
Irreplaceable loss of resources	By taking a precautionary approach, an insignificant loss of fossil resources is expected (**No Loss**). (1)	
Duration	Permanent (4)	
Cumulative effect	Low	
Intensity/magnitude	Low	
Significance Rating	*low*	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	1
Reversibility	4	4
Irreplaceable loss	1	1
Duration	4	4
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-14 (Low Negative)**	**-12 (Low Negative)**
Mitigation measures	Monitoring of major excavations for fossil material by the ESO on an on-going basis during construction phase.	

Environmental Parameter	Prevent the loss of Palaeontological Heritage not identified during the site survey.
	Significant fossil finds to be reported to SAHRA for recording and sampling by a professional palaeontologist Chance find procedure must be followed. • When a chance find is made the person must instantly stop all work near the find. • The site must be secured to protect it from any additional damage • The finder of the fossil heritage must immediately report the find to his/her direct supervisor, according to the reporting protocols instituted by the Mine/development management. The supervisor must in turn report the find to his/her manager and the ECO. The ECO must report the find to the relevant Authorities and a relevant palaeontologist. • The ECO must appoint a relevant palaeontologist to investigate and access the chance find and site. • Both ECO and palaeontologist must ensure that accurate records and documentation are kept. The documentation must start with the initial chance find report, including records of all actions taken, persons involved and contacted, comments received and findings. • These documents will be necessary to request authorizations and permits from the relevant Authorities to continue with the work on site • The reports and all other documents will be submitted to SAHRA by the paleontologist. • The report will include recommendations for additional specialist work if necessary, or request approval to continue with the development. • Once the required approvals have been issued, the Mine/development may carry on with the development. • The ECO will close off the chance find procedure and would be required to implement any requirements issued by the Authority and to add it to the operational management plan.

6.2.8.3 **Operational Phase**

No heritage impacts are expected during the operational phase.

6.2.8.4 **Decommissioning Phase**

No impacts identified.

6.2.8.5 **No-Go Alternative**

Impacts associated with the no-go alternative are considered neutral as if the proposed development does not go ahead then no impacts on paleontology resources would occur.

Heritage Impacts

6.2.8.6 **Planning / Pre-construction Phase**

No heritage impacts are expected during the pre-construction phase.

6.2.8.7 **Construction Phase**

Table 82: Stone Age impact rating

Environmental Parameter	**Stone Age find spots and sites**
Issue/Impact/Environmental Effect/Nature	Two types of Stone Age heritage have been identified during the survey; both the find spots and sites rated as having low archaeological significance. None of the identified find spots or sites will be impacted by construction activities, therefore the impact is seen as negligible.
Extent	Site
Probability	Unlikely
Reversibility	Irreversible
Irreplaceable loss of resources	The nature of heritage resources is such that they are non-renewable. The proper mitigation and documentation of these resources can however preserve the data for research
Duration	Permanent
Cumulative effect	Low
Intensity/magnitude	Low
Significance Rating	Low Negative before mitigation and Low Negative after mitigation

Environmental Parameter	**Stone Age find spots and sites**	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	1	1
Probability	1	1
Reversibility	4	4
Irreplaceable loss	4	4
Duration	4	4
Cumulative effect	2	1
Intensity/magnitude	1	1
Significance rating	**-16 (Low Negative)**	**-15 (Low Negative)**
Mitigation measures	• A chance find protocol will need to be enacted during construction activities. • A 20m buffer should be applied to all Stone Age find spots and sites. • Provide ECO with locations and monitor excavations.	

Table 83: Colonial buildings impact rating

Environmental Parameter	**Colonial buildings and stone walled kraals**	
Issue/Impact/Environmental Effect/Nature	Given that these features are in relatively good condition, providing decent data about the historic use of the Rondekop properties, and the early settlement history of the area, all colonial buildings and stone walled kraals have been assigned a medium significance rating.	
Extent	Site	
Probability	Unlikely	
Reversibility	Irreversible	
Irreplaceable loss of resources	The nature of heritage resources is such that they are non-renewable. The proper mitigation and documentation of these resources can however preserve the data for research	
Duration	Permanent	
Cumulative effect	Low	
Intensity/magnitude	Low	
Significance Rating	Low Negative before mitigation and Low Negative after mitigation	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	**1**	**1**
Probability	**1**	**1**
Reversibility	**4**	**4**
Irreplaceable loss	**4**	**4**
Duration	**4**	**4**

Environmental Parameter	**Colonial buildings and stone walled kraals**	
Cumulative effect	**2**	**1**
Intensity/magnitude	**1**	**1**
Significance rating	**-16 (Low Negative)**	**-15 (Low Negative)**
Mitigation measures	• A 50m buffer should be applied to all Colonial buildings and stone walled kraals. • Provide ECO with locations and monitor excavations	

Table 84: Impact on monuments (memorials)

Environmental Parameter	**Monuments (memorials)**	
Issue/Impact/Environmental Effect/Nature	Given that this feature is in relatively good condition, providing data about the historic use of the Rondekop properties, and the early settlement history of the area, this monument been assigned a medium significance rating.	
Extent	Site	
Probability	Unlikely	
Reversibility	Irreversible	
Irreplaceable loss of resources	The nature of heritage resources are such that they are non-renewable. The proper mitigation and documentation of these resources can however preserve the data for research	
Duration	Permanent	
Cumulative effect	Low	
Intensity/magnitude	Low	
Significance Rating	Low Negative before mitigation and Low Negative after mitigation	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	1	1
Probability	1	1
Reversibility	4	4
Irreplaceable loss	4	4
Duration	4	4
Cumulative effect	2	1
Intensity/magnitude	1	1
Significance rating	**-16 (Low Negative)**	**-15 (Low Negative)**
Mitigation measures	• A 50m buffer should be applied to all monuments.	

Table 85 : Chance finds impact rating

Environmental Parameter	**Unidentified heritage structures, beyond the already surveyed portions of the property.**	
Issue/Impact/Environmental Effect/Nature	Due to the size of the area assessed, and the design process requiring surveying before identification of the layout, the possibility of encountering heritage features in non-surveyed areas does exist.	
Extent	Site	
Probability	Possible	
Reversibility	Irreversible	
Irreplaceable loss of resources	The nature of heritage resources are such that they are non-renewable. The proper mitigation and documentation of these resources can however preserve the data for research	
Duration	Permanent	
Cumulative effect	Medium	
Intensity/magnitude	Low	
Significance Rating	Low Negative before mitigation and Low Negative after mitigation	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	2	2
Reversibility	4	4
Irreplaceable loss	4	4
Duration	4	4
Cumulative effect	2	1
Intensity/magnitude	1	1
Significance rating	**-17 (Low Negative)**	**-16 (Low Negative)**
Mitigation measures	• An archaeological walk down of the final approved layout will be required before construction commence; • Any heritage features of significance identified during this walk down will require formal mitigation or where possible a slight change in design could accommodate such resources. • A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations. • A chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing SAHRA of such	

Environmental Parameter	**Unidentified heritage structures, beyond the already surveyed portions of the property.**
	finds and a final process of mitigation implementation.

6.2.8.8 **Operational Phase**

No heritage impacts are expected during the operational phase.

6.2.8.9 **Decommissioning Phase**

No impacts identified.

6.2.8.10 **No-Go Alternative**

Impacts associated with the no-go alternative are considered neutral as if the proposed development does not go ahead then no impacts on heritage resources would occur.

6.2.9 *Social Impacts*

The Socio-economic Assessment was conducted by Dr Neville Bews & Associates (NBA). The full report is included in **Appendix 6G**. The following socio-economic impacts are discussed in detail below:

Please note that further to this assessment the layout was revised, and the specialist concluded that the impacts contained in the original assessment are still valid. A copy of this letter can be found in **Appendix 6**.

6.2.9.1 **Planning / Pre-construction Phase**

No socio-economic impacts are expected during the pre-construction phase.

6.2.9.2 **Construction Phase**

Table 86: Annoyance dust and noise

Environmental Parameter	**Health and social wellbeing**
Issue/Impact/Environmental Effect/Nature	Annoyance dust and noise
Extent	Site

Probability	Definite	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss of resource	
Duration	Short term	
Cumulative effect	Negligible cumulative impact	
Intensity/magnitude	Medium	
Significance Rating	Low Negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	4
Reversibility	1	1
Irreplaceable loss of resources	1	1
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	2	1
Significance Rating	**-18 (Low Negative)**	**-9 (Low Negative)**
Mitigation measures	1. Where necessary apply the appropriate dust suppression methods; 2. Follow the mitigation measures suggested in the Noise Impact Assessment.	

Table 87: Increase in crime

Environmental Parameter	**Health and social wellbeing**	
Issue/Impact/Environmental Effect/Nature	Increase in crime	
Extent	Local area	
Probability	Probable	
Reversibility	Barely reversible	
Irreplaceable loss of resources	No loss of resource	
Duration	Short term	
Cumulative effect	Medium cumulative impact	
Intensity/magnitude	Medium	
Significance Rating	Medium Negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	3
Reversibility	3	3
Irreplaceable loss	2	2
Duration	2	2

Environmental Parameter	Health and social wellbeing	
Cumulative effect	3	3
Intensity/magnitude	2	2
Significance rating	**-30 (Medium Negative)**	**-30 (Medium Negative)**
Mitigation measures	1. Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing; 2. Fence off construction site and control access to these sites; 3. Appoint an independent security company to monitor the site; 4. Encourage local people to report any suspicious activity associated with the construction sites through the establishment of a community liaison forum; 5. Prevent loitering within the vicinity of the construction camp as well as construction sites.	

Table 88: Increased risk of HIV infections

Environmental Parameter	Health and social wellbeing	
Issue/Impact/Environmental Effect/Nature	Increased risk of HIV infections	
Extent	Entire province	
Probability	Definite	
Reversibility	Barely reversible	
Irreplaceable loss of resources	Significant loss of resource	
Duration	Long term	
Cumulative effect	High cumulative impact	
Intensity/magnitude	High	
Significance Rating	High Negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	3	3
Probability	4	3
Reversibility	3	2
Irreplaceable loss	3	2
Duration	3	3
Cumulative effect	4	3
Intensity/magnitude	3	2
Significance rating	**-60 (High Negative)**	**-32 (Medium Negative)**
Mitigation measures	1. Ensure that an onsite HIV infections policy is in place and that construction workers have easy access to condoms;	

Environmental Parameter	Health and social wellbeing
	2. Expose workers to a health and HIV/AIDS awareness educational program; 3. Extend the HIV/AIDS program into the community with specific focus on schools and youth clubs.

Table 89: Influx of construction workers

Environmental Parameter	Health and social wellbeing	
Issue/Impact/Environmental Effect/Nature	Influx of construction workers	
Extent	Site	
Probability	Definite	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss of resource	
Duration	Short term	
Cumulative effect	Medium cumulative impact	
Intensity/magnitude	Medium	
Significance Rating	Low Negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	4
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	3	3
Intensity/magnitude	2	2
Significance rating	**-22(Low Negative)**	**-22 (Low Negative)**
Mitigation measures	1. Communicate the limitation of opportunities created by the project through Community leaders and Ward Councilors; 2. Draw up a recruitment policy in conjunction with the Community Leaders and Ward Councilors of the area and ensure compliance with this policy.	

Table 90: Hazard exposure

Environmental Parameter	Health and social wellbeing
Issue/Impact/Environmental Effect/Nature	Hazard exposure
Extent	Local
Probability	Definite
Reversibility	Partly reversible
Irreplaceable loss of resources	Marginal loss of resource

Duration	Short term	
Cumulative effect	Medium Cumulative Impact	
Intensity/magnitude	Medium Negative	
Significance Rating	Low Negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	3	3
Intensity/magnitude	2	2
Significance rating	**-28 (Low Negative)**	**-24 (Low Negative)**
Mitigation measures	1. Ensure all construction equipment and vehicles are properly maintained at all times; 2. Ensure that operators and drivers are properly trained and make them aware, through regular toolbox talks, of any risk they may pose to the community. Place specific emphasis on the vulnerable sector of the population such as children and the elderly; 3. Ensure that fires lit by construction staff are only ignited in designated areas and that the appropriate safety precautions, such as not lighting fires in strong wilds and completely extinguishing fires before leaving them unattended, are strictly adhered to; 4. Make staff aware of the dangers of fire during regular tool box talks.	

Table 91: Disruption of daily living patterns

Environmental Parameter	**Quality of the living environment**
Issue/Impact/Environmental Effect/Nature/	Disruption of daily living patterns
Extent	Local
Probability	Definite
Reversibility	Partly reversible
Irreplaceable loss of resources	Marginal loss of resource
Duration	Short term
Cumulative effect	Medium Cumulative Impact
Intensity/magnitude	Medium
Significance Rating	Low Negative

Environmental Parameter	Quality of the living environment	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	2	2
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	**-28 (Low Negative)**	**-26 (Low Negative)**
Mitigation measures	1. Ensure that, at all times, people have access to their properties as well as to social facilities.	

Table 92: Disruption to social and community infrastructure

Environmental Parameter	Quality of the living environment	
Issue/Impact/Environmental Effect/Nature	Disruptions to social and community infrastructure	
Extent	District	
Probability	Definite	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss of resource	
Duration	Short term	
Cumulative effect	High cumulative impact	
Intensity/magnitude	Medium	
Significance Rating	Medium Negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	2	2
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	4	4
Intensity/magnitude	2	2
Significance rating	**-30 (Medium Negative)**	**-30 (Medium Negative)**
Mitigation measures	• Regularly monitor the effect that construction is having on infrastructure and immediately report any damage to infrastructure to the appropriate authority;	

Environmental Parameter	Quality of the living environment
	• Ensure that where communities' access is obstructed that this access is restored to an acceptable state.

Table 93 : Job creation and skills development

Environmental Parameter	Economic	
Issue/Impact/Environmental Effect/Nature	Job creation and skills development	
Extent	District	
Extent	Definite	
Probability	Partly reversible	
Reversibility	Significant gain of resource	
Irreplaceable loss of resources	Short term	
Duration	Medium cumulative impact	
Cumulative effect	Medium	
Intensity/magnitude	High positive	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	2	2
Irreplaceable loss	3	3
Duration	1	1
Cumulative effect	3	3
Intensity/magnitude	2	2
Significance rating	**30 (Medium positive)**	**30 (Medium positive)**
Mitigation measures	1. Wherever feasible, local residents should be recruited to fill semi and unskilled jobs; 2. Women should be given equal employment opportunities and encouraged to apply for positions; 3. A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills which they can use to secure jobs elsewhere post-construction; 4. A procurement policy promoting the use of local business should, where possible, be put in place to be applied throughout the construction phase.	

Table 94: Socio-economic development

Environmental Parameter	Economic
Issue/Impact/Environmental Effect/Nature	Positive economic impacts

Environmental Parameter	Economic	
Extent	Provincial	
Probability	Definite	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Significant gain of resource	
Duration	Short term	
Cumulative effect	Medium cumulative impact	
Intensity/magnitude	Medium	
Significance Rating	High positive	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	3	3
Probability	4	4
Reversibility	2	2
Irreplaceable loss	3	3
Duration	1	1
Cumulative effect	3	3
Intensity/magnitude	2	2
Significance rating	**32 (Medium positive)**	**32 (Medium positive)**
Mitigation measures	1. A procurement policy promoting the use of local business should, where possible, be put in place to be applied throughout the construction phase.	

6.2.9.3 **Operational Phase**

Table 95: Transformation of the sense of place

Environmental Parameter	Quality of the living environment	
Issue/Impact/Environmental Effect/Nature	Transformation of the sense of place	
Extent	Region	
Probability	Definite	
Reversibility	Barely reversible	
Irreplaceable loss of resources	Significant loss of resource	
Duration	Long term	
Cumulative effect	High Cumulative Impact	
Intensity/magnitude	High	
Significance Rating	High Negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	3	3

Environmental Parameter	Quality of the living environment	
Probability	4	4
Reversibility	3	3
Irreplaceable loss	3	3
Duration	3	3
Cumulative effect	4	4
Intensity/magnitude	3	3
Significance rating	**-60 (High Negative)**	**-60 (High Negative)**
Mitigation measures	1. Apply the mitigation measures suggested in the Visual Impact Assessment Report; 2. Communicate the benefits associated with renewable energy to the broader community as is being done in this EIA process; 3. Ensure that all affected land owners and tourist associations are regularly consulted; 4. A Grievance Mechanism should be put in place and all grievances should be dealt with in a transparent manner; 5. The mitigation measures recommended in the Heritage and Paleontology Impact Assessment should be followed.	

Table 96: Job creation and skills development

Environmental Parameter	Economic	
Issue/Impact/Environmental Effect/Nature	Positive economic impacts	
Extent	District	
Probability	Definite	
Reversibility	Partly reversible	
Gain of resources	Marginal gain of resource	
Duration	Long term	
Cumulative effect	Low cumulative impact	
Intensity/magnitude	Medium	
Significance Rating	Medium positive	
	Pre-mitigation impact rating	**Post mitigation impact rating**
Extent	2	2
Probability	4	4
Reversibility	2	2
Irreplaceable loss	2	2
Duration	3	3
Cumulative effect	2	2
Intensity/magnitude	2	2
Significance rating	**30 (medium positive)**	**30 (medium positive)**

Environmental Parameter	Economic
Mitigation measures	1. Implement a training and skills development programme for locals; 2. Work closely with the appropriate municipal structures in regard to establishing a social responsibility programme;

Table 97:Socio-economic stimulation

Environmental Parameter	Economic	
Issue/Impact/Environmental Effect/Nature	Socio-economic stimulation	
Extent	National	
Probability	Definite	
Reversibility	Partly reversible	
Gain of resources	Significant gain of resource	
Duration	Long term	
Cumulative effect	High cumulative impact	
Intensity/magnitude	Medium	
Significance Rating	High positive	
	Pre-mitigation impact rating	**Post mitigation impact rating**
Extent	4	4
Probability	4	4
Reversibility	2	2
Irreplaceable loss	3	3
Duration	3	3
Cumulative effect	4	4
Intensity/magnitude	2	2
Significance rating	**60 (high positive)**	**60 (high positive)**
Mitigation measures	1. Ensure that the procurement policy supports local enterprises; 2. Establish a social responsibility programme either in line with the REIPPPP BID guidelines or equivalent; 3. Work closely with the appropriate municipal structures in regard to establishing a social responsibility programme; 4. Ensure that any trusts or funds are strictly managed in respect of outcomes and funds.	

6.2.9.4 **Decommissioning**

Decommissioning will result in a limited number of jobs being created over a short period of time as components are dismantled and the site is cleared. Although positive, this will be a rather insignificant benefit considering the size of the WEF and the time period attached to decommissioning.

Considering the time period to decommissioning, the uncertainty of what would exactly occur, and the significance of the impact in isolation it would be rather meaningless to attach assessment criteria to decommissioning at this point. However, prior to decommissioning the following mitigation measures are suggested.

Decommissioning mitigation measures

1. Ensure that a retrenchment package is in place;
2. Ensure that staff have been trained in a manner that would provide them with saleable skills within the job market;
3. Ensure that the site is cleared responsibly and left in a safe condition.

6.2.9.5 **No-Go Alternative**

The no project option would mean that the social environment is not affected as the status quo remains. On a negative front it would also mean that all the positive aspects associated with the project would not materialise. Consequently, there would be no job creation, no revenue streams into the local economy and municipal coffers and a lost opportunity to enhance the national grid with a renewable source of energy. Considering that Eskom's coal fired power stations are a huge contributor to carbon emissions the loss of a chance to supplement the National Grid through renewable energy would be significant at a national, if not at a global level. The Intergovernmental Panel on Climate Change (6 October 2018, p. 15) has warned that that C02 emissions need to be reduce by 45% from 2010 levels by 2030 and to zero by 2050 which basically means that coal must go.

Table 98: No project alterative***

Environmental Parameter	No project alternative
Issue/Impact/Environmental Effect/Nature	No project
Extent	National
Probability	Possible
Reversibility	Completely reversible
Loss of resources	Significant loss of resource
Duration	Long term
Cumulative effect	Medium cumulative impact
Intensity/magnitude	Medium
Significance Rating	Medium Negative
	Impact rating
Extent	4
Probability	4
Reversibility	2
Irreplaceable loss	3
Duration	3
Cumulative effect	4
Intensity/magnitude	2
Significance rating	**-32 (Medium Negative)**

**** Please note this is not a formal climate change assessment it is purely mentioned by the Social specialist describing the positive impacts that may not be realised if the no-go alternative prevails.

6.2.10 *Traffic Impacts*

6.2.10.1 **Planning / Pre-construction Phase**

No impacts are expected during planning.

Please note that further to this assessment the layout was revised, and the specialist concluded that the impacts contained in the original assessment are still valid. A copy of this letter can be found in **Appendix 6**.

For the transportation of the turbines to the WEF site, it was assumed that the turbine blades will be transported to site individually due to the size of the blades being up to 90 m each.

Consequently, for each steel wind turbine three abnormal loads will be required for the blades, seven abnormal loads for the tower sections and another abnormal load for the nacelle. All further components will be transported with normal limitations haulage vehicles. With approximately 11 abnormal loads trips, the total trips to deliver the components of 48 turbines to the WEF site will be around 528 trips. This would amount to less than 2 vehicle trips per day for a typical construction period of 18-24months.

As concrete towers require up to 18 abnormal load trips per turbine, the total number of abnormal load trips for a concrete turbine is approximately 22 trips. The total trips to deliver the components of 48 turbines to the WEF site will be around 1 056 trips. This would amount to approximately 3 vehicle trips per day for a typical construction period of 18-24months.

The constructions of roads and concrete footings will also have a significant impact on the surrounding road network as vehicles deliver materials to the site. A concrete footing (approximately 500 m3) adds over 80 trips by concrete trucks to the surrounding road network.

The significance of the transport impact without mitigation measures during the construction and decommissioning phases can be rated as high. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level.

6.2.10.2 **Construction Phase**

Table 99: Transport of equipment, material and staff to site will lead to congestion.

Environmental Parameter	***Traffic Congestion***
Issue/Impact/Environmental Effect/Nature	*Transport of equipment, material and staff to site will lead to congestion.*
Extent	*Local*
Probability	*Definite*

Environmental Parameter	*Traffic Congestion*	
Reversibility	*Partly reversible*	
Irreplaceable loss of resources	*No loss*	
Duration	*Short term*	
Cumulative effect	*Medium cumulative impact*	
Intensity/magnitude	*High*	
Significance Rating	*Negative Medium impact*	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	4	2
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	3	2
Intensity/magnitude	3	2
Significance rating	**-70 (High Negative)**	**-35 (Medium Negative)**
Mitigation measures	1. Stagger turbine component delivery to site 2. Reduce the construction period 3. The use of mobile batch plants and quarries in close proximity to the site 4. Staff and general trips should occur outside of peak traffic periods. *5.* Regular maintenance of gravel roads by the Contractor during the construction and decommissioning phases.	

Table 100: Traffic on roads will generate dust.

Environmental Parameter	Air quality will be affected by dust pollution	
Issue/Impact/Environmental Effect/Nature	Traffic on roads will generate dust.	
Extent	Local	
Probability	Definite	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss	
Duration	Short term	
Cumulative effect	Low cumulative impact	
Intensity/magnitude	High	
Significance Rating	Negative Medium impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	4	2
Reversibility	1	1
Irreplaceable loss	1	1

Environmental Parameter	Air quality will be affected by dust pollution	
Duration	1	1
Cumulative effect	2	1
Intensity/magnitude	3	1
Significance rating	**-35 (Medium Negative)**	**-6 (Low Negative)**
Mitigation measures	1. Dust Suppression of gravel roads during the construction and decommissioning phases, as required. 2. Regular maintenance of gravel roads by the Contractor during the construction and decommissioning phases.	

Table 101: Traffic on roads will generate noise.

Environmental Parameter	*Noise pollution due to increased traffic.*	
Issue/Impact/Environmental Effect/Nature	*Traffic on roads will generate noise.*	
Extent	*Local*	
Probability	*Definite*	
Reversibility	*Completely reversible*	
Irreplaceable loss of resources	*No loss*	
Duration	*Short term*	
Cumulative effect	*Low cumulative impact*	
Intensity/magnitude	*High*	
Significance Rating	*Negative Medium impact*	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	4	2
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	2	1
Intensity/magnitude	3	1
Significance rating	**-35 (Medium Negative)**	**-6 (Low Negative)**
Mitigation measures	1. Stagger turbine component delivery to site 2. Reduce the construction period as much as possible 3. The use of mobile batch plants and quarries in close proximity to the site 4. Staff and general trips should occur outside of peak traffic periods	

6.2.10.3 **Operational Phase**

The traffic generated during this phase will be minimal and will have not have any impact on the surrounding road network.

6.2.10.4 **Decommissioning Phase**

Table 102: Transport of equipment, material and staff to site will lead to congestion.

Environmental Parameter	**Traffic Congestion.**	
Issue/Impact/Environmental Effect/Nature	Transport of equipment, material and staff to site will lead to congestion.	
Extent	Local	
Probability	Definite	
Reversibility	Partly reversible	
Irreplaceable loss of resources	No loss	
Duration	Short term	
Cumulative effect	Medium cumulative impact	
Intensity/magnitude	High	
Significance Rating	Negative Medium impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	4	2
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	3	2
Intensity/magnitude	3	2
Significance rating	**-70 (High Negative)**	**-35 (Medium Negative)**
Mitigation measures	1. Stagger turbine component removal from site 2. Reduce the construction period 3. Staff and general trips should occur outside of peak traffic periods	

Table 103: Traffic on roads will generate dust.

Environmental Parameter	**Air quality will be affected by dust pollution**
Issue/Impact/Environmental Effect/Nature	Traffic on roads will generate dust.
Extent	Local
Probability	Definite
Reversibility	Completely reversible
Irreplaceable loss of resources	No loss
Duration	Short term
Cumulative effect	Low cumulative impact
Intensity/magnitude	High

Environmental Parameter	Air quality will be affected by dust pollution	
Significance Rating	Negative Medium impact	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	2	2
Intensity/magnitude	3	3
Significance rating	**-35 (Medium Negative)**	**-6 (Low Negative)**
Mitigation measures	1. Dust Suppression	

Table 104: Traffic on roads will generate noise.

Environmental Parameter	Noise pollution due to increased traffic.	
Issue/Impact/Environmental Effect/Nature	Traffic on roads will generate noise.	
Issue/Impact/Environmental Effect/Nature	Local	
Extent	Definite	
Probability	Completely reversible	
Reversibility	No loss	
Irreplaceable loss of resources	Short term	
Duration	Low cumulative impact	
Cumulative effect	High	
Intensity/magnitude	Negative Medium impact	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	2	2
Intensity/magnitude	3	3
Significance rating	**-35 (Medium Negative)**	**-6 (Low Negative)**
Mitigation measures	1. Stagger turbine component delivery to site 2. Reduce the construction period 3. The use of mobile batch plants and quarries in close proximity to the site 4. Staff and general trips should occur outside of peak traffic periods	

6.2.10.5 **No-Go Alternative**

The no-go alternative implies that the proposed development of the Rondekop WEF does not proceed. This would mean that there will be no negative environmental impacts and no traffic impact on the surrounding network. However, this would also mean that there would be no socio-economic benefits to the surrounding communities and it will not assist government in meeting the targets for renewable energy. Hence, the no-go alternative is not a preferred alternative.

7 CUMULATIVE IMPACT ASSESSMENT

The area has seen a notable interest from developers of various renewable energy projects, which could be associated with the wind and solar energy resource potential found in the region, as well as other factors. Such developments, whether already approved or only proposed, need to be considered together as they have the potential to create numerous cumulative impacts, whether positive or negative, if all are implemented. **Table 105** lists the projects that have been considered when examining the cumulative impacts; their location relative to the project under review is illustrated in Figure 48. The specialists have identified specific cumulative impacts, and these are outlined below.

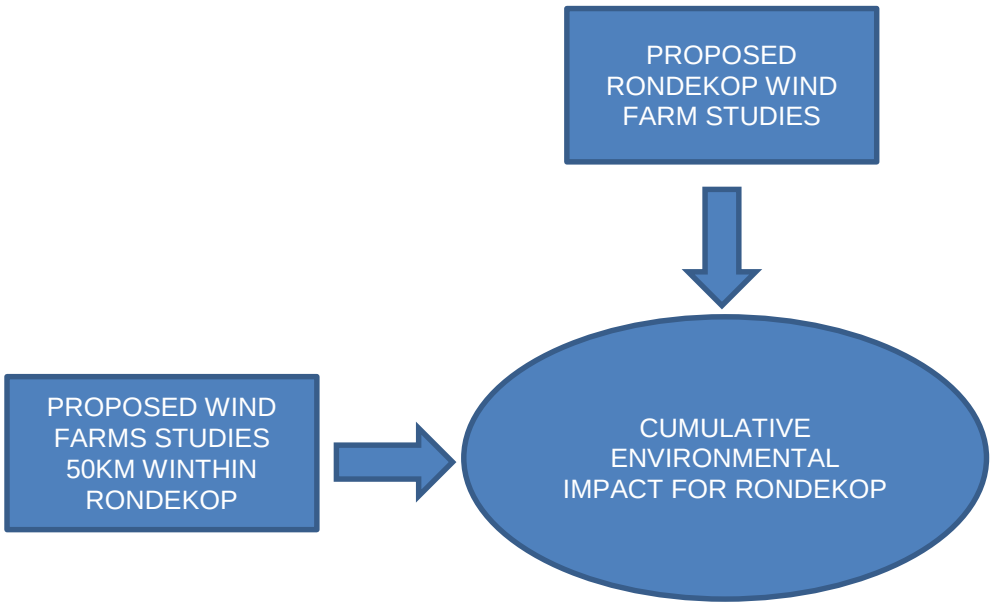

Figure 47: Cumulative impact organogram

As requested by the DEA, a literature review of other specialist assessments / studies which were undertaken for the other nearby renewable energy developments proposed within a 50km radius of the proposed Rondekop Wind Farm application site was also undertaken in order to ascertain any additional cumulative impacts that should be taken into consideration. Some of the project sites are at a very advanced stage, and the initial studies were undertaken in 2012 which are not currently publicly available to download. Nonetheless, a fair amount of information was available. The information (including specialist studies, EIA / Scoping and EMPr Reports) that could be obtained for the surrounding proposed renewable energy sites that were taken into account by the various specialists is elaborated on below.

Table 105: Projects within a 50 km radius of the Rondekop WEF.

NAME	MEGAWATT	STATUS
Brandvalley WEF	140	Approved
Esizayo WEF	140	Approved
Gunstfontein WEF	200	Approved
Hidden Valley (Karusa & Soetwater) WEF	140 each	Preferred bidders. Construction to commence in 2019
Hidden Valley (Greater Karoo) WEF	140	Approved
Kareebosch WEF	140	Approved
Komsberg West and East WEF	140 each	Approved
Kudusberg WEF	325	In process
Maralla WEF (East and West)	140 each	Approved
Perdekraal East WEF	110	Under construction
Perdekraal West WEF	150	Approved
Rietkloof WEF	36	Approved
Roggeveld WEF	140	Preferred bidder. Construction to commence in 2019
Sutherland WEF	140	Approved
Sutherland SEF	10	Approved
Tooverberg WEF	140	In process
Witberg WEF	120	Approved

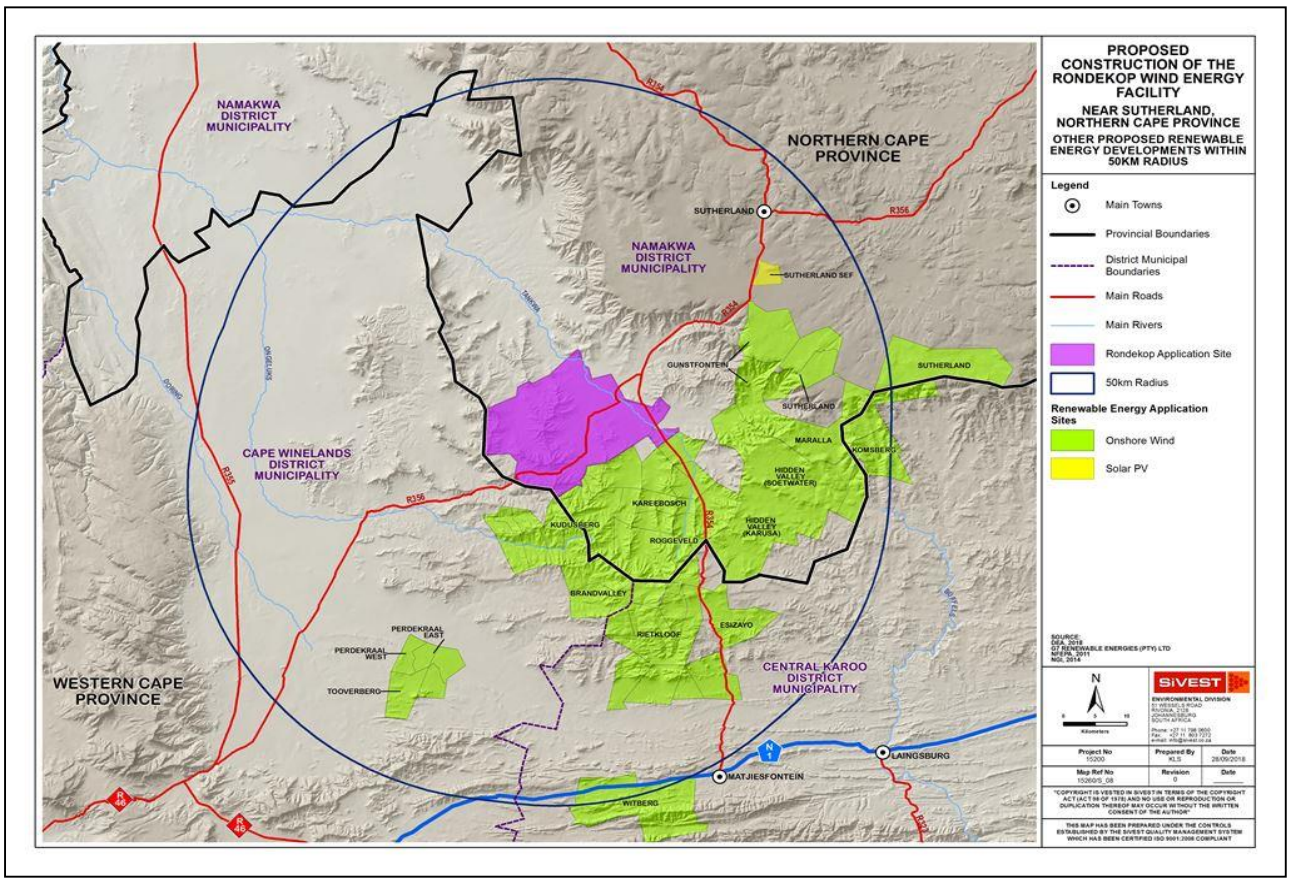

Figure 48: Projects within a 50 km radius of the Rondekop WEF.

7.1 Terrestrial Ecological

From an Ecological perspective, there are various cumulative impacts that may occur as a result of the combined impact of a number of similar projects in the area, as follows:

- Loss and/or fragmentation of indigenous natural vegetation due to clearing;
- Loss of individuals of plant species of conservation concern and/or protected plants;
- Changes to ecological processes at a landscape level;
- Mortality, displacement and/or disturbance of fauna;
- General increase in the spread and invasion of new habitats by alien invasive plant species;
- Reduction in the opportunity to undertake or plan conservation, including effects on CBAs and ESAs, as well as on the opportunity to conserve any part of the landscape;
- Loss of the wilderness character of the area;

It must be noted that the cumulative assessment is based on a worst case scenario and the assumption that all projects will be developed. However, it is unlikely that all the projects in the area will be developed due to the competitive nature of the REIPPPP.

Cumulative impacts on indigenous natural vegetation

The regional terrestrial vegetation types in the broad study area are listed as Least Threatened and generally have large areas. Loss of habitat will definitely occur for each project, each of which will be a small area in comparison to the total area of the vegetation type. The total loss of habitat due to a number of projects together will be greater than for any single project, so a cumulative effect will occur. However, the area lost in total will be small compared to the total area of the vegetation type concerned. Of more concern is the total degree of fragmentation and/or edge effects due to the combination of all projects, which will be much more significant than gross loss of habitat, measured in hectares. Direct loss of habitat will not result in a change in the conservation status of the vegetation types, but overall degradation due to fragmentation effects may be a greater cause for concern. The cumulative effect will therefore be low for vegetation loss, but possibly significant for fragmentation. In addition, the current project is located in a rural area with the no existing infrastructure nearby, as is the case with all the other proposed projects. This will fundamentally change the character of this area in terms of its remoteness and natural state. However, this has been discussed and assessed as part of the Visual Impact Assessment as well as the proposed developments location in the Komsberg REDZ.

Table 106 - Loss, degradation and/or fragmentation of indigenous natural vegetation.

Environmental parameter	Indigenous natural vegetation
Issue/Impact/Environmental Effect/Nature	Loss, degradation and/or fragmentation of indigenous natural vegetation.
Extent	The impact will affect natural vegetation in a broad area (within 50 km of the site) and is rated as local/district.
Probability	Loss and/or disturbance of vegetation will definitely happen for all of the projects if all are developed.
Reversibility	In all projects, loss of vegetation is effectively irreversible within the immediate footprint of permanent

Environmental parameter	Indigenous natural vegetation	
	infrastructure, since construction of roads and other hard surfaces completely removes vegetation and modifies the substrate upon which it grows. For all the projects, in other areas (crane pads, construction camp and disturbed areas adjacent to construction activities) the impact is partially reversible in the sense that secondary vegetation in disturbed areas will probably never resemble the original vegetation found on site.	
Irreplaceable loss of resources	For each project, there will locally be marginal to significant loss of resources. Assessed over a wider area (the combined footprint of all projects), there will probably only be marginal loss of resources (in relation to all biodiversity resources within the area).	
Duration	Within the immediate footprint of the permanent infrastructure (turbine foundations, roads and substation) the impact will be Permanent (mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient). In other areas (crane pads, construction camp and disturbed areas adjacent to construction activities) the impact will be of long-term duration. The assessment here is for the permanently affected areas.	
Cumulative effect	Medium cumulative impact. Added to existing impacts on natural habitat from activities on site, will cause additional loss of vegetation, the cumulative effect of which will be medium.	
Intensity/magnitude	Medium. At the very minimum, the projects together will alter the quality, use and integrity of vegetation in the area, but the system (vegetation) will continue to function in a moderately modified way and maintain general integrity.	
Significance rating	Medium negative impact expected.	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	2 (District)	2 (District)
Probability	4 (Definite)	4 (Definite)
Reversibility	4 (Irreversible)	4 (Irreversible)
Irreplaceable loss	2 (Marginal loss of resources)	2 (Marginal loss of resources)
Duration	4 (Permanent)	4 (Permanent)
Cumulative effect	3 (Medium)	2 (Low)

Environmental parameter	Indigenous natural vegetation	
Intensity/magnitude	2 (Medium)	2 (Medium)
Significance rating	**-38 (medium negative)**	**-36 (medium negative)**
Mitigation measures	All projects should adhere to the site-specific recommendations of the ecologists to ensure that all facilities mitigate impacts where possible. The Rondekop WEF is to adhere to the mitigation measures proposed in this report.	

Cumulative impacts on plant species of concern and protected plant species

There are various plant species of conservation concern and protected plant species that may occur in the study area, all of which are relatively widespread. A distinction is made here between protected species, which are often widespread, and threatened species, which are often rare. Constructing the current project as well as all other renewable energy projects increases the likelihood of individuals being affected, but unless large numbers of individuals are directly affected, there will only be small to moderate cumulative effects. In principle, no development should allow loss of populations of threatened species, so the assessment undertaken below is for protected species (although effects on threatened species are also discussed).

Table 107 - Disruption, disturbance or alteration of ecological processes

Environmental parameter	Protected plants, as per NEM:BA or NCNCA or listed plants
Issue/Impact/Environmental Effect/Nature	Loss of individuals occurring within the footprint of construction.
Extent	The impact will affect local populations or individuals of the affected species. The large number of projects taken together make this a regional effect.
Probability	Based on the list of species that are protected or listed, the impact is certain to happen to protected plants and probable for threatened plants.
Reversibility	Partly reversible. Where necessary, individuals can be rescued or else cultivated to replace lost specimens. Unfortunately, this is probably not feasible for threatened plants, which means the impact is barely reversible / irreversible for such species.
Irreplaceable loss of resources	Marginal loss of resources could occur for protected plants and significant loss of resources for threatened plants. The protected species that are likely to occur on site (for all sites) are mostly relatively common throughout their range and they have very wide geographical ranges. With a number of projects, however, the chances of threatened species being affected increases.

Environmental parameter	Protected plants, as per NEM:BA or NCNCA or listed plants	
Duration	The impact will be long-term for protected plants (for the life of the project) and possibly permanent for threatened plants.	
Cumulative effect	Medium cumulative impact. Based on the species that will be affected, which mostly have wide geographical ranges, the cumulative effects will be minor.	
Intensity/magnitude	Possibly medium for protected plants and very high for threatened plants. Loss of some individuals will be insignificant compared to the number that probably occur in nearby natural areas.	
Significance rating	Low negative impact expected.	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	2 (District)	2 (District)
Probability	4 (Definite)	4 (Definite)
Reversibility	2 (Partly reversible)	2 (Partly reversible)
Irreplaceable loss	2 (Marginal loss of resources)	2 (Marginal loss of resources)
Duration	3 (Long-term)	2 (Medium-term)
Cumulative effect	3 (Medium)	2 (Low)
Intensity/magnitude	2 (Medium)	2 (Medium)
Significance rating	**-32 (medium negative)**	**-28 (low negative)**
Mitigation measures	The following mitigation measures would help to avoid and limit impacts: ▪ It is a legal requirement to obtain permits for specimens that will be lost. ▪ Undertake a detailed pre-construction walk-through survey will be required during a favourable season to locate any additional individuals of protected plants. This survey must cover the footprint of all approved infrastructure, including internal access roads. ▪ A Plant Rescue Plan must be compiled to be approved by the appropriate authorities. ▪ Where large populations of affected species of high value are encountered, consideration should be given to shifting infrastructure to avoid such areas. ▪ All projects should adhere to the site-specific recommendations of the ecologists to ensure that all facilities mitigate impacts where possible. The	

Environmental parameter	Protected plants, as per NEM:BA or NCNCA or listed plants
	Rondekop WEF is to adhere to the mitigation measures proposed in this report.

Cumulative impacts on ecological processes

There are various ecological processes that may be affected at a landscape level by the presence of multiple projects. This includes obvious processes, such as migration, pollination and dispersal, but also more difficult to interpret factors, such as spatial heterogeneity, community composition and environmental gradients, that can become disrupted when landscapes are disturbed at a high level. Disturbance can alter the pattern of variation in the structure or function of ecosystems. Fragmentation is the breaking up of a habitat, ecosystem, or land-use type into smaller parcels. An important consequence of repeated, random clearing is that contiguous cover can break down into isolated patches. This happens when the area cleared exceed a critical level and landscapes start to become disconnected. Spatially heterogenous patterns can be interpreted as individualistic responses to environmental gradients and lead to natural patterns in the landscape. Disrupting gradients and creating disturbance edges across wide areas is very disruptive of natural processes and will lead to fundamental changes in ecosystem function.

Table 108 - Disruption, disturbance or alteration of ecological processes

Environmental parameter	Landscape-level ecological processes	
Issue/Impact/Environmental Effect/Nature	Disruption, disturbance or alteration of ecological processes	
Extent	The large number of projects taken together make this a regional effect.	
Probability	Based on the number and the nature of the projects (mostly wind-energy projects), the impact may possibly happen.	
Reversibility	Partly reversible, where disruptions to specific processes can be identified and rectified.	
Irreplaceable loss of resources	Significant loss of resources could potentially occur, but it is more likely that marginal loss of resources will happen.	
Duration	The impact will be long-term to permanent, depending on the process and the specific impact.	
Cumulative effect	Medium cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Based on the nature and number of projects and the ecological process affected, the impact is most likely to be of medium intensity.	
Significance rating	Low negative impact expected.	
	Pre-mitigation impact rating	Post-mitigation impact rating

Environmental parameter	Landscape-level ecological processes	
Extent	2 (District)	2 (District)
Probability	2 (Possible)	2 (Possible)
Reversibility	2 (Partly reversible)	2 (Partly reversible)
Irreplaceable loss	3 (Significant loss of resources)	2 (Marginal loss of resources)
Duration	3 (Long-term)	2 (Medium-term)
Cumulative effect	3 (Medium)	2 (Low)
Intensity/magnitude	2 (Medium)	2 (Medium)
Significance rating	**-30 (medium negative)**	**-24 (low negative)**
Mitigation measures	The following mitigation measures would help to understand impacts: ▪ All projects should adhere to the site-specific recommendations of the ecologists to ensure that all facilities mitigate impacts where possible. ▪ The Rondekop WEF is to adhere to the mitigation measures proposed in this report.	

Cumulative impacts on fauna

Construction activities, loss of habitat, noise, dust and general activity associated with the construction phase of the project are likely to cause all mobile species to move away from the area. This effect will be increased if there are a number of projects being constructed at the same time or in quick succession, so the effect is likely to be cumulative. However, the geographical ranges of the species of concern is wide and it is considered that the significance of the effect will be low in the long-term, although probably significant during the combined construction phase of the projects. It is possible that some species will be more significantly negatively affected than others, especially shy species, territorial species that get displaced, or those with large territories that get shrunk. It is also possible that some species will benefit from the increased presence of humans and will migrate into the area. This will possibly cause additional shifts in other species that are affected by the increase in numbers or new species.

Table 109 - Loss of individuals and habitats due to various factors, changes in behaviour, migration away from disturbance.

Environmental parameter	Fauna
Issue/Impact/Environmental Effect/Nature	Loss of individuals and habitats due to various factors, changes in behaviour, migration away from disturbance.
Extent	Fauna in the general area of all RE projects being considered will be affected, rated as **district**.
Probability	The impact will probably happen to some extent.
Reversibility	Impact is partly reversible with mitigation measures.
Irreplaceable loss of resources	Marginal loss of resources will occur.
Duration	The impact will be long-term (for the duration of the projects).
Cumulative effect	Medium cumulative impact.

Environmental parameter	Fauna	
Intensity/magnitude	Potentially medium intensity. Population processes likely to continue to function in a moderately modified way with general integrity maintained.	
Significance rating	Low negative impact expected.	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	2 (District)	2 (District)
Probability	3 (Probable))	3 (Probable))
Reversibility	2 (Partly reversible)	2 (Partly reversible)
Irreplaceable loss	2 (Marginal)	2 (Marginal)
Duration	3 (Long-term)	3 (Long-term)
Cumulative effect	3 (Medium)	2 (Low)
Intensity/magnitude	2 (Medium)	2 (Medium)
Significance rating	**-30 (medium negative)**	**-28 (low negative)**
Mitigation measures	▪ All projects should adhere to the site-specific recommendations of the ecologists to ensure that all facilities mitigate impacts where possible. ▪ The Rondekop WEF is to adhere to the mitigation measures proposed in this report.	

Cumulative impacts due to spread of declared weeds and alien invader plants

There is a moderate possibility that alien plants could be introduced to areas within the footprint of the proposed infrastructure from surrounding areas in the absence of control measures. The greater the number of projects, the more likely this effect will happen; therefore, the effect is cumulative. For the current site, the impact is predicted to be low due to the current absence of invasive species on site and the high ability to control any additional impact. The significance will therefore be low, especially if control measures are implemented. However, the increased overall disturbance of the landscape will create opportunities and, if new invasions are not controlled, can create nodes that spread to new locations due to the heightened disturbance levels.

Table 110 - Loss or degradation of habitat due to invasion by alien plants

Establishment and spread of declared weeds	
Environmental parameter	Vegetation and habitat
Issue/Impact/Environmental Effect/Nature	Loss or degradation of habitat due to invasion by alien plants
Extent	Habitat in the general area of all RE projects being considered will be affected, rated as district.
Probability	The impact will probably happen in the absence of control measures.
Reversibility	Partly reversible in the absence of control measures. Completely reversible if mitigation measures applied.

	Preventative measures will stop the impact from occurring.	
Irreplaceable loss of resources	Marginal to significant loss of resources will occur. Uncontrolled invasion can affect all nearby natural habitats.	
Duration	The impact will be long-term.	
Cumulative effect	Medium cumulative impact. Cumulative effects will be minor.	
Intensity/magnitude	Medium. Severe invasion can alter the functioning of natural ecosystems.	
Significance rating	Low negative impact expected.	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	2 (District)	2 (District)
Probability	3 (Probable))	2 (Possible))
Reversibility	2 (Partly)	1 (Completely)
Irreplaceable loss	3 (Significant)	2 (Marginal)
Duration	3 (Long-term)	3 (Long-term)
Cumulative effect	3 (Medium)	2 (Low)
Intensity/magnitude	2 (Medium)	1 (Low)
Significance rating	**-32 (medium negative)**	**-12 (low negative)**
Mitigation measures	▪ All projects should adhere to the site-specific recommendations of the ecologists to ensure that all facilities mitigate impacts where possible. ▪ The Rondekop WEF is to adhere to the mitigation measures proposed in this report.	

Cumulative impacts due to loss of protected animals

There are various animal species protected according to National legislation that occur in the geographical area covered by the combined projects. Some of these animals may be vulnerable to secondary impacts, such as hunting, road kill and illegal collecting (the Armadillo Girdled Lizard may be particularly vulnerable to this). The greater the number of projects, the more likely this effect will happen; therefore, the effect is cumulative. However, in all cases, the geographical distribution of each species is much wider than the combined project areas. The significance will therefore be low, especially if control measures are implemented.

Table 111 - Loss of individuals and habitats due to various factors, changes in behaviour, migration away from disturbance

Mortality of protected fauna	
Environmental parameter	Protected fauna
Issue/Impact/Environmental Effect/Nature	Loss of individuals and habitats due to various factors, changes in behaviour, migration away from disturbance.

Mortality of protected fauna		
Extent	Fauna in the general area of all RE projects being considered will be affected, rated as district.	
Probability	The impact will probably happen to some extent.	
Reversibility	Impact is partly reversible with mitigation measures.	
Irreplaceable loss of resources	Marginal loss of resources will occur.	
Duration	The impact will be long-term (for the duration of the projects).	
Cumulative effect	Medium cumulative impact.	
Intensity/magnitude	Potentially medium intensity. Population processes likely to continue to function in a moderately modified way with general integrity maintained.	
Significance rating	Low negative impact expected.	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	2 (District)	2 (District)
Probability	3 (Probable))	3 (Probable))
Reversibility	2 (Partly reversible)	2 (Partly reversible)
Irreplaceable loss	2 (Marginal)	2 (Marginal)
Duration	3 (Long-term)	3 (Long-term)
Cumulative effect	3 (Medium)	2 (Low)
Intensity/magnitude	2 (Medium)	2 (Medium)
Significance rating	**-30 (medium negative)**	**-28 (low negative)**
Mitigation measures	All projects should adhere to the site-specific recommendations of the ecologists to ensure that all facilities mitigate impacts where possible. The Rondekop WEF is to adhere to the mitigation measures proposed in this report.	

Cumulative impacts on CBAs and conservation planning

Significant proportions of the site and surrounding sites are included in Critical Biodiversity Areas for the Northern Cape. Disruption of these areas means that conservation planners have to find alternative sites to include in future CBAs according to an algorithm that seeks a least-cost outcome for preserving biodiversity, i.e. the least amount of land space for preserving the greatest amount of area of biodiversity importance, as well as meeting specific conservation targets. At some point, the loss of suitable sites leads to a situation where it is no longer possible to plan effective conservation networks or the cost of doing so increases due to a lack of choice. The higher the density of similar projects in a uniform area, the less chance there is of finding sites suitable for conservation that contain all the attributes that are desired to be conserved, including both ecological processes and ecological patterns.

Table 112 - Loss, degradation or fragmentation of areas of vegetation that have been categorised as falling within CBA1, CBA2 or ESA areas.

Impact on integrity of CBAs	
Environmental parameter	Critical Biodiversity Area
Issue/Impact/Environmental Effect/Nature	Loss, degradation or fragmentation of areas of vegetation that have been categorised as falling within CBA1, CBA2 or ESA areas.
Extent	The impact will affect natural vegetation on site, but affects defined CBAs that extend regionally, effectively affecting conservation planning for the entire Province.
Probability	Based on the location of other Renewable Energy Projects as well as the Northern Cape CBA map, it is definite that areas within CBAs will be affected.
Reversibility	In all projects, loss of vegetation is effectively **irreversible** within the immediate footprint of permanent infrastructure, since construction of roads and other hard surfaces completely removes vegetation and modifies the substrate upon which it grows. For all the projects, in other areas (crane pads, construction camp and disturbed areas adjacent to construction activities) the impact is partially reversible in the sense that secondary vegetation in disturbed areas will probably never resemble the original vegetation found on site.
Irreplaceable loss of resources	For each individual project, **marginal** loss of resources will occur within the footprint of the proposed infrastructure since vegetation clearing is required prior to installation of infrastructure, but the overall loss of resources relative to the entire CBA is less significant.
Duration	Within the immediate footprint of the permanent infrastructure (turbine foundations, roads and substation) the impact will be **Permanent** (mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient). In other areas (crane pads, construction camp and disturbed areas adjacent to construction activities) the impact will be of long-term duration. The assessment here is for the permanently affected areas.
Cumulative effect	Medium cumulative impact. Added to existing impacts on natural habitat from activities in the general region as well as the nearby similar RE projects, the current project will cause additional loss of vegetation, the cumulative effect of which will be medium.
Intensity/magnitude	Medium. The functional integrity of vegetation on site will be compromised to some degree (especially in the

Impact on integrity of CBAs		
	sense that the quality, integrity and functionality of CBA areas will be affected, which can be limited to some extent by implementation of mitigation measures.	
Significance rating	Medium negative impact expected.	
	Pre-mitigation impact rating	Post-mitigation impact rating
Extent	3 (Province)	3 (Province)
Probability	4 (Definite)	4 (Definite)
Reversibility	3 (Barely reversible)	3 (Barely reversible)
Irreplaceable loss	2 (Marginal)	2 (Marginal)
Duration	4 (Permanent)	4 (Permanent)
Cumulative effect	3 (Medium)	2 (Low)
Intensity/magnitude	2 (Medium)	2 (Medium)
Significance rating	**-42 (medium negative)**	**-40 (medium negative)**
Mitigation measures	All projects should adhere to the site-specific recommendations of the ecologists to ensure that all facilities mitigate impacts where possible. The Rondekop WEF is to adhere to the mitigation measures proposed in this report.	

The Avifaunal and Bat Pre-Construction Assessment is currently underway. Detailed assessment of these impacts will be incorporated in the ecology impact assessment and included in the EIA report.

7.2 Avifauna

The effects of the Rondekop WEF, considering other projects, will produce impacts that are likely to impact on the bird communities, on a broader scale. Although wind energy facilities' footprints are not that intense, the construction of roads and building platforms can affect relatively large portions of natural vegetation. Also, it is important to consider that other renewable energy facilities which therefore leads to increased destruction of habitats. Such facilities have also been planned and approved in the proximities of the Rondekop WEF.

Avoid infrastructure siting, especially turbines (including the 90 m 'impact zone' areas around each turbine), in very high sensitive areas (i.e. no-go areas). Keep all noise disturbance to a minimum, especially near areas that have been defined as being sensitive. The use of existing access routes must be used as far as possible during construction. Considering the likelihood of displaying passerines in the Karoo area, it is recommended that the turbine minimum rotor swept height is not lower than 40 m. A monitoring plan is recommended during the construction and operational phase to improve the understanding of the real impact caused by the WEF on local bird populations, as well as to validate the success of the mitigation measures proposed.

Table 113: Disturbance/Displacement Effects; Habitat Loss; Fatalities due to Collision

Environmental Parameter	Disturbance/Displacement Effects; Habitat Loss; Fatalities due to Collision	
Issue/Impact/Environmental Effect/Nature	Disturbance/displacement of the bird community due to the presence of wind turbines and the increase of people and vehicles in the area, when operating the facilities. Habitat loss as a result of the removal of natural vegetation when constructing the facilities. Fatalities when each facility experiences bird collisions with wind turbines.	
Extent	Province/region	
Probability	Probable	
Reversibility	Partly Reversible	
Irreplaceable loss of resources	Significant loss of resource	
Duration	Long term	
Cumulative effect	Medium Cumulative Impact	
Intensity/magnitude	Medium	
Significance Rating	These impacts will likely have moderate negative effects and will require moderate mitigation measures.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	3	3
Probability	3	3
Reversibility	3	2
Irreplaceable loss	3	2
Duration	3	2
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	**-36 (medium negative)**	**-28 (low negative)**
Mitigation measures	• Lower the noise levels and traffic movement as far as possible. • Avoid turbine placement in no-go areas. Clearance and removal of vegetation should be kept to a minimum. • Vegetation restoration should take place after construction, if significant sensitive areas are affected. • Overhead powerlines must be fitted with bird flight diverters and may not run perpendicularly to any known bird flight paths. • All above-ground powerline infrastructure must be signed off as “bird-friendly” by the avifaunal specialist, prior to construction. • Lower blade tip should not be lower than 40m. • A monitoring programme (including carcass searches and bias/scavenger trials) is recommended for a minimum of two years during the operational.	

Table 114 - Destruction of important habitat areas (natural vegetation & water features etc.) due to the construction of wind turbines and associated infrastructures.

Environmental Parameter	Habitat Loss	
Issue/Impact/Environmental Effect/Nature	Destruction of important habitat areas (natural vegetation & water features etc.) due to the construction of wind turbines and associated infrastructures.	
Extent	Site	
Probability	Probable	
Reversibility	Partly Reversible	
Irreplaceable loss of resources	Marginal loss of resource	
Duration	Long term	
Cumulative effect	Negligible Cumulative Impact	
Intensity/magnitude	Medium	
Significance Rating	Habitat loss will have negligible negative effects and will require little to no mitigation.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	3	1
Reversibility	2	1
Irreplaceable loss	2	2
Duration	3	2
Cumulative effect	1	1
Intensity/magnitude	2	2
Significance rating	**-24 (low negative)**	**-16 (low negative)**
Mitigation measures	• Avoidance of new infrastructure siting (especially wind turbines) in high sensitivity areas. Clearance and removal of vegetation should be kept to a minimum. Clearance and removal of vegetation should be kept to a minimum. Vegetation restoration should take place after construction, if significant sensitive areas are affected.	

Table 115 Disturbance/Displacement Effects; Habitat Loss; Fatalities due to Collision

Environmental Parameter	Disturbance/Displacement Effects; Habitat Loss; Fatalities due to Collision
Issue/Impact/Environmental Effect/Nature	Disturbance/displacement of the bird community due to the presence of wind turbines and the increase of people and vehicles in the area, when operating the facilities. Habitat loss as a result of the removal of natural vegetation when constructing the facilities. Fatalities when each facility experiences bird collisions with wind turbines.
Extent	Province/region
Probability	Probable
Reversibility	Partly Reversible

Environmental Parameter	Disturbance/Displacement Effects; Habitat Loss; Fatalities due to Collision	
Irreplaceable loss of resources	Significant loss of resource	
Duration	Long term	
Cumulative effect	Medium Cumulative Impact	
Intensity/magnitude	Medium	
Significance Rating	These impacts will likely have moderate negative effects and will require moderate mitigation measures.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	3	3
Probability	3	3
Reversibility	3	2
Irreplaceable loss	3	2
Duration	3	2
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	**-36 (medium negative)**	**-28 (low negative)**
Mitigation measures	1. Lower the noise levels and traffic movement as far as possible. 2. Avoid turbine placement in no-go areas. Clearance and removal of vegetation should be kept to a minimum. Vegetation restoration should take place after construction, if significant sensitive areas are affected. 3. Overhead powerlines must be fitted with bird flight diverters and may not run perpendicularly to any known bird flight paths. 4. All above-ground powerline infrastructure must be signed off as “bird-friendly” by the avifaunal specialist, prior to construction. 5. Lower blade tip should not be lower than 40m. A monitoring programme (including carcass searches and bias/scavenger trials) is recommended for a minimum of two years during the operational.	

7.3 Bats

The effects of the Rondekop WEF, considering other projects, will produce impacts that are likely to impact on the bat community, on a broader scale. Although wind energy facilities’ footprints are not that intense, the construction of roads and building platforms can affect relatively large portions of natural vegetation. Also, it is important to consider that other renewable energy facilities which therefore leads to increased destruction of habitats. Such facilities have also been planned and approved in the proximities of the Rondekop WEF.

Avoid infrastructure siting, especially turbines (including the 200m ‘area of influence’ buffers around each turbine), in very high sensitive areas (i.e. no-go areas). Keep all noise disturbance to a minimum, especially near areas that have been defined as being sensitive. The use of existing access routes must be used as far as possible during construction. A monitoring plan is recommended during the

construction and operational phase to improve the understanding of the real impact caused by the WEF on local bat populations, as well as to validate the success of the mitigation measures proposed.

Table 116 - Disturbance/displacement of the bat community due to the increase of people and vehicles in the area, when dismantling wind turbines and associated infrastructures.

Issue/Impact/Environmental Effect/Nature	Disturbance/Displacement Effects Fatalities Events	
Extent	Disturbance/displacement of the bat community due to noise and movement generated by turbines and people/vehicles operating in the area. Fatalities due to collision with wind turbine blades or barotrauma.	
Probability	Province	
Reversibility	Probable	
Irreplaceable loss of resources	Partly Reversible	
Duration	Significant loss of resource	
Cumulative effect	Long Term	
Intensity/magnitude	Medium Cumulative Impact	
Significance Rating	Medium	
Issue/Impact/Environmental Effect/Nature	The project will have a moderate negative effect on disturbance/displacement effects and will require moderate mitigation measures.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	3	3
Probability	3	3
Reversibility	3	2
Irreplaceable loss	3	2
Duration	3	2
Cumulative effect	3	2
Intensity/magnitude	2	2
Significance rating	**-36 (medium negative)**	**-28 (low negative)**
Mitigation measures	Lower the noise levels and traffic movement as far as possible. Avoid turbine placement in no-go areas. A monitoring programme (including carcass searches and bias/scavenger trials) is recommended for a minimum of two years during the operational. If high levels of mortality are observed, management actions should be put into action to mitigate fatality. No tall vegetation should be allowed within the 200m buffer around the wind turbines. Utilisation of red lights in the turbines, instead of white or as per the requirements of the CAA.	

Issue/Impact/Environmental Effect/Nature	Disturbance/Displacement Effects Fatalities Events
	Regional cumulative mitigation consists of sufficient project specific mitigations being implemented for each project, as there is no overarching mitigation that can be recommended on a regional level.

7.4 Aquatic Ecology

It must be noted that surface water resources change from one site to another and can range from a number of surface water resources in one area to very few on a neighbouring property depending on factors such as topography, geology, local rainfall and other environmental factors. Additionally, the characteristics of surface water resources can change along its course where longitudinal hydrological systems are involved. Nonetheless, the most important factor to consider when evaluating surface water impacts from a cumulative perspective is downstream impacts. Where a development takes place upstream, should impacts occur, these are likely to have an impact downstream to some degree.

The main potential cumulative surface water impacts from a catchment perspective in the local area include both potential direct and indirect impacts. Direct impacts include cumulative loss of as well as further degradation of surface water resources due to the footprints of developments encroaching or destroying surface water resources in the greater catchment. The indirect impacts relate mainly to increased run-off, sedimentation and erosion for linear hydrological systems. The indirect impacts to hydrological systems (i.e. drainage lines) which are connected across several farm boundaries have a greater risk for potential cumulative impacts from developments upstream.

The surface water specialist notes that the greatest threat to the watercourses within the region in general is the poor placement of roads. For the below mentioned projects, the road layouts have been revised in such a manner that all the important wetland areas / rivers were avoided, through the use of impacted areas at existing crossings.

Cumulative impacts related to Surface Water can be reduced by implementing the abovementioned mitigation measures by the holder of EAs in the region.

Table 117: Overall Cumulative Impact with regards to Surface Water

Environmental Parameter	Overall cumulative impact
Issue/Impact/Environmental Effect/Nature	In the assessment of this project, a number of projects have been assessed by the report author and include the following, while (see Figure 9) the remaining projects documents within a 50km radius have been reviewed and or sites accessed during the course of travelling between the various projects. 1. Perdekraal East & West WEF

Environmental Parameter	Overall cumulative impact
	2. Witberg WEF 3. Esizayo WEF 4. Gunstfontein WEF 5. Hidden Valley Wind Project (Note this has been separated into three separate projects namely Karusa, Soetwater and Great Karoo); 6. Brandvalley WEF. 7. Roggeveld WEF 8. Karreebosch WEF 9. Komsberg West 10. Maralla East and West 11. Rietkloof 12. Sutherland 13. Sutherland Solar Energy Facility 14. Tooverberg 15. Kudusberg Of these potential projects, this report author has been involved in the initial EIA aquatic assessments or has managed / assisted with the WUL process for several of the projects shown above. All of the projects have indicated that this is also their intention with regard mitigation, i.e. selecting the best possible routes to minimise the local and regional impacts and improving the drainage or hydrological conditions with these rivers the cumulative impact could be seen as a net benefit. However, the worse-case scenario has been assessed below, i.e. only the minimum of mitigation be implemented by the other projects, and that flows within these systems are sporadic.
Extent	Local
Probability	Probable
Reversibility	Partly reversible
Irreplaceable loss of resources	A loss in resources will occur if a high number of new crossings especially in the case of the other projects where wetlands do occur and need to be crossed
Duration	Pre-mitigation the impact would be definite, with mitigation and completion of the construction phase the impacts would be minimal
Cumulative effect	The greatest threat to the watercourses within the region is the poor placement of roads. For the above-mentioned projects, the road layouts have been

Environmental Parameter	Overall cumulative impact	
	revised in such a manner that all the important wetland areas / rivers were avoided, through the use of impacted areas at existing crossings. Cumulative impacts can be reduced by implementing the abovementioned mitigation measures by the holder of EAs in the region.	
Intensity/magnitude	The overall intensity of the impact would be Low when compared to scale of the impacts, the projects in relation to the remaining habitats within the catchments, coupled to the overall avoidance of creating high numbers of new crossings and their respective buffers.	
Significance Rating	Impact would be considered LOW with mitigations in place based on the intensity of the impact described above	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	4	3
Reversibility	3	1
Irreplaceable loss	3	2
Duration	4	3
Cumulative effect	1	1
Intensity/magnitude	2	1
Significance rating	**-34 (Medium Negative)**	**-11 (Low Negative)**
Mitigation measures	• Improve the current stormwater and energy dissipation features not currently found along the tracks and roads within the region. • Install properly sized culverts with erosion protection measures at the present road / track crossings.	

7.5 Agricultural and Soils

All of the projects have the same impacts within a very similar agricultural environment, with the same agricultural potential, and mostly within the same Renewable Energy Development Zone (REDZ). The one solar project will have a greater proportional footprint on agricultural land than the wind farms, but it is a small project of only 10 MW. The potential cumulative impact is a regional loss or degradation of agricultural land. What is important in assessing this impact is that the cumulative impact is affecting an agricultural environment that has been declared a REDZ (or have the same agricultural potential as the

adjacent REDZ) precisely because it is an environment that can accommodate numerous renewable energy developments without exceeding acceptable levels of agricultural land loss. This is primarily because of the low agricultural capability of land across the area, and the fact that such land is not a scarce resource in South Africa. It is far preferable to incur a cumulative loss of agricultural land in such a region, without cultivation potential, then to lose agricultural land that has a higher potential, to renewable energy development, elsewhere in the country.

Another important factor which renders the cumulative impact low, is the fact that the footprint of disturbance of wind farms is very small in relation to available land (approximately 2% of the total surface area – see above). Therefore, even if every single farm portion across the entire area (50km buffer) contained wind farms, the total cumulative footprint would never exceed 2% of the land surface, which would still be well below acceptable levels of change. The cumulative impact across the landscape is much lower because it is highly unlikely that every farm within the 50km buffer will ever contain a wind farm.

This environment could accommodate many more renewable energy projects than currently exist or than are proposed, before acceptable levels of change have any likelihood of being exceeded. Acceptable levels of change in terms of other areas of impact such as visual impact would be exceeded long before agricultural levels of change came anywhere near to being exceeded.

Table 118: Cumulative Impact on Agricultural Land

Environmental Parameter	**Agricultural land (grazing)**	
Nature	Occupation of and impact to the land by the project infrastructure of multiple developments	
Extent	Local / district	
Probability	Probable / Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal	
Duration	Long term	
Cumulative effect	Negligible	
Intensity/magnitude	Low	
Significance Rating	Low Negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	2
Reversibility	2	2
Irreplaceable loss	2	2
Duration	3	3

Environmental Parameter	Agricultural land (grazing)	
Cumulative effect	1	1
Intensity	1	1
Significance rating	**-13 (Low Negative)**	**-12 (Low Negative)**
Mitigation measures:	• There is no additional mitigation required for cumulative impacts, other than what has already been recommended for the project.	

7.6 Noise

The proposed windfarm is located adjacent to several other windfarms within 50 km of Rondekop Windfarm. The windfarms that were considered are as follows:

1. Karreebosch WEF
2. Witberg WEF
3. Tooverberg WEF
4. Guntsfontein WEF
5. Hidden Valley (Karusa & Soetwater) – both preferred bidders, to be constructed in 2019
6. Hidden Valley (Greater Karoo)
7. Kudusberg WEF
8. Brandvalley WEF
9. Esizayo WEF
10. Komsberg (East and West)
11. Roggeveld WEF – preferred bidder, to be constructed in 2019
12. Maralla (East and West)
13. Perdekraal (East & West) – Perdekraal East under construction
14. Soetwater WEF
15. Karusa WEF
16. Rietkloof WEF
17. Sutherland WEF

Although there are other facilities proposed within the REDZ, the distance from Rondekop is too great to contribute to the cumulative noise impact. This is thus a worst-case scenario, as it is highly unlikely that all turbines will be operational simultaneously even if all the sites obtain the required regulatory approval. The noise impacts from the windfarms that are further away will not impact the identified NSA's as noise decreases in intensity with distance.

The cumulative noise impact modelling result indicated that the cumulative impact will not exceed the night limit of 35 dB(A) or the day limit of 45 dB(A) except at NSA 15 and 16 above 5m/s windspeed. The modelling furthermore indicated that the noise impact of ONLY the Kudusberg WEF noise did not exceed the night limit of 35 dB(A). The combined noise impact is thus NOT from the Kudusberg WEF, but from the Rondekop WEF. The wind masking effect above 5m/s will mitigate the noise impact.

Table 119: Noise emissions for the Cumulative Impacts during the Operational Phase

Environmental Parameter	**Noise emissions for the Cumulative Impacts during the Operational Phase**	
Issue/Impact/Environmental Effect/Nature	*Noise impacts could affect human receptors negatively and cause a noise disturbance.*	
Extent	Will affect the local area	
Probability	Unlikely	
Reversibility	Reversible	
Irreplaceable loss of resources	No loss of resource	
Duration	Long term	
Cumulative effect	Negligible Cumulative Impact	
Intensity/magnitude	Low	
Significance Rating	7– Low Negative impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	1	1
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-7 (Low Negative)**	**-7 (Low Negative)**
Mitigation measures	None	

7.7 Visual

Although several renewable energy developments and infrastructure projects, either proposed or under construction, were identified within a 50 km radius of the Rondekop WEF, it was determined that only two of these would have any significant impact on the landscape within the visual assessment zone. Both of these WEFs (Kudusberg WEF and Kareebosch WEF) are directly adjacent to the Rondekop WEF. It is anticipated that this concentration of facilities will alter the inherent sense of place and introduce an increasingly industrial character into a largely rural area. This will result in significant cumulative impacts, rated as negative medium during both construction and operation phases of the project. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists.

It should be noted that there is a concentration of sites proposed for WEF development to the south-east of the application site, with most of these being located outside the 8k m visual assessment zone.

Given the distance from the study area and the hilly topography in the broader area, it is not anticipated that the WEF developments beyond the 8 km study area will result in any significant cumulative impacts affecting the landscape or the visual receptors within the Rondekop WEF visual assessment zone.

Two of the proposed WEF development sites are however located in the 8 km visual assessment zone for the Rondekop project, these being Kudusberg WEF and Karreebosch WEF which are both close to the south-eastern boundary of the Rondekop application site

In addition, both proposed WEFs adjacent to the Rondekop WEF are within the 8 km viewing distance of the potentially sensitive receptor locations identified in the south-eastern portion of the study area. As such, these receptors would experience exacerbated visual impacts should these two facilities and associated infrastructure be constructed, in conjunction with the Rondekop WEF. It should however be noted that the landowners (VR 18-21 and VR23) are associated with the Kudusberg WEF and thus are likely to find the proposed development less visually intrusive.

Visual assessments undertaken for the Kudusberg and Kareebosch WEFs identified similar visual impacts to those identified in this report and also provided similar recommendations and mitigation measures. As such, these visual specialist studies are considered to be in line with this VIA.

From a visual perspective, the concentration of renewable energy facilities as proposed will inevitably change the visual character of the area and alter the inherent sense of place, introducing an increasingly industrial character into a largely rural area, and thus giving rise to significant cumulative impacts. It is however anticipated these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures put forward by the visual specialists in their respective reports.

It should be noted however that the study area is partially located in the REDZ 2, and thus the relevant authorities support the concentration of renewable energy developments in this area. In addition, it is possible that the three WEFs in close proximity to each other could be seen as one large WEF rather than three separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

Table 120: Rating of cumulative visual impacts as a result of the renewable energy developments (including associated infrastructure) proposed nearby during operation

Environmental Parameter	Visual Impact
Issue/Impact/Environmental Effect/Nature	Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings.

Environmental Parameter	Visual Impact	
	Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	
Extent	Local/district (2)	
Probability	Definite (4)	
Reversibility	Irreversible (4)	
Irreplaceable loss of resources	Significant (3)	
Duration	Long term (3)	
Cumulative effect	High cumulative effects (4)	
Intensity/magnitude	Medium (2)	
Significance Rating	**Prior to mitigation measures:** Negative Medium impact **After mitigation measures:** Negative medium impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	4	4
Irreplaceable loss	3	2
Duration	3	3
Cumulative effect	4	3
Intensity/magnitude	2	2
Significance rating	**-40 (negative medium)**	**-36 (negative medium)**
Mitigation measures	▪ Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. ▪ Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work). ▪ If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale, if economically and technically feasible ▪ Dust suppression techniques are to be implemented on all access roads.	

Environmental Parameter	Visual Impact
	▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ The operation and maintenance buildings should not be illuminated at night with the exception of security lighting. ▪ The operation and maintenance buildings should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible. ▪ Where possible, overhead power lines should be aligned parallel to existing power lines and other linear features. ▪ Select the alternatives that will have the least impact on visual receptors. ▪ All WEF's should implement the project specific mitigation measures.

7.8 Heritage and Palaeontology Impacts

Paleontology

Various Paleontological Impact assessments have been conducted in the Rondekop development footprint in the past. These PIA's may be used as a reference list for the present impact study. Paleontological studies in the Klein-Roggeveld and Roggeveld Plateau regions found the paleontological sensitivity of the general area to be low and thus the impact significance has been rated as Low. Almond found that although scientifically important fossil remains does occur in the area, the probability of significant impacts on scientifically important and rare fossils were small. Although fossils heritage does occur in the formations present, they tend to be extremely rare and the majority of these fossils represent common forms which occur commonly in outcrops of the immediate area. He established that the cumulative impact significance of the proposed WEF and SEF facilities in the Roggeveld area is likely to be low (negative) provided that all mitigation and monitoring recommendations are adhered to. This negative impact could slightly be improved with the improved knowledge of fossils of the Karoo area. Without mitigation the magnitude of cumulative impacts of this large number of WEFs and SEFs and associated infrastructure affecting the same fossiliferous rock sequences would be considerably higher and probable. The assessed cumulative impact significance without mitigation is medium.

Table 121: Rating of Cumulative Impacts - Paleontology

Environmental Parameter	Prevent the loss of Palaeontological Heritage
Issue/Impact/Environmental Effect/Nature	Damage, destroy or permanently seal-in fossils at or below the ground surface that are then no longer

Environmental Parameter	Prevent the loss of Palaeontological Heritage	
	available for scientific study, this will occur during vegetation clearance or during the construction phase	
Extent	National (3)	
Probability	Since fossil heritage is known from these formations the probability of impacts on palaeontological heritage during the construction phase is probable. (3)	
Reversibility	Impacts on fossil heritage are generally **irreversible** (4)	
Irreplaceable loss of resources	By taking a precautionary approach, an insignificant loss of fossil resources is expected (**No Loss**). (1)	
Duration	The expected duration of the impact is assessed as potentially permanent to **long term**. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent. (4)	
Cumulative effect	The cumulative effect of the development of the WEF and associated infrastructure within the proposed location is considered to be **low**. This is as a result of the broader Sutherland area not being considered as fossiliferous (1).	
Intensity/magnitude	Probable significant impacts on palaeontological heritage during the construction phase are high, but the intensity of the impact on fossil heritage is rated as low as fossil heritage is not common in the development area or in the greater Sutherland area (1).	
Significance Rating	Should the project progress without due care to the possibility of fossils being present at the proposed site in the Abrahamskraal Formation and Waterford Formation. The resultant damage, destruction or inadvertent relocation of any affected fossils will be **permanent and irreversible**. Thus, any fossils occurring within the area are potentially scientifically and culturally significant and any negative impact on them would be of **high** significance (without the implementation of mitigation measures).	
	Pre-mitigation impact rating	Post mitigation impact rating

Environmental Parameter	Prevent the loss of Palaeontological Heritage	
Extent	3	3
Probability	3	1
Reversibility	4	4
Irreplaceable loss	1	1
Duration	4	4
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-16 (Low Negative)**	**-14 (Low Negative)**
Mitigation measures	Monitoring of major excavations for fossil material by the ESO on an on-going basis during construction phase. Significant fossil finds to be reported to SAHRA for recording and sampling by a professional palaeontologist The chance find procedure must be followed. 1. When a chance find is made the person must instantly stop all work near the find. 2. The site must be secured to protect it from any additional damage 3. The finder of the fossil heritage must immediately report the find to his/her direct supervisor, according to the reporting protocols instituted by the Mine/development management. The supervisor must in turn report the find to his/her manager and the ECO. The ECO must report the find to the relevant Authorities and a relevant paleontologist. 4. The ECO must appoint a relevant paleontologist to investigate and access the chance find and site. 5. Both ECO and paleontologist must ensure that accurate records and documentation are kept. The documentation must start with the initial chance find report, including records of all actions taken, persons involved and contacted, comments received and findings. 6. These documents will be necessary to request authorizations and permits from the relevant Authorities to continue with the work on site 7. The reports and all other documents will be submitted to SAHRA by the paleontologist.	

Environmental Parameter	Prevent the loss of Palaeontological Heritage
	8. The report will include recommendations for additional specialist work if necessary, or request approval to continue with the development. 9. Once the required approvals have been issued, the Mine/development may carry on with the development. 10. The ECO will close off the chance find procedure and would be required to implement any requirements issued by the Authority and to add it to the operational management plan.

Heritage

The possible cumulative impacts (CI) on heritage resources with the addition of the Rondekop WEF have been assessed. The CI on heritage resources evaluated a 50-kilometer radius. It must further be noted that the evaluation is based on available heritage studies and cannot take the findings of outstanding studies on current ongoing EIA's in consideration.

The analysis of the competed studies as listed in the Heritage Impact Report, took in to account the findings and recommendation of each of the sixteen evaluated HIA's and thirteen RE EIAs. The cumulative impact on the cultural landscape was discounted as the HIA's, in most cases, did not address this and the Visual Impact Assessment covers such analysis in detail.

The overall findings of the 29 studies (**Table 124** below) all concur that the area is characterised by numerous Stone Age find spots and archaeological resources. Many these concentrated around pans and outcrops in a landscape where water, food and shelter came at a premium. The sites around the pans and the outcrops where in most cases given a medium to high heritage significance on a local scale and in the majority of the cases were recommended as being no-go areas or extensive mitigation is required. There are no pans located within the Rondekop project site.

Table 122: Impact rating – Cumulative Impact

Environmental Parameter	Heritage Resources
Issue/Impact/Environmental Effect/Nature	The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources
Extent	Regional
Probability	Possible
Reversibility	Irreversible
Irreplaceable loss of resources	The nature of heritage resources are such that they are non-renewable. The proper mitigation and documentation of these resources can however preserve the data for research

Duration	Permanent	
Cumulative effect	It is my considered opinion that this additional load on the overall impact on heritage resources will be low. With a detailed and comprehensive regional dataset this rating could possibly be adjusted and more accurate.	
Intensity/magnitude	Low	
Significance Rating	Low Negative impact before mitigation and Low Negative after mitigation.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	4
Probability	2	1
Reversibility	4	4
Irreplaceable loss	4	4
Duration	4	4
Cumulative effect	1	1
Intensity/magnitude	1	1
Significance rating	**-19 (Low Negative)**	**-18 (Low Negative)**
Mitigation measures	▪ All projects should implement their specific mitigation measures on a case by case basis.	

Table 123: Heritage Impact Assessments conducted within 50 km of Rondekop WEF application area

Study	Findings	Recommendation
ALMOND, J, & ORTON, J. 2017. Heritage Impact Assessment: Proposed Construction of a Substation and 132 kV Distribution Line to support the Proposed Sutherland 2 WEF, Sutherland and Laingsburg Magisterial Districts, Northern and Western Cape.	*Historical and Stone Age heritage remains as well as several burial grounds and fossil sites were uncovered in this assessment.*	▪ It was recommended that development may continue under the condition that 30m & 20m buffers are implemented around certain 'no-go' sites and that the relevant contingencies are implement should heritage remains be affected by the development process.
BANDAMA, F. & MOHAPI, M. 2014. An Archaeological Scoping and Assessment Report for The Proposed Gamma (Victoria West, Northern Cape) - Kappa (Ceres – Western Cape) 765Kv (2) Eskom Power Transmission Line.	*This scoping report identified a range of heritage resources in and around the local area including: stone walling (kraals and possible windbreaks), ESA-LSA artefact scatters, buildings and farm complexes (with associated artefacts like glass, metal and ceramic), rock art and engravings, pottery and graves (both formal and informal).*	▪ It was recommended that a detailed walkdown of the powerline options be considered due to high number of sites in the area albeit being of low significance.
BOOTH, C. 2012. A Phase 1 AIA for the proposed Hidden Valley Wind Energy Facility, near Sutherland, Northern cape Province.	*Historical heritage resources were uncovered in this assessment.*	▪ It was recommended that an archaeologist be present during all construction related activities in two of the study areas.
BOOTH, C. 2015. A Phase 1 Archaeological Impact Assessment for the Proposed Karusa Facility Substation and Ancillaries, near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, NC Province.	*No significant heritage resources were uncovered in this assessment.*	▪ It was recommended that the development may continue and that the relevant contingencies are implement should heritage remains be uncovered during the development process.
BOOTH, C. 2015. A Phase 1 Archaeological Impact Assessment for the Proposed Eskom Karusa Switching Station, Ancillaries and a 132kV Double Circuit Overhead Power Line, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province.	*Some low significance Historical heritage remains were uncovered in this assessment.*	▪ It was recommended that a 30m buffer around discovered sites be adhered to and that the relevant contingencies are implement should heritage remains be uncovered during the development process.

Study	Findings	Recommendation
BOOTH, C. 2015. An Archaeological Walk-Through For The Proposed Karusa Wind Energy Facility Situated On The Farms: De Hoop 202, Standvastigheid 210, Portion 1 Of The Farm Rheebokke Fontein 209, Portion 2 of the Farm Rheebokke Fontein 209, Portion 3 of the Farm Rheebokke Fontein 209 andthe Remainder Of The Farm Rheebokke Fontein 209, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province.	*Historical heritage resources were uncovered in this assessment.*	▪ It was recommended that the historical remains be recorded and a destruction permit be applied for if they are not able to be avoided.
BOOTH, C. 2015. An Archaeological Walk-Through for the Proposed Soetwater Wind Energy Facility Situated On The Farms: The Remainder Of And Portion 1, 2 And 4 Of Farm Orange Fontein 203 And Annex Orange Fontein 185, Farm Leeuwe Hoek 183 And Farm Zwanepoelshoek 184, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province.	*No significant heritage resources were uncovered in this assessment.*	▪ It was recommended that the development may continue and that the relevant contingencies are implement should heritage remains be uncovered during the development process.
BOOTH, C. 2015. A Phase 1 Archaeological Impact Assessment for the Proposed Soetwater Substation, 132kvV Overhead Powerline and Ancillaries Soetwater Wind Energy Facility, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province.	*No significant heritage resources were uncovered in this assessment.*	▪ It was recommended that the development may continue and that the relevant contingencies are implement should heritage remains be uncovered during the development process.
BOOTH, C. 2015. Phase 1 Archaeological Impact Assessment for the proposed extension of the existing Komsberg Substation (two alternative areas) and widening of the access road, near Sutherland, NC Province.	*No heritage remains were uncovered in this assessment.*	▪ It was recommended that the development may continue.

Study	Findings	Recommendation
FOURIE, W. 2010. Archaeological Walk Down Report: Gamma-Omega Transmission Section 1: Gamma-Kappa.	*This study identified a range of heritage resources, the majority of which comprise Stone Age artefact scatters of varying densities. These are primarily ESA and MSA scatters, although LSA artefacts were also located. In addition, rock engravings were also found, along with stone walled structures of varied construction (kraals, walls, possible wind breaks); infrequent non-decorated potsherds were sporadic. Later historical structures were also found (with glass, metal and ceramic fragments), along with associated graves/burial areas. The earliest graves place regional occupation pre-1892.*	▪ The demarcation of sites as "no-go" areas ▪ Where the demarcation of sites is not sufficient, and the sites are unavoidable by the development, then mitigation measures must be implemented.
FOURIE, W., ALMOND, J. & ORTON J. 2014. National Wind and Solar PV SEA Specialist Assessment Report – Heritage Evaluation. This report provides on overview of potential heritage impacts in the REDZ Komsberg focus area 2.	*The following types of heritage are listed for this area: Middle and Later Stone Age artefact scatters (frequently associated with water sources), rock art (confined to the mountainous areas), colonial farmsteads (18-19th Century – farmhouses, kraals and earth dams), provincial heritage sites (i.e., Matjiesfontein, Karoopoort), South African War period fortifications and cemeteries (dating back to the early 1800s).*	▪ Mitigation: Adjust buffers through site specific management and incorporation of viewshed analysis from VIA's. ▪ Sensitive heritage features such as cultural landscapes and archaeological sites are very localised and can be managed through thorough HIAs as recommended in sensitive areas.
HALKETT, D, & ORTON, J. 2011. Heritage Impact Assessment for the Proposed Phtovoltaic Solar Energy Facility on the Remainder of Farm Jakhalsvalley 99, Sutherland Magisterial District, Wetern Cape.	*Historical heritage resources were uncovered in this assessment.*	▪ It was recommended that the development may continue however, the remains should be avoided and that the ECO must make sure of this.
HALKETT, D. 2011. Heritage Impact Assessment Proposed Renewable Energy Facility at the Sutherland Site, Western and Northern Cape Provinces.	*Some historical and Stone Age heritage remains as well as a burial ground that was uncovered in this assessment.*	▪ It was recommended that development may continue and that the relevant contingencies are implement should heritage remains be affected by the development process.
KAPLAN, J. 2009. Phase 1 Archaeological Impact Assessment of the Proposed Driefontein Resort (Driefontein Farm No. 127) Sutherland, Northern Cape Province.	*Historical heritage remains were uncovered in this assessment.*	▪ It was recommended that the historical remains be avoided and that a Conservation Management Plan be drafted to protect the remains.

Study	Findings	Recommendation
KAPLAN, J. 2015. Proposed borrow pit (Karusa North) on the Farm Rheebokke Fontein 209 Remainder near Sutherland, Northern Cape Assessment conducted under Section 38 (3) of the National Heritage Resource Act (No. 25 of 1999).	*Historical, Iron Age and Stone Age heritage remains were uncovered in this assessment.*	▪ Relevant sites should be protected, 20m buffers implemented where necessary and that the relevant contingencies are implement should heritage remains be uncovered during the development process.
KAPLAN, J. 2015. Proposed borrow pit (Karusa East) on the Farm Rheebokke Fontein 209/2 & 209/3 near Sutherland, Northern Cape.	*Low significance historical heritage resources were uncovered in this assessment.*	▪ It was recommended that the development may continue and that the relevant heritage authorities should be contacted if any human remains are uncovered during the development process.
VAN DER RYST, M. & FOURIE, W. 2014. Phase 2 Specialist Study of Affected Stone Age Locality on The Gamma Kappa Transmission Line – Tower GKB-T846 (Site GK062), Tankwa Karoo, Touwsrivier.	*This report documents medium density scatters of ESA, MSA and LSA artefacts at a single deflated, secondary context, locality, with the assemblage comprising a very low quantity of formal tools.*	▪ The mitigation procedure was deemed satisfactory and it was further recommended that a destruction permit may be applied for from SAHRA.
VAN DER WALT, J. 2015. Archaeological Impact Assessment Report for the Proposed Gunstfontein Wind Energy Facility, Northern Cape.	*Historical remains as well as Rock Art were uncovered in this assessment.*	▪ It was recommended that the development footprint be updated in order to accommodate the heritage findings and that the ECO must make sure the heritage resources are protected.
VAN DER WALT, J. 2016. Archaeological impact assessment report for the proposed Gunstfontein 132 kV power line, switching station and ancillaries for the proposed Gunstfontein wind energy facility near Sutherland, Northern Cape.	*Desktop level assessment based of previous fieldwork done in the study area. Historical remains as well as Rock Art was uncovered in this assessment.*	▪ It is recommended that a full heritage walk down of the study area must be conducted.
WEBLEY, L. 2017. Heritage Impact Assessment: Proposed Construction of the Maralla West Wind Energy Facility near Sutherland in the Northern Cape.	*Historical and Stone Age heritage remains were uncovered in this assessment.*	▪ It was recommended that highly sensitive No-Go area should be avoided, that a walk-down be conducted should the development layout change and that the relevant contingencies are implement should heritage remains be uncovered during the development process.
Study	**Findings**	**Recommendation**
ALMOND, J, & ORTON, J. 2017. Heritage Impact Assessment: Proposed Construction of a Substation and 132 kV Distribution Line to support the Proposed Sutherland 2 WEF, Sutherland and Laingsburg Magisterial Districts, Northern and Western Cape.	*Historical and Stone Age heritage remains as well as several burial grounds and fossil sites were uncovered in this assessment.*	▪ It was recommended that development may continue under the condition that 30m & 20m buffers are implemented around certain 'no-go' sites and that the relevant contingencies are implement should heritage remains be affected by the development process.

Study	Findings	Recommendation
BANDAMA, F. & MOHAPI, M. 2014. An Archaeological Scoping and Assessment Report for The Proposed Gamma (Victoria West, Northern Cape) - Kappa (Ceres – Western Cape) 765Kv (2) Eskom Power Transmission Line.	*This scoping report identified a range of heritage resources in and around the local area including: stone walling (kraals and possible windbreaks), ESA-LSA artefact scatters, buildings and farm complexes (with associated artefacts like glass, metal and ceramic), rock art and engravings, pottery and graves (both formal and informal).*	▪ It was recommended that a detailed walkdown of the powerline options be considered due to high number of sites in the area albeit being of low significance.
BOOTH, C. 2012. A Phase 1 AIA for the proposed Hidden Valley Wind Energy Facility, near Sutherland, Northern cape Province.	*Historical heritage resources were uncovered in this assessment.*	▪ It was recommended that an archaeologist be present during all construction related activities in two of the study areas.
BOOTH, C. 2015. A Phase 1 Archaeological Impact Assessment for the Proposed Karusa Facility Substation and Ancillaries, near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, NC Province.	*No significant heritage resources were uncovered in this assessment.*	▪ It was recommended that the development may continue and that the relevant contingencies are implement should heritage remains be uncovered during the development process.
BOOTH, C. 2015. A Phase 1 Archaeological Impact Assessment for the Proposed Eskom Karusa Switching Station, Ancillaries and a 132kV Double Circuit Overhead Power Line, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province.	*Some low significance Historical heritage remains were uncovered in this assessment.*	▪ It was recommended that a 30m buffer around discovered sites be adhered to and that the relevant contingencies are implement should heritage remains be uncovered during the development process.
BOOTH, C. 2015. An Archaeological Walk-Through For The Proposed Karusa Wind Energy Facility Situated On The Farms: De Hoop 202, Standvastigheid 210, Portion 1 Of The Farm Rheebokke Fontein 209, Portion 2 of the Farm Rheebokke Fontein 209, Portion 3 of the Farm Rheebokke Fontein 209 andthe Remainder Of The Farm Rheebokke Fontein 209, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province.	*Historical heritage resources were uncovered in this assessment.*	▪ It was recommended that the historical remains be recorded and a destruction permit be applied for if they are not able to be avoided.

Study	Findings	Recommendation
BOOTH, C. 2015. An Archaeological Walk-Through for the Proposed Soetwater Wind Energy Facility Situated On The Farms: The Remainder Of And Portion 1, 2 And 4 Of Farm Orange Fontein 203 And Annex Orange Fontein 185, Farm Leeuwe Hoek 183 And Farm Zwanepoelshoek 184, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province.	*No significant heritage resources were uncovered in this assessment.*	▪ It was recommended that the development may continue and that the relevant contingencies are implement should heritage remains be uncovered during the development process.
BOOTH, C. 2015. A Phase 1 Archaeological Impact Assessment for the Proposed Soetwater Substation, 132kvV Overhead Powerline and Ancillaries Soetwater Wind Energy Facility, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province.	*No significant heritage resources were uncovered in this assessment.*	▪ It was recommended that the development may continue and that the relevant contingencies are implement should heritage remains be uncovered during the development process.
BOOTH, C. 2015. Phase 1 Archaeological Impact Assessment for the proposed extension of the existing Komsberg Substation (two alternative areas) and widening of the access road, near Sutherland, NC Province.	*No heritage remains were uncovered in this assessment.*	▪ It was recommended that the development may continue.
FOURIE, W. 2010. Archaeological Walk Down Report: Gamma-Omega Transmission Section 1: Gamma-Kappa.	*This study identified a range of heritage resources, the majority of which comprise Stone Age artefact scatters of varying densities. These are primarily ESA and MSA scatters, although LSA artefacts were also located. In addition, rock engravings were also found, along with stone walled structures of varied construction (kraals, walls, possible wind breaks); infrequent non-decorated potsherds were sporadic. Later historical structures were also found (with glass, metal and ceramic fragments), along with associated graves/burial areas. The earliest graves place regional occupation pre-1892.*	▪ The demarcation of sites as “no-go” areas ▪ Where the demarcation of sites is not sufficient, and the sites are unavoidable by the development, then mitigation measures must be implemented.

Study	Findings	Recommendation
FOURIE, W., ALMOND, J. & ORTON J. 2014. National Wind and Solar PV SEA Specialist Assessment Report – Heritage Evaluation. This report provides on overview of potential heritage impacts in the REDZ Komsberg focus area 2.	*The following types of heritage are listed for this area: Middle and Later Stone Age artefact scatters (frequently associated with water sources), rock art (confined to the mountainous areas), colonial farmsteads (18-19th Century – farmhouses, kraals and earth dams), provincial heritage sites (i.e., Matjiesfontein, Karoopoort), South African War period fortifications and cemeteries (dating back to the early 1800s).*	▪ Mitigation: Adjust buffers through site specific management and incorporation of viewshed analysis from VIA's. ▪ Sensitive heritage features such as cultural landscapes and archaeological sites are very localised and can be managed through thorough HIAs as recommended in sensitive areas.
HALKETT, D, & ORTON, J. 2011. Heritage Impact Assessment for the Proposed Phtovoltaic Solar Energy Facility on the Remainder of Farm Jakhalsvalley 99, Sutherland Magisterial District, Wetern Cape.	*Historical heritage resources were uncovered in this assessment.*	▪ It was recommended that the development may continue however, the remains should be avoided and that the ECO must make sure of this.
HALKETT, D. 2011. Heritage Impact Assessment Proposed Renewable Energy Facility at the Sutherland Site, Western and Northern Cape Provinces.	*Some historical and Stone Age heritage remains as well as a burial ground that was uncovered in this assessment.*	▪ It was recommended that development may continue and that the relevant contingencies are implement should heritage remains be affected by the development process.
KAPLAN, J. 2009. Phase 1 Archaeological Impact Assessment of the Proposed Driefontein Resort (Driefontein Farm No. 127) Sutherland, Northern Cape Province.	*Historical heritage remains were uncovered in this assessment.*	▪ It was recommended that the historical remains be avoided and that a Conservation Management Plan be drafted to protect the remains.
KAPLAN, J. 2015. Proposed borrow pit (Karusa North) on the Farm Rheebokke Fontein 209 Remainder near Sutherland, Northern Cape Assessment conducted under Section 38 (3) of the National Heritage Resource Act (No. 25 of 1999).	*Historical, Iron Age and Stone Age heritage remains were uncovered in this assessment.*	▪ Relevant sites should be protected, 20m buffers implemented where necessary and that the relevant contingencies are implement should heritage remains be uncovered during the development process.
KAPLAN, J. 2015. Proposed borrow pit (Karusa East) on the Farm Rheebokke Fontein 209/2 & 209/3 near Sutherland, Northern Cape.	*Low significance historical heritage resources were uncovered in this assessment.*	▪ It was recommended that the development may continue and that the relevant heritage authorities should be contacted if any human remains are uncovered during the development process.
VAN DER RYST, M. & FOURIE, W. 2014. Phase 2 Specialist Study of Affected Stone Age Locality on The Gamma Kappa Transmission Line – Tower GKB-T846 (Site GK062), Tankwa Karoo, Touwsrivier.	*This report documents medium density scatters of ESA, MSA and LSA artefacts at a single deflated, secondary context, locality, with the assemblage comprising a very low quantity of formal tools.*	▪ The mitigation procedure was deemed satisfactory and it was further recommended that a destruction permit may be applied for from SAHRA.

Study	Findings	Recommendation
VAN DER WALT, J. 2015. Archaeological Impact Assessment Report for the Proposed Gunstfontein Wind Energy Facility, Northern Cape.	*Historical remains as well as Rock Art were uncovered in this assessment.*	▪ It was recommended that the development footprint be updated in order to accommodate the heritage findings and that the ECO must make sure the heritage resources are protected.
VAN DER WALT, J. 2016. Archaeological impact assessment report for the proposed Gunstfontein 132 kV power line, switching station and ancillaries for the proposed Gunstfontein wind energy facility near Sutherland, Northern Cape.	*Desktop level assessment based of previous fieldwork done in the study area. Historical remains as well as Rock Art was uncovered in this assessment.*	▪ It is recommended that a full heritage walk down of the study area must be conducted.
WEBLEY, L. 2017. Heritage Impact Assessment: Proposed Construction of the Maralla West Wind Energy Facility near Sutherland in the Northern Cape.	*Historical and Stone Age heritage remains were uncovered in this assessment.*	▪ It was recommended that highly sensitive No-Go area should be avoided, that a walk-down be conducted should the development layout change and that the relevant contingencies are implement should heritage remains be uncovered during the development process.

Table 124 - Other proposed renewable projects within 50km of Rondekop WEF application site

Study	Findings	Recommendation
UCT Environmental Evaluation Unit. 2011. Touwsrivier Solar Energy Facility.	*This report anticipates the existence of Middle and Early stone age material in the ploughed lands within the study area while they have confirmed several historical structures relating to South African railway history.*	▪ A policy of minimal intervention is recommended with respect to the surviving historical railway infrastructure. In terms of archaeology, the site is considered to be insensitive however a walk-over would be required for the transmission lines once a route has been approved.
ERM. 2012. Proposed renewable energy facility at the Perdekraal Site 2, Western Cape.	*No heritage resources were identified with the proposed study area however two small rockshelters, several grave sites and concentration of historical structures were identified within the general vicinity of the study area.*	▪ If the Ekkraal Valley is to be impacted, then this area has to be thoroughly surveyed and all heritage sites recorded. Sensitive areas must be flagged so that these can be protected from construction related activities. ▪ If human remains are uncovered during the construction phase, work in the specific location should cease, and HWC/SAHRA should be notified.
Savannah Environmental. 2014. Roggeveld Wind farm.	*This report identified several stone age tool scatters and historical farm buildings, all of which considered low significance. Further, a number of collapsing stone structures including buildings, kraals, a well, oven and threshing floor were recorded, considered to be of low significance. Additionally, An unfenced graveyard is located on the Rietpoort farm and a number of stone cairns were identified which could represent graves. There is a high probability that additional unmarked graves will be uncovered during the construction phase.*	▪ Avoid disturbance or damage to buildings and structures older than 60 years by maintaining 500m buffers around the on-site dwellings; ▪ Avoid inland water bodies (100m buffer) and rivers (200m buffer); ▪ Maintain a 200m buffer zone around cemeteries or graves onsite; and ▪ Remove turbines from the 'koppie' in the south eastern portion of the site comprising Waaipoort Formation and ensuring palaeontological input prior to or during construction of turbines along the thin band of Whitehill Formation running through the central portion of the Perdekraal farm (Rem of Lower Stinkfontein 245). ▪ Prior to or during foundation excavations which may be located on the Whitehill Formation, positions and/or excavations must be inspected by a palaeontologist; ▪ Buffer zones around built structures should be maintained during the construction phase to prevent damage to structures of heritage interest; ▪ Mitigation of the pre-colonial, colonial archaeology and avoidance of marked graves which may not have been identified during the site survey should involve micro-siting prior to construction; and ▪ Should any human burials, archaeological or palaeontological materials (fossils, bones, artefacts etc.) be uncovered or exposed during earthworks or excavations, they must immediately be reported to the HWC and/or South African Heritage Resources Agency (SAHRA). After assessment and if appropriate a permit must be obtained from the SAHRA or HWC to remove such remains.
Savannah Environmental. 2014. Hidden Valley WEF.	This report identified multiple grave sites and historical structural remains. The historical	• A professional archaeologist must be appointed during the construction phase to monitor and identify possible archaeological material remains and features that may occur below the surface and make further appropriate

Study	Findings	Recommendation
	sites are of low significance and the grave sites are of high significance.	recommendations on removing and/or protecting the archaeological remains and features. • Should any human burials, archaeological or palaeontological materials (fossils, bones, artefacts etc.) be uncovered or exposed during earthworks or excavations, they must immediately be reported to the HWC and/or South African Heritage Resources Agency (SAHRA). After assessment and if appropriate a permit must be obtained from the SAHRA or HWC to remove such remains. • Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites. • A 10m buffer zone must be maintained between sites and construction activities where the activities do encroach on the sites.
Savannah Environmental. 2015. Karreebosch Wind Farm.	This report identified scarce examples of Stone age remains however it found multiple grave sites and historical structural remains. All of which are of low-medium significance save for the grave sites.	▪ None of these heritage artefacts/sites occur within the proposed wind turbine development footprint. The pre-colonial heritage of the area as manifested by archaeological traces is extremely sparse. Very little material was identified, and no particular mitigation is suggested. ▪ If any of the valley bottoms are to be impacted or the valley bottom roads widened, then this area will need to be thoroughly surveyed and all heritage sites recorded and mapped on the landscape. Sensitive areas must be flagged so that these can be protected from construction related activities.
EOH. 2016. Proposed Brandvalley WEF.	This report identified scarce examples of Stone age remains however it found multiple grave sites and historical structural remains. All of which are of low-medium significance save for the grave sites.	• Once the final layout of the Brandvalley WEF has been established a more intensive survey of these areas should be conducted and further recommendations and further migratory be made. • No development should occur within 20 m – 30 m of the stone walling features and associated historical artefacts. The features should be clearly demarcated before any development activities begin to avoid any negative impact. The layout of any infrastructure should be reconsidered to preserve these heritage resources. • The graveyard is already fenced off, however, the area should be clearly demarcated and the upgrade of the road be to the west or the road be diverted further away to avoid any possible negative impact to the graveyard. • Effective rehabilitation of the landscape after decommissioning. • Recommendations for the establishment of 20 m – 30 m buffer zones that are clearly demarcated and, in some instances, the possible rerouting of the proposed road to avoid negative impact and promote the implementation of

Study	Findings	Recommendation
		precautionary measures be adopted for heritage resources occurring along the route. • If any of the old farm buildings are to be intended for rehabilitation or re-use or demolition a qualified and experienced professional (historical archaeologist / historical architect) must be consulted. • No turbines are to be located on Tafelkop or Spitskop. • An archaeological heritage walk-through survey must be conducted if any changes to the positions of the wind turbines, associated infrastructure and roads outside the scope of this study are made for the final layout and further recommendations and mitigation measures be suggested if necessary. • If concentrations of historical and pre-colonial archaeological heritage material and/or human remains (including burials and graves) are uncovered during construction, all work within close vicinity of the find must cease immediately and be reported the South African Heritage Resources Agency (SAHRA) (021 462 4502) or Heritage Western Cape (HWC) (021 483 5959) so that systematic and professional investigation/excavation can be undertaken. Phase 2 mitigation in the form of test-pitting/sampling or systematic excavations and collections of the pre-colonial shell middens and associated artefacts will then be conducted to establish the contextual status of the sites and possibly remove the archaeological deposit before development activities within the specific area can continue. • Construction managers/foremen and/or the ECO should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.
EOH. 2016. Proposed Rietkloof WEF.	This report identified scarce examples of Stone age remains however it found multiple grave sites and historical structural remains. All of which are of low-medium significance save for the grave sites.	• It would be difficult to avoid encountering Precolonial / Stone Age artefact scatters within areas they occur. Once the final layout of the Rietkloof WEF has been established a more intensive survey of these areas should be conducted and further recommendations and further mitigatory be made to assist with micro-sitting. • No development should occur within 20 m – 30 m of Stone Walling Features and associated Historical Artefact Scatters. The features should be clearly demarcated before any development activities begin to avoid any negative impact. The layout of any infrastructure should be • The graveyard is already fenced off, however, the area should be clearly demarcated and the upgrade of the road be to the west or the road be diverted further away to avoid any possible negative impact to the graveyard.

Study	Findings	Recommendation
		• It is strongly recommended that any proposed access roads avoid using these homesteads as a thoroughfare for the proposed wind energy facility as far as possible. • Effective rehabilitation of the landscape after decommissioning. • No turbines are to be constructed on Tafelkop. • If any of the old farm buildings are to be intended for rehabilitation or re-use or demolition a qualified and experienced professional (historical archaeologist / historical architect) must be consulted. • An archaeological heritage walk-through survey must be conducted if any changes to the positions of the wind turbines, associated infrastructure and roads outside the scope of this study are made for the final layout and further recommendations and mitigation measures be suggested if necessary. • If concentrations of historical and pre-colonial archaeological heritage material and/or human remains (including burials and graves) are uncovered during construction, all work within close vicinity of the find must cease immediately and be reported the South African Heritage Resources Agency (SAHRA) (021 462 4502) or Heritage Western Cape (HWC) (021 483 5959) so that systematic and professional investigation/excavation can be undertaken. Phase 2 mitigation in the form of test-pitting/sampling or systematic excavations and collections of the pre-colonial shell middens and associated artefacts will then be conducted to establish the contextual status of the sites and possibly remove the archaeological deposit before development activities within the specific area can continue. • Construction managers/foremen and/or the Environmental Control Officer (ECO) should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.
WSP. 2017. Proposed Esizayo Wind Energy Facility near Laingsburg, Western Cape	This report identified the following heritage resources: • A few large scatters of LSA stone artefacts were identified. They are of medium significance; • A few “pastoralist settlements” were identified containing LSA artefacts, ceramics and grindstones along dry river beds in the bottom of valleys. They are of medium significance;	The following mitigation and management measures have been recommended: ▪ Construction Phase ○ The hill and surrounds on which substation alternative 1 is located, must be declared a “No-Go” area; ○ The Nuwerus cemetery must be protected during the construction phase; and ○ If any human remains are uncovered during the excavations for the Wind Farm, work must stop in that area and HWC must be alerted immediately. ▪ Operational Phase:

Study	Findings	Recommendation
	• At least two rock art sites. They are of high significance; • The Nuwerus cemetery is located next to the R354. There are also several other potential graves/cairns within the study area. They are of high significance; • A spread of early 20th century historical material on the lower slopes of two koppies, in association with several stone enclosures (fortifications) on the farm Aanstoot. They may represent the debris from the South African War; and • There are numerous roughly-packed, circular enclosures of dry stone walling, which may represent both pre-colonial and colonial era stone kraals, distributed along the lower slopes of small koppies, and close to streams or fountains across the study area. They are of low to medium significance.	○ Any abandoned farm buildings and the established cemetery should be protected from vandalism during the operational phase of the wind farm.
WSP. 2017. Proposed Maralla East Wind Energy Facility near Sutherland, Northern and Western Cape.	This report identified the following heritage resources: • A large and informal graveyard (at least 5-10 graves) on the banks of the Komsberg River in the southern portion of the farm Schalkwykskraal, associated with 19th century historic remains and a nearby stone kraal; • Also, on the Komsberg River, are the remains of a late 19th century stone stockpost, with small dwelling and extensive stone kraal complex; • Extensive archaeological and colonial period sites is along the Ventersrivier on the farm Welgemoed, including stone artefact scatters, rock art as well as ruined	The following mitigation and management measures have been recommended: It is expected that most of the damage to the heritage resources on Maralla East will occur during construction. Heritage sites are concentrated along river valleys, while the turbines are generally located along the tops of the mountain ridges. Therefore, the following activities may result in direct impacts to the landscape and any heritage that lies on it: • Bulldozing of roads across river valleys to the turbine sites; • Upgrading of existing roads particularly where they cut through river valleys or are in close proximity to existing settlements (i.e. farmhouse of Welgemoed); • Excavation of linear trenches for cables through river valleys, resulting in destruction of archaeological sites or graves on the banks of the rivers ▪ During the operational phase of the wind facility the only risks are potential vandalism of heritage sites by staff of the wind facility(s). This includes stripping

Study	Findings	Recommendation
	farm buildings, kraals, stockposts and graves.	of fittings from abandoned farm buildings, careless damage to kraal walls, graffiti on rock art sites, etc. No further impacts to heritage would occur during operation of the currently proposed facility, although any expansion to the facility (effectively a new construction phase), would introduce new impacts. • In the case of Maralla East WEF, the proximity of the blue substation to the rock art site on the Venters Rivier may result in damage (graffiti) during the operational life of the wind farm (; • Similarly, the potential adaptive re-use of the Welgemoed farmhouse may result in vandalism and damage
WSP. 2017. Proposed Maralla West Wind Energy Facility near Sutherland, Northern and Western Cape.	This report identified the following heritage resources: • Several well-defined LSA sites with relatively abundant artefactual material (including Khoekhoen pottery) associated with water sources such as small streams and spring. These “pastoralist” sites are found on sandy river banks, often in proximity to later colonial sites. There are numerous stone kraals and abandoned stockpost dwellings in the same area; • Remains of a large, late 19th century settlement, on Drie Roode Heuvels, on both sides of the public gravel road. It comprises a series of kraal complexes to the west of the road, as well as a threshing floor (trapvloer) and a wide distribution of 19thcentury ceramics and glass. This site has been bisected by the gravel road, as the graveyard, containing at least 12-15 Christian style graves, is located to the east of the road. There is also extensive stone walling, on both sides of the road.	The following mitigation and management measures have been recommended: It is expected that most of the damage to the heritage resources on Maralla West will occur during construction. Heritage sites are concentrated along river valleys, while the turbines are generally located along the tops of the mountain ridges. Therefore, the following activities may result in direct impacts to the landscape and any heritage that lies on it: • Bulldozing of roads across river valleys to the turbine sites; • Upgrading of existing roads particularly where they cut through river valleys or are in close proximity to existing settlements (i.e. farmhouse of Wolven Hoek); • Construction of electrical infrastructure in the form of substations ▪ During the operational phase of the wind facility the only risks are potential vandalism of heritage sites by staff of the wind facility(s). This includes stripping of fittings from abandoned farm buildings, careless damage to kraal walls, graffiti on rock art sites, etc. No further impacts to heritage would occur during operation of the currently proposed facility, although any expansion to the facility (effectively a new construction phase), would introduce new impacts. • The potential adaptive re-use of the Wolven Hoek or Die Kom farmhouses may result in vandalism and damage

Study	Findings	Recommendation
Savannah Environmental. 2016. Gunstfontein Wind Energy Facility, Northern Cape Province.	This report identified the following heritage resources: • South African War fortifications • Rock art sites • Stone cairns • Historical stone ruins (farm labourer dwellings)	The following mitigation and management measures have been recommended: • The majority of sites identified in this study will not be directly impacted by the proposed development. • However, where necessary, it is recommended that all proposed infrastructure respect a 60m buffer zone around all sites and; • If development takes place particularly close to a site, then that site must be demarcated during construction.
CSIR. 2016. Amendment Application for the Proposed Splitting of the Sutherland Renewable Energy Facility into three 140 MW Wind Energy Facilities, Sutherland, Northern and Western Cape Provinces.	This report identified the following heritage resources: • Several colonial stone structures • Possible graves • Possible KhoeKhoe hunting hides • Later Stone Age sites	The following mitigation and management measures have been recommended: • A field survey must be undertaken by a palaeontologist prior to any construction taking place; • A few LSA sites containing ceramics and occasional formal stone microliths were identified. These often occur in the lee of ridges and near water sources. Some of these have been accorded high significance and have to be avoided. • A number of colonial household dumps/refuse heaps were recognised associated with domestic elements of the built environment. Some of these are considered to be of high significance and have to be avoided; • Unoccupied standing historic farm buildings as well as ruins are found on Welgemoed and De Kom. These would be accorded high significance and have to be avoided. • A more detailed survey must be conducted along the proposed access roads and connecting cable routes and turbine sites to ensure graves are not disturbed; • If unmarked graves are uncovered during construction, work should cease in that area and either SAHRA or HWC must be notified, depending on the location. A protocol to deal with accidentally discovered burials must be compiled for the construction phase.
Environmental Evaluation Unit. 2011. The Proposed Photovoltaic Solar Energy Facility on a site south of Sutherland, Northern Cape Province.	This report identified the following heritage resources: ▪ Several scatters of stone artefacts were recorded in open areas. ▪ One rock art site, lying in a long, shallow shelter which also contains some piled stone walling forming a small enclosure.	The following mitigation and management measures have been recommended: ▪ The Environmental Control Officer (ECO) is to ensure that no-one removes any artefacts from the area. ▪ The ECO is to ensure that no-one damages the sites. ▪ As the site has been shifted slightly to the east, it is recommended that an archaeologist shall be contracted to visit the site after the development footprint has been pegged on site, but before construction commences, to search for and ensure that no ephemeral heritage resources (specifically

Study	Findings	Recommendation
	▪ Several pre-colonial stone walled structures. ▪ Several sites were found with scatters of historical artefacts. These artefacts include fragments of glass, metal, ceramics. Some are associated with the historical use of the area, perhaps having been left by shepherds, but others are more likely connected with the Anglo-Boer War. ▪ Stone-walled sites can be regarded as historical for the regularity of their shapes and the fact that the stones are relatively neatly placed on top of one another, often in courses. These could include huts, kraals, and animal cages. ▪ A number of ruined structures relating to the second Anglo-Boer War were found.	stone -built structures) are found within the facility footprint and are lost without suitable recording due to construction activities.

7.9 Social Impacts

Over the last five years South Africa has experienced a proliferation in the number of renewable energy facilities being constructed across the country. Many of these facilities are being constructed in parts of the Western and Northern Cape Provinces, in particular in areas such as the Karoo that has the ideal climate, with long cloudless days that result in the area having high levels of solar irradiation and wind energy. Accordingly, the government has identified eight REDZs and embarked on an initiative, the Renewable Energy Independent Power Producer Procurement Program (REIPPPP), in an effort to channel private sector expertise and investment into grid-connected renewable energy in South Africa. This has resulted in many of these renewable energy facilities being clustered within or close to these REDZs, which in turn has resulted in a cumulative impact in and around these areas.

In response to these developments in the Karoo there has been a counter reaction amongst some communities opposed to this relatively sudden change to what was previously an isolated, tranquil and pristine environment. In this vein the Heritage Association of South Africa published an undated appeal to the Minister of the Department Environmental Affairs to consider the need for a cumulative impact assessment with regard to the cumulative effect of mining and energy developments within the area. Another article cited in the Karoo News Group appeal is a criticism of the cumulative effects of the renewable energy sector, highlighting environmental questions regarding wind farms. Apart from the general reaction towards the cumulative effects of renewable energy projects the following more specific social issues need to be considered, these relate to the effects on:

- Risk of HIV;
- Sense of place;
- Service supplies and infrastructure and;
- The economy.

The cumulative impacts discussed above have been assessed in the Social Impact Assessment attached as **Appendix 6** to this report. The specialist notes however, that this assessment is at a superficial level as any in-depth investigation of the cumulative effects of the various developments being planned for the region are beyond the scope of this study as they would require a broad-based investigation on a far larger scale. The socio-economic cumulative impacts are assessed below.

Risk of HIV infections

With respective HIV prevalence rates of 18.7 and 17.5 percent, both the Western and Northern Cape provinces have the lowest HIV prevalence rates across the country. At a district level the Cape Winelands has the fifth lowest HIV prevalence across all districts in South Africa, with a prevalence rate of 15% and, most significantly, the Namaqua district has the lowest HIV prevalence rate in the country at 2.3%, followed by the Central Karoo which has the second lowest HIV prevalence rate in the country at 6.9%. Consequently, the district within which the project is located, and the neighbouring districts, have the lowest HIV prevalence rates across the country.

These figures are significantly low compared to other areas of the country which range from a rate of 20.3% in Limpopo and 40.1% in KwaZulu-Natal with the iLembe District Municipality having an HIV prevalence rate of 45.9% in 2013. The provinces sharing common borders with the Western and Northern Cape Provinces all have relatively high HIV prevalence rates as indicated below;

- North West = 28.2%
- Free State = 29.8%;
- Eastern Cape = 31.1%

With the influx of labour, particularly following the construction of the various renewable energy and mining projects within the region, the risk of HIV infections in the area is likely to rise significantly. It is well documented on both an international and local basis that the construction industry carries a high level of HIV which can be spread amongst the local communities, particularly through the spread of prostitution that follows the availability of disposable income. It is also well documented on both an international and local level that HIV is also spread by truck drivers and there is likely to be an increase in truck drivers in the area as equipment and material is delivered to the various construction sites.

These issues associated with the area being extremely poor and the associated disposable income that will follow the construction workers and truck drivers to the area will heighten the risk of the spread of HIV infections across what is a rather remote region. In this regard The World Bank (2009, pp. 367-368) had indicated a strong link between infrastructure projects and health as:

“Transport, mobility, and gender inequality increase the spread of HIV and AIDS, which along with other infectious diseases, follow transport and construction workers on transport networks and other infrastructure into rural areas, causing serious economic impacts.”

Table 125: Social Impact cumulative assessment - Risk of HIV

Environmental Parameter	**Health**	
Issue/Impact/Environmental Effect/Nature	Risk of HIV	
Extent	Province	
Probability	Definite	
Reversibility	Irreversible	
Irreplaceable loss of resources	Significant loss of resource	
Duration	Permanent	
Cumulative effect	High cumulative impact	
Intensity/magnitude	High	
Significance Rating	High Negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	4
Probability	4	4
Reversibility	4	3
Irreplaceable loss	3	3
Duration	4	4
Cumulative effect	4	4

Environmental Parameter	Health	
Intensity/magnitude	3	3
Significance rating	**-69 (High Negative)**	**-66 (High Negative)**
Mitigation measures	▪ Mitigation can only be implemented at a regional level and will need to be driven on a provincial and municipal basis. In this sense the following mitigation measures would need to be considered. ▪ Ensure that all companies coming into the area have and are implementing an effective HIV/AIDS policy; ▪ Introduce HIV/ADS awareness programs to schools and youth institutions; ▪ Carefully monitor and report on the HIV status of citizens in the region and will need to be driven on a provincial and municipal basis; and ▪ Be proactive in dealing with any increase in the HIV prevalence rate in the area.	

Sense of place

There is also a concern amongst various interest groups that the proliferation of renewable energy facilities, particularly when considered in association with other industrial activities such as mining, will have a significant and negative cumulative social impact on the area. In this regard issues such as the noise from blades; aesthetic associated with highly visible wind farms; the loss of bird and bat life and its effect on tourism; as well as the disruption of social networks have all been cited amongst these concerns.

This is, however, a complex issue as there are varying opinions in respect of the aesthetic appearance of wind farms with some regarding them in a far more positive light than others may. In a study of public attitudes towards onshore windfarms in south-west Scotland it was found that many regarded the visual impact of these developments in a positive light. It must, however, be noted that this was linked with community ownership having a positive impact on public attitudes towards windfarm developments in Scotland. A further and important consideration in this regard is of an ethical nature associated with community acceptance and energy justice and raises the question of the incorporation of public acceptance, particularly that of the underrepresented, into energy policy.

Table 126: Socio-economic cumulative assessment - Sense of place

Environmental Parameter	Quality of the living environment
Issue/Impact/Environmental Effect/Nature	Sense of place
Extent	Regional
Probability	Definite
Reversibility	Irreversible
Irreplaceable loss of resources	Significant loss of resource
Duration	Permanent
Cumulative effect	High cumulative impact

Environmental Parameter	Quality of the living environment	
Intensity/magnitude	High	
Significance Rating	High Negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	3	3
Probability	4	4
Reversibility	4	4
Irreplaceable loss	3	3
Duration	4	4
Cumulative effect	4	4
Intensity/magnitude	3	3
Significance rating	**-66 (High Negative)**	**-66 (High Negative)**
Mitigation measures	▪ Mitigation can only be implemented at a regional level and will need to be driven on a provincial and municipal basis. In this sense the following mitigation measures would need to be considered. ▪ Consider undertaking a cumulative impact assessment to evaluate the changes taking place across the area on a broader scale; ▪ Form a regional work group tasked with addressing the effect of changes to the sense of place of the region; ▪ Establish grievance mechanisms to deal with complaints associated with changes to the area; ▪ Enlighten the public about the need and benefits of wind power; ▪ Engage with the tourism businesses and authorities in the region to identify any areas of cooperation that could exist.	

Services, Supplies and Infrastructure

With the proliferation of renewable energy facilities in the area it is quite likely that the local authorities, currently hard pressed to deliver services, will find it difficult to keep up with this development. The influx of construction workers is likely to place pressure on accommodation and the need for both services and supplies. Sutherland, Matjiesfontein and Laingsburg, being either within or just outside of the 70km radius of these projects, are likely to bear the brunt of the demand for accommodation, services and supplies. On this basis market demands could inflate costs that may have a negative effect on local communities, particularly the poor, who may be forced to pay higher prices for essential supplies resulting in an escalation of the cost of living in the area. Social services such as medical and educational facilities could also be placed under pressure due to increased demand. Although this may reach its peak during the construction phase it should be mitigated somewhat by the fact that the construction of the various project will be spread across different timelines, with some project commencing while other reach completion. Where numerous projects are entering into construction phase simultaneously, the project companies should engage to align efforts. Employing local people

across the various projects and project phases may also assist in reducing the stress placed on services, supplies and infrastructure in the area.

During the operational phases it is likely that these demands will continue as operational staff take up more long-term residency in the area and are supported by service and maintenance personnel who may spend some time on site on a contractual basis. An influx of temporary maintenance and service workers is likely to last over the operational phase of the projects but is likely to settle within the medium term as the economy adjusts and the municipal authorities are able to respond to this growth.

Table 127: Social Impactcumulative assessment - Service, supplies and infrastructure

Environmental Parameter	**Quality of the living environment**	
Issue/Impact/Environmental Effect/Nature	Service supplies and infrastructure	
Extent	District	
Probability	Definite	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Significant loss of resource	
Duration	Medium term	
Cumulative effect	Medium cumulative impact	
Intensity/magnitude	Medium	
Significance Rating	Medium Negative	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	2	2
Irreplaceable loss	3	2
Duration	2	2
Cumulative effect	3	3
Intensity/magnitude	2	2
Significance rating	**-32 (Medium Negative)**	**-30 (Medium Negative)**
Mitigation measures	▪ Mitigation can only be implemented at a regional level and will need to be driven on a provincial and municipal basis. In this sense the following mitigation measures would need to be considered. ▪ Engage with the municipal authorities to ensure that they are aware of the expansion planned for the area and the possible consequences of this expansion; ▪ Ensure that local labour is recruited in respect of these developments in the area.	

Economic

The cumulative economic impact of the project will be both positive and negative. The negative economic impacts, associated with a possible rise in living costs driven by market demand, are considered under the section above. Under this section the positive economic impacts will be addressed.

From a positive perspective the proliferation of renewable energy facilities within the region is likely to result in significant and positive cumulative impacts in the area in terms of both direct and indirect job creation, skills development, training opportunities, and the creation of business opportunities for local businesses. In this regard it is indicated in the IPPPP Quarterly Report, as at 31 March 2018, that in respect of South Africa as a whole and through the Independent Power Producers Procurement Programme, " .the REIPPPP is targeting broader economic and socio-economic developmental benefits" and that "[t]o date, a total of 35 702 job years have been created for South African citizens, of which 30 763 were in construction and 4 938 in operations" (Independent Power Producer Office, 2018a, p. 36 & 40). In addition to this R 20.6 Billion has been committed to socio-economic development while the projected procurement spend is "…R 147.6 billion of which R 55.5 billion has been spent to date." The district and local municipalities within the area have identified renewable energy as a strategic economic opportunity in a region that previously had few such opportunities. This is indicated in the various IDPs and LEDs pertaining to the affected municipalities.

Table 128: Social Impactcumulative assessment - Economy

Environmental Parameter	**Economic**	
Issue/Impact/Environmental Effect/Nature	Positive economic impacts	
Extent	National	
Probability	Definite	
Reversibility	Barely reversible	
Irreplaceable loss of resources	Significant gain of resource	
Duration	Long term	
Cumulative effect	High cumulative impact	
Intensity/magnitude	Very high	
Significance Rating	Very High Positive	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	4
Probability	4	4
Reversibility	3	3
Irreplaceable gain	3	3
Duration	3	3
Cumulative effect	4	4
Intensity/magnitude	4	4
Significance rating	**84 (Very High Positive)**	**84 (Very High Positive)**

Environmental Parameter	Economic
Mitigation measures	▪ Mitigation can only be implemented at a regional level and will need to be driven on a provincial and municipal basis. In this sense the following mitigation measures would need to be considered. ▪ Implement a training and skills development programme for locals; ▪ Ensure that the procurement policy supports local enterprises; ▪ Establish a social responsibility programme in line with the REIPPPP; ▪ Work closely with the appropriate municipal structures in regard to establishing a social responsibility programme; ▪ Ensure that any trusts or funds are strictly managed in respect of outcomes and funds allocated.

The assessment of the cumulative impacts takes into consideration the impacts associated with wind energy facilities in the area and on this basis no fatal flaws associated with the cumulative impacts are evident at a social level.

7.10 Traffic

To assess the cumulative impact of traffic, it was assumed that all wind farms within 50 km currently proposed and authorized, would be constructed at the same time. This is the precautionary approach as in reality; these projects would be subject to a highly competitive bidding process. Only a handful of projects would be selected to enter into a power purchase agreement with Eskom.

The construction and decommissioning phases of a WEF are the only significant traffic generators. The duration of these phases is short term i.e. the impact of the WEF traffic on the surrounding road network is temporary and WEFs, when operational, do not add any significant traffic to the road network. Even if all wind farms are constructed and decommissioned at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.

Table 129: Impact Rating - Cumulative Impact

Environmental Parameter	Traffic Congestion
Issue/Impact/Environmental Effect/Nature	Transport of equipment, material and staff to site will lead to congestion.
Extent	Local
Probability	Definite
Reversibility	Partly reversible

Environmental Parameter	Traffic Congestion	
Irreplaceable loss of resources	No loss	
Duration	Medium term	
Cumulative effect	High cumulative impact	
Intensity/magnitude	High	
Significance Rating	Negative High impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	3
Reversibility	2	1
Irreplaceable loss	1	1
Duration	2	1
Cumulative effect	4	3
Intensity/magnitude	3	2
Significance rating	**-72 (High Negative)**	**-35 (Medium Negative)**
Mitigation measures	▪ Stagger turbine component removal from site ▪ Reduce the construction period ▪ Staff and general trips should occur outside of peak traffic periods	

Table 130: Cumulative Impact on Air Quality caused by Dust Pollution from traffic on roads

Environmental Parameter	Air quality will be affected by dust pollution
Issue/Impact/Environmental Effect/Nature	*Traffic on roads will generate dust.*
Extent	*Local*
Probability	*Definite*
Reversibility	*Completely reversible*
Irreplaceable loss of resources	*No loss*
Duration	*Short term*
Cumulative effect	*Low cumulative impact*
Intensity/magnitude	*High*

Environmental Parameter	Air quality will be affected by dust pollution	
Significance Rating	*Negative High impact*	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	4	2
Intensity/magnitude	3	2
Significance rating	**-60 (High Negative)**	**-35 (Medium Negative)**
Mitigation measures	▪ *Dust Suppression*	

Table 131: Cumulative Impact of Noise Pollution due to increased traffic on roads

Environmental Parameter	Noise pollution due to increased traffic.	
Issue/Impact/Environmental Effect/Nature	*Traffic on roads will generate noise.*	
Extent	*Local*	
Probability	*Definite*	
Reversibility	*Completely reversible*	
Irreplaceable loss of resources	*No loss*	
Duration	*Short term*	
Cumulative effect	*Low cumulative impact*	
Intensity/magnitude	*High*	
Significance Rating	*Negative Medium impact*	
	Pre-mitigation impact rating	Pre-mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	3	2
Intensity/magnitude	3	3

Environmental Parameter	Noise pollution due to increased traffic.	
Significance rating	**-60 (High Negative)**	**-35 (Medium Negative)**
Mitigation measures	▪ *Stagger turbine component delivery to site* ▪ *Reduce the construction period* ▪ *The use of mobile batch plants and quarries in close proximity to the site* ▪ *Staff and general trips should occur outside of peak traffic periods*	

8 PUBLIC PARTICIPATION PROCESS

Public participation is the cornerstone of any EIA. The principles of NEMA as well as the EIA Regulations govern the EIA process, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment, and ensuring the participation of previously disadvantaged people, women and the youth.

The public participation process is primarily based on two factors.

1. Firstly, ongoing interaction with the environmental specialists and the technical teams in order to achieve integration of technical assessment and public participation throughout.
2. Secondly, to obtain the bulk of the issues to be addressed early on in the process, with the latter half of the process designed to provide environmental and technical evaluation of these issues. These findings are presented to stakeholders for verification that their issues have been captured and for further comment.

Input into the public participation process by members of the public and stakeholders can be given at various stages of the EIA process. Registration on the project can take place at any time during the EIA process up until the final EIA report is submitted to DEA. There are however established periods in which comments are required from Interested and / or Affected Parties (I&APs) in order to ensure that these are captured in time for the submission of the various reports. The comment periods during the EIA Phase will be implemented according to NEMA EIA Regulations, 2014 (as amended) Any I&APs that wish to register as an I&AP or comment on this report are encouraged to contact SiVEST environmental division. The contact details are as follows:

Contact: Hlengiwe Ntuli
PO Box 2921, RIVONIA, 2128
☎ Phone:(011) 798 0600
E-mail:hlengiwen@sivest.co.za or sivest_ppp@sivest.co.za
Fax:(011) 803 7272
Websites:www.sivest.co.za

The EIA Regulations emphasise the importance of public participation. In terms of these regulations, registered interested and/or affected parties –

- may participate in the application process;
- may comment on any written communication submitted to the competent authority by the applicant or environmental consultant;
- must comment within the timeframes as stipulated by the EIA Regulations;
- must send a copy of any comments to the applicant or Environmental Assessment Practitioner (EAP) if the comments were submitted directly to the competent authority; and
- must disclose any direct business, financial, personal or other interests that the person has in the application being granted or refused.

Further, in terms of the EIA Regulations, the EAP:

- manages the application process;
- must be independent;
- must undertake the work objectively – even if this results in views and findings that are not favourable to the applicant;
- must disclose material information that may influence the decision; and
- must conduct a public participation process.

The Section 6-10 below detail the PPP undertaken to date.

8.1 Objectives of Public Participation

An understanding of what the public participation is, and is what it is not, needs to be explored and must be clarified.

- Public Participation is:
    - A communication mechanism to inform I&APs regarding a proposed project.
    - A communication mechanism to record comments and/or concerns raised during the relevant phase of the EIA by I&APs regarding a proposed project.

- Public Participation is not:
    - A marketing exercise.
    - A process to address grievances but rather to record comments raised.
    - One-on-one consultation with each I&AP during the EIA process.

The primary aims of the PPP were:

- To inform I&APs and key stakeholders of the proposed development.
- To initiate meaningful and timeous participation of I&APs.
- To identify issues and concerns of key stakeholders and I&APs with regards to the proposed development.
- To promote transparency and an understanding of the proposed project and its potential environmental impacts.
- To provide information used for decision-making.
- To provide a structure for liaison and communication with I&APs and key stakeholders.
- To assist in identifying potential environmental impacts associated with the proposed development.

- To ensure inclusivity (the views, needs, interests and values of I&APs must be considered in the decision-making process).
- To focus on issues relevant to the project and issues considered important by I&APs and key stakeholders.
- To provide responses to I&AP queries.
- To encourage co-regulation, shared responsibility and a sense of ownership.
- Meet the requirements for PPP as stated in the EIA Regulations section 41.

In addition to the guidance of the PPP in the EIA Regulations, every effort was also made to conform to the requirements of the Promotion of Administrative Justice Act 2000 (Act 3 of 2000).

8.2 Overview of the Public Participation Process to date

The public participation process was initiated in September 2018 with initial landowner consultation and included the following activities to date:

- A site notice (as per regulations) was placed within the study area during a site visit undertaken from the 18th-21th of September 2018. Proof of the site notice is shown in **Appendix 7A** of this report.
- An I&AP database was compiled including all affected landowners, adjacent landowners, occupiers of affected and adjacent land, other potentially interested parties, organs of state and other surrounding project developers. Refer to **Appendix 7F**.
- Contacting all landowners and adjacent landowners to request contact details of the occupiers residing on their land. Refer to **Appendix 7H**.
- Public notification of the EIA process was advertised in the *Noordwester Oewernuus*, a local/regional newspaper, as required under the EIA Regulations, 2014 (as amended. Refer to **Appendix 7C**.
- A Background Information Document was issued in November 2018 (Refer to **Appendix 7B**) along with written notification to all I&APs.
- The DSR was released for public review and comment on the 14th November 2018 and remained in the public domain until 14th December 2018. Refer to **Appendix 7B and 7J**.
- All Organs of State were sent electronic copies (on CD) of the DSR which was made available for review. Reminder notifications of the closing period of the DSR were sent out two days prior to the comment period ending to ensure that comments were received from the Organs of State. Refer to **Appendix 7I**.
- The DSR was available from the Sutherland public library and from *http://data.g7energies.com/eia/rondekop.* Refer to **Appendix 7J**.
- Comments received on the DSR were included in the FSR which was submitted to the DEA on Monday 14 January 2019.
- The DEA subsequently acknowledged the receipt and accepted the FSR and EIA Plan of study on Thursday 29 January 2019.
- An EIA Newsletter was sent out to all I&Aps on 22 February 2019 notifying them of the initiation of the EIA phase of the project. Refer to Appendix 7J
- The DEIAr is available from the Sutherland public library and from *https://ppp.g7energies.com/H492kzl1258.*
- During the DEIAr comment period, the public meeting will be held on the 4th April 2019.

- The stages that typically form part of the public participation process during the Scoping Phase are reflected in Figure 49 below.

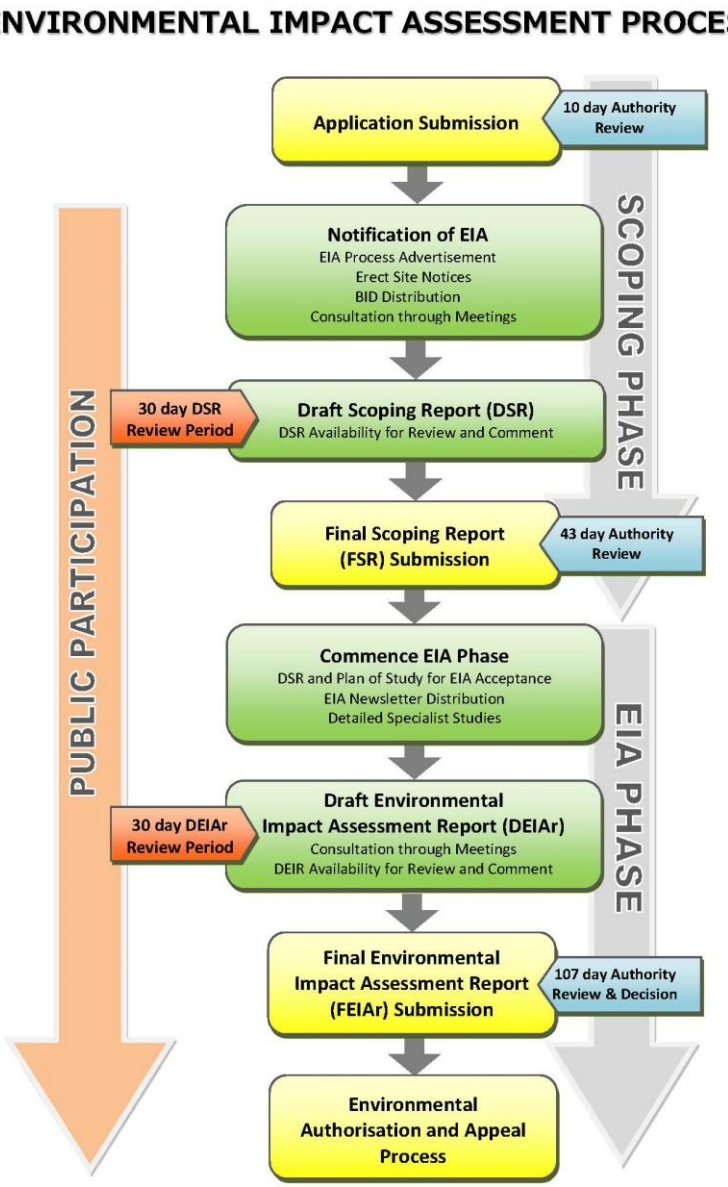

Figure 49: EIA and Public Participation Process

On-going consultation with key stakeholders (e.g. provincial, district and local authorities, relevant government departments, local business etc.) and identified I&APs ensured that I&APs are kept informed regarding the EIA process. Networking with I&APs effectively continued throughout the Scoping Phase of the project until the Final Scoping Report and EIA Plan of Study were submitted to DEA. Where required, stakeholders and I&APs were engaged on an individual basis.

During the scoping assessment, individuals, businesses, institutions and organisations, and the following sectors of society have been identified and were afforded the opportunity to comment (the full stakeholder database list is included in **Appendix 7F**):

- National Authorities;
- Provincial Authorities;
- Karoo Hoogland Local Municipality;
- Namakwa District Municipality;
- Government Structures such as SAHRA, SANRAL, Eskom Telkom, etc.;
- Agriculture Associations;
- Environmental bodies / NGOs;
- Department of Environmental Affairs: Biodiversity and Conservation;
- Department of Water and Sanitation;
- Community representatives, CBOs, development bodies;
- Landowners;
- I&APs;
- Civil Aviation Authority (CAA);
- South African Large Telescope;
- Square Kilometre Array
- All telecommunication service providers; and
- Air Traffic and Navigation Services (ATNS).

8.3 Landowner Consent and Notification

Regulation 39 (1) of the EIA Regulations (as amended) states that "*if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land*".

Regulation 39 (2) of the 2014 NEMA EIA Regulations (as amended) further states that "*sub-regulation (1) does not apply in respect of: (a) linear activities; (b) activities constituting, or activities directly related to prospecting or exploration of a mineral and petroleum resource or extraction and primary processing of a mineral or petroleum resource; and (c) strategic integrated projects as contemplated in the Infrastructure Development Act, 2014*".

The majority of the proposed Rondekop WEF project constitutes a non-linear activity, and landowner consent is therefore required for the following land portions:

Table 132: Land portions where consents for the EIA process to occur was obtained**.**

FARM DESCRIPTION	21 DIGIT SURVEYOR GENERAL CODE
Ashoek No 224	C07200000000022400000
Remainder of Bloem Fontein No 192	C07200000000019200000
Portion 1 of Bloem Fontein No 192	C07200000000019200001
Portion 1 of Lange Huis 174	C07200000000017400001
Remainder of Hout Hoek No 191	C07200000000019100000
Remainder of Roodeheuvel No 170	C07200000000017000000
Portion 1 of Roodeheuvel No 170	C07200000000017000001
Portion 1 of Urias Gat No 193	C07200000000019300001

FARM DESCRIPTION	21 DIGIT SURVEYOR GENERAL CODE
Portion 2 of Urias Gat No 193	C07200000000019300002
Remainder of Vinke Kuil 171	C07200000000017100000
Remainder of Venters Kraal No 166	C07200000000016600000
Portion 1 of Venters Kraal No 166	C07200000000016600001
Portion 3 of Venters Kraal No 166	C07200000000016600003
Remainder of Wind Heuvel No 190	C07200000000019000000
Portion 1 of Wind Heuvel No 190	C07200000000019000001
Remainder of Zeekoegat No 169	C07200000000016900000
Remainder of Farm 220	C07200000000022000000

The landowners of the above farm portions, on which the Rondekop WEF is proposed have been notified. The notification has been included as **Appendix 7H**.

In terms of the Chapter 6 Section 39 of the NEMA EIA Regulations, 2014(as amended), notification of directly adjacent landowners and occupiers is required. As a result, the Landowners and adjacent landowners were notified of the proposed development. Please refer to **Appendix 7H** for proof of this correspondence. Additionally, all landowners and adjacent landowners were approached in order to determine the best method to notify the occupiers of each property**. Table 133** below show the method in which the landowners were contacted and those landowners that responded. Landowners who had not responded in the Scoping Phase were contacted during the EIA phase in an effort to notify the occupiers.

Table 133: shows the Occupier database

Landowners and Neighbours				Occupier Details Requested	Method of Contact			Date	Landowner Response			Followed up in EIA Phase: Method of Contact			Date
Landowner / Neighbour	ERF	Farm Name	Contact Name		Phone	Email	Registered Post		No Occupiers	Landowner will Notify / Occupiers Unreachable	Details Provided	Phone	Email	Registered Post	
Landowner	2/156	Gats Rivier	Spitskop Trust	✓	✓	✓		31-Oct-18	✓	.		✓	✓		22-Feb- 2019
Landowner	224	Ashoek	Nicolaas Paulsen	✓	✓	✓		31-Oct-18	✓	.		✓	✓		22-Feb- 2019
Landowner	1/166	Venters Kraal	Magritha Susanna Steenkamp	✓	✓	✓		31-Oct-18	✓	.		✓	✓		22-Feb- 2019
Landowner	3/166	Venters Kraal	Elias Nel Basson	✓	✓	✓		16-Oct-18	.	✓		✓	✓		22-Feb- 2019
Landowner	RE/166	Venters Kraal	Elias Nel Basson	✓		✓		16-Oct-18		✓		✓	✓		22-Feb- 2019
Neighbour	RE/175	Wagen Drift	Abraham Gericke Du Plessis	✓		✓		11-Nov-18		✓		✓	✓		22-Feb- 2019
Landowner	169	Zeekoegat	Moneyflow Six Pty Ltd	✓		✓		11-Nov-18		✓		✓	✓		22-Feb- 2019
Neighbour	2/192	Bloem Fontein	JohannaMaria Caldo	✓			✓	08-Nov-18				✓	✓		22-Feb- 2019
Neighbour	1/161	Tanqua Rivier	Hendrik Albertus Engelbrecht	✓		✓	✓	08-Nov-18				✓	✓		22-Feb- 2019
Neighbour	2/80	Thyskraal	De Compagnie Wynlandgoed Pty Ltd	✓			✓	08-Nov-18				✓	✓		22-Feb- 2019
Neighbour	RE/173	Kraai Rivier	Jannie du Plessis	✓			✓	08-Nov-18				✓	✓		22-Feb- 2019
Neighbour	1/168	De Goede Hoop	Merwe Nicolaas Meiring Van Der	✓		✓	✓	08-Nov-18				✓	✓		22-Feb- 2019
Neighbour	1/173	Kraai Rivier	Coetzee Aletta Susanna	✓		✓		08-Nov-18		✓	✓	✓	✓		22-Feb- 2019
Neighbour	2/173	Kraai Rivier	Steenkamp Familie Trust	✓		✓	✓	09-Nov-18				✓	✓		22-Feb- 2019
Neighbour	RE/189	Kranskraal	Cloete Family Trust	✓		✓		09-Nov-18				✓	✓		22-Feb- 2019
Neighbour	3/193	Urias Gat	Keuler	✓	✓			02-Nov-18	✓			✓	✓		22-Feb- 2019
Neighbour	187	Roode Wal	Virginia Trust/cardian Familietrust	✓		✓		08-Nov-18				✓	✓		22-Feb- 2019
Landowner	RE/191	Hout Hoek	Elizna Reynolds	✓		✓		08-Nov-18				✓	✓		22-Feb- 2019
Landowner	2/193	Urias Gat	Johan Le Roux	✓		✓		08-Nov-18	✓	✓		✓	✓		22-Feb- 2019
Landowner	1/193	Urias Gat	Johan Le Roux	✓		✓		08-Nov-18				✓	✓		22-Feb- 2019
Neighbour	RE/193	Urias Gat	Johan Le Roux	✓		✓		08-Nov-18				✓	✓		22-Feb- 2019
Neighbour	RE/158	Amandelboom	Frans Du Toit Trust										✓		26- Feb- 2019
Landowner	RE/174	Lange Huis	Plessis Carel Aaron Du	✓		✓		08-Nov-18				✓	✓		22-Feb- 2019
Landowner	1/192	Bloem Fontein	Koedoesfontein Trust	✓		✓	✓	18-Oct-18				✓	✓		22-Feb- 2019
Neighbour	4/193	Urias Gat	Koedoesfontein Trust	✓		✓		18-Oct-18				✓	✓		22-Feb- 2019
landowner	1/158	Amandelboom	Koedoesfontein Trust	✓		✓		18-Oct-18				✓	✓		22-Feb- 2019
neighbour	6/193	Urias Gat	De List Trust	✓		✓		08-Nov-18				✓	✓		22-Feb- 2019
Landowner	1/190	Wind Heuvel	De List Trust	✓		✓		08-Nov-18				✓	✓		22-Feb- 2019
Neighbour	5/193	Urias Gat	De List Trust	✓		✓		08-Nov-18				✓	✓		22-Feb- 2019
Landowner	RE/192	Bloem Fontein	Kobus Fourie	✓			✓	12-Oct-18	✓			✓	✓		22-Feb- 2019
Landowner	RE/170	Roodeheuvel	Eduard Jacobus Petrus Esterhuyse	✓		✓		31-Oct-18				✓	✓		22-Feb- 2019
Landowner	1/170	Roodeheuvel	Eduard Jacobus Petrus Esterhuyse	✓		✓		31-Oct-18				✓	✓		22-Feb- 2019
Landowner	RE/171	Vinke Kuil	Tuinplaas Trust	✓		✓		17-Oct-18				✓	✓		22-Feb- 2019
Landowner	RE/220	FARM 220	T T Paulsen Trust	✓				16-Oct-18				✓	✓		22-Feb- 2019
Landowner	RE/167	Waterval	Jacobus Lodewikus Theron	✓		✓		08-Nov-18				✓	✓		22-Feb- 2019
Neighbour	RE/161	Tanqua Rivier	Jacobus Lodewikus Theron	✓		✓		08-Nov-18				✓	✓		22-Feb- 2019
Neighbour	215	Klappieshoek	Welbedacht Trust	✓										✓	12-Mar- 2019
Neighbour	RE/78	Kook Fontein	David Gerdarhus Malherbe	✓			✓	08-Nov-18				✓	✓		22-Feb- 2019

Landowners and Neighbours				Occupier Details Requested	Method of Contact			Date	Landowner Response			Followed up in EIA Phase: Method of Contact			Date
Landowner / Neighbour	ERF	Farm Name	Contact Name		Phone	Email	Registered Post		No Occupiers	Landowner will Notify / Occupiers Unreachable	Details Provided	Phone	Email	Registered Post	
Neighbour	1/78	Kook Fontein	Wydekloof Boerdery Pty Ltd	✓			✓	08-Nov-18				✓	✓		22-Feb- 2019
Neighbour	1/188	Brakwater	Ronel Trust			✓		08-Nov-18				✓	✓		22-Feb- 2019

8.4 Comments Received during the Scoping Phase

All comments and recommendations made by stakeholders and I&APs during the scoping phase and submitted as part of the FSR have been taken into consideration when preparing the DEIAr.

Issues, comments and concerns raised during the public participation process to date have been captured in the Comments and Response Report (C&RR) which is included in **Appendix 7E** of the DEIR. This C&RR provides a summary of the issues raised, as well as responses provided to I&APs. This information will be used to feed into the evaluation of social impacts. The C&RR will be further updated with comments raised during the DEIAr 30-day comment period.

8.4.1 *Summary of comments received*

Table 134: Summary of Comments received to date

I&AP	Date received	Summary of comments
ESKOM	15-11-2018	Eskom requirements for works at or near Eskom infrastructure for consideration during the EIA process. Requested additional information which was provided.
SENTECH	13-11-2018	SENTECH provided a letter of no objection to the proposed development
ANSD	18-12-2018	Air Navigation Services Department require a more detailed investigation to determine if the proposed wind farm will have an impact on the Sutherland Navigation Beacon (VOR SLV) & the Sutherland Radar.
ATNS	19-11-2018	The proposed project falls outside the Annex14 surfaces associated with Cape Town International Airport and Langebaanweg Military Airport. However, it needs to be determined whether the proposed project will affect the safety of flights. Air Traffic Navigation Services said to contact the Langebaanweg Military Airport due to the proximity between the Airport and proposed WEF. **The applicant submitted a formal application to the CAA.**
SARAO	21-11-2018	The South African Radio Astronomy Observatory (SARAO) do not anticipate any negative impact on the SKA and have no objection to the project at this current stage. However, SARAO advise SiVEST to also contact the South African Astronomy Observatory as there may be risks to the South African Large Telescope in the Sutherland. SARAO also advised SiVEST to ensure that the electromagnetic emissions of the facility do not exceed the limits as prescribed in the latest edition of the CISPR standards. In addition, all wireless communication should comply with the Regulations on the Protection of the Karoo Central Astronomy Advantage Area as published.

I&AP	Date received	Summary of comments
DAFF	27-12-2018	The affected vegetation types are Koedoesberg-Moordenaars Karoo and Central Mountain Shale Renosterveld. The study site falls in Critical Biodiversity Area (CBA) 1 and 2 and most of the northern half is mapped as an Ecological Support Area (ESA), therefore comments must be obtained from the provincial Department of Environment and Nature Conservation (DENC). The report confirmed that only one NFA listed protected tree species has a geographical distribution in close vicinity to the study area, namely *Podocarpus latifolius*, but this species does not occur near the site. The report stated that no protected tree species were found or are likely to occur in the site. The only tree species associated with the riparian vegetation is *Vachellia karroo*, which is indigenous, but not protected. The proposed development is therefore unlikely to have any impacts on NFA listed protected tree species and therefore this Department has no objection and no further comments about the proposed development.
WESSA	12-12-2018	WESSA will not be submitting a comment on the Rondekop WEF application.
SACAA	14-12-2018	Due to the proximity of the site relative to the Sutherland Navigation Beacon (VOR SLV) & the Sutherland Radar, a more detailed investigation is required to determine if the proposed wind farm will have an impact on these aviation safety critical navigation systems. It is noted that CAA will provide an official response by 11 January 2019 following a more detailed investigation to determine if the proposed wind farm will have an impact on the aviation safety critical navigation systems mentioned. At the time of printing no comments had been received, nor have any been received to date.

I&AP	Date received	Summary of comments
DEA - Biodiversity Conservation	14-12-2018	The Directorate: Biodiversity Conservation has reviewed and evaluated the DSR and the relevant specialist's studies. The following recommendations must be included in the Final Scoping Report (FSR): ▪ A detailed site Rehabilitation Plan, ▪ plant species of conservation concern (SCC) which are protected are identified in the study area, ▪ Search and Rescue Plan must be compiled by a qualified ecologist and submitted for review, ▪ An alien invasive species eradication plan, ▪ Pre-Construction Bird and Bat Monitoring Program should be conducted so as to inform the EIA, permits are required to destroy plant species that are provincially protected by the Northern Cape Nature Conservation Act, (Act No. 9 of 2009) and one protected according National Environmental Management: Biodiversity Act (Act No 10. Of 2004) be obtained from the relevant Authorities, ▪ Environmental Management Programme (EMPr) to be submitted as part of the final Scoping Report, ▪ any Provincial Biodiversity Conservation Plan or guideline should be included in the report.
DEA	07-12-2018	The application form and the draft Scoping Report (SR) received by the Department on 14 November 2018. The Department required rewording of the description of the project listed activities applied for as well as general reminders of the legislative requirements of the FSR going forward.
DEA	29-01-2019	The Scoping Report (SR) and Plan of Study for Environmental Impact Assessment (PoSEIA) received by the Department on 15 January 2019 was accepted. The Department required clarity on the project listed activities applied for, clarity on specialist studies undertaken as well as general reminders of the legislative requirements of the DEIR going forward.
SAHRA	19-12-2018	SAHRA's comments and letter of no objections of the proposed Rondekop WEF are duly noted. The conditions of the no objections have been forwarded to Rondekop Wind Farm (Pty) Ltd, who will adhere to all terms and conditions provided by SAHRA during the pre-construction, construction, operation and decommissioning phases of the project. Recommendations provided in the report include the following: ▪ A 20 m buffer should be applied to all Stone Age find spots and sites;

I&AP	Date received	Summary of comments
		▪ A 50 m buffer should be applied to all monuments, colonial buildings and stone walled kraals; ▪ The Environmental Control Officer (ECO) must be provided the location of the heritage sites and these must be monitored during excavations; ▪ An archaeological walk down of the final approved layout will be required before construction commences; ▪ Any heritage features of significance identified during this walk down will require formal mitigation or where possible a slight change in design could accommodate such resources; ▪ A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations; and ▪ A chance finds protocol must be developed that must include the procedure to follow regarding work stoppage, site protection and evaluation and informing SAHRA of such finds and a final process of mitigation implementation. ▪ Monitoring of major excavations (deeper than 1 m) for fossil material by the ECO on an on-going basis during construction phase; ▪ Significant fossil finds to be reported to SAHRA for recording and sampling by a professional palaeontologist; and ▪ A Chance Finds procedure must be followed.
Western Cape Government	15-01-2019	As the application does not fall within the Western Cape, the Department does not require further communication regarding the status of the application.
Building Energy	20-12-2018	Representatives from Building Energy requested to be registered as an Interested and Affected Party for the proposed wind farm(s).
ACED	12-11-2018	Representatives from African Clean Energy Developments (ACED) requested to be registered as an Interested and Affected Party for the proposed wind farm(s).
BIOTHERM	13-11-2018	Representatives BioTherm Energy (Pty) Ltd requested to be registered as an Interested and Affected Party for the proposed wind farm(s).

8.5 Stakeholders and I&APs

In line with Regulation 41 (2) (b) of GN R326 and prior to the commencement of the scoping and EIA Process (and advertising the EIA Process in the local print media), an initial database of I&APs (including key stakeholders and Organs of State) was developed for the scoping and EIA Process. This was supplemented with input from the Applicant as well as the EAPs experience. **Appendix 7F** of this contains a detailed copy of the I&AP database, key stakeholders and all I&APs that have been added to the project database.

In line with Regulation 41 (2) (b) of the 2014 NEMA EIA Regulations, the database includes the details of the following:

- Landowners of the affected farm portions;
- Landowners of the neighbouring adjacent farm portions;
- Contact details of known occupiers of the affected farm portions and neighbouring adjacent farm portions (Refer to **Appendix 7H**);
- The municipal councilors of the wards in which the proposed project will be undertaken;
- The municipalities which have jurisdiction in the areas (i.e. the Karoo Hoogland Local Municipality and the Namakwa District Municipality);
- Relevant Organs of State that have jurisdiction in respect of any aspect of the activity; and
- Any other party as required by the DEA.

The above-mentioned stakeholders, Organs of State and I&APs have accordingly received written notification of the commencement of the EIA process. Refer to Appendix **7B and 7I**.

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

- Provincial and Local Government Departments;
- Local interest groups, for example, Councilors and Rate Payers associations;
- Surrounding landowners;
- Farmer Organisations;
- Environmental Groups and Non-Government Organisations (NGOs); and
- Grassroots communities and structures.

8.6 Proof of Notification

Appendix 7 includes all proof of notification of I&APs to date. More specifically, the types of proofs are as follows:

- Site notice text (**Appendix 7A**);
- Photographs of site notice (**Appendix 7A**);
- Background Information Document (**Appendix 7B**);

- Proof of advertisement in the newspaper (**Appendix 7C**);
- Notification to landowners and occupiers of affected and neighbouring adjacent farm portions (**Appendix 7D**);
- Notification to Organs of State (**Appendix 7I**);
- Notification of DSR Comment Period Commencing and ending (**Appendix 7B**);
- Notification of FSR Submitted to DEA (**Appendix 7I**);
- Notification of DEA Acceptance of FSR (**Appendix 4**);
- EIA Newsletter (**Appendix 7E**); and

8.7 Public Meeting / Open Day

During the review period of the Environmental Impact Assessment Report (DEIAr), meetings will be undertaken to present the proposed development to the public and solicit comments. Up to two (2) Public/Focus Group Meetings will be undertaken during the EIA Phase. Following all meetings, minutes will be compiled and forwarded to all attendees for their review and comment. The primary aim of these meetings is to:

- disseminate information regarding the proposed development to I&APs;
- provide I&APs with an opportunity to interact with the EIA team and the representatives from the Applicant present;
- supply more information regarding the EIA process;
- answer questions regarding the project and the EIA process; and
- receive input regarding the public participation process and the proposed development.

A Public Meeting (PM) will be held during the review of the DEIAr as follows:
Table 135: Venues where the DEIAr Public Meeting (PM) will be held

DATE	TIME	MEETING TYPE	VENUE
4 April 2019	6pm	Public Meeting	Sutherland NG Kerk

**Please note that the dates, times and venues for the Public Meeting / Open Day still need to be confirmed. Notifications will be sent to all I&APS and Stakeholders in order to provide details of the above-mentioned Public Meeting / Open Day once this has been confirmed.*

Invitation letters were sent out via sms, post and e-mail to all registered I&APs on the project's database.

The Public Meeting will be held in order to provide I&APs with information regarding the proposed development, present the EIA phase environmental findings and invite I&APs to raise any further comments and/or concerns that they may have.

Draft minutes of the PM will be compiled and forwarded to all attendees for their review and comment. Minutes of the meetings will be included in **Appendix 7G** in the FEIAr.

8.8 Public Review of Draft Environmental Impact Assessment Report

The DEIAr will be made available for review from **Wednesday 20 March 2019 to Wednesday 24 April 2019** at the following venue for a period of 30 calendar days, excluding public holidays:

Table 136: Venues where the DEIAr will be publicly available

VENUE	STREET ADDRESS	HOURS	CONTACT NO
Sutherland Library	Sarel Cilliers Street, Sutherland	Mondays- Fridays 08h00 – 13h00 14h00 – 17h00	023 571 1429

All comments received on this report will be incorporated into the updated Comments and Response Report (C&RR), which will be attached to the FEIAr as **Appendix 7E**.

8.9 Review of the Draft Scoping Report by Organs of State

In terms of section 40 (2) of the EIA Regulations, public participation must include consultation with all organs of state which have jurisdiction in respect of the activity to which the application relates.

Table 137 below includes all the organs of state who were e-mailed the DSR and sent electronic copies (on CD) of the full report including all appendices. Telephonic follow-up with stakeholders was done through the review period in order to provide them with ample opportunity to comment during the DSR comment period. All the below Organs of State will be provided with an opportunity to comment on the DEIAr

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
KAROO HOOGLAND LOCAL MUNICIPALITY						
Mr	Gibbsons	Allistar	Community Service Manager	PO Box 44 6835	a.gibbons@karoohoogland.gov.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Mr Gibbons for comment via telephone on the 13 December 2018 before 14 December 2018 to no avail. **EIA Phase** Access to an electronic copy of the report will be made available
NAMAKWA DISTRICT MUNICIPALITY						

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
Mr	Loubser	Jannie	Manager: Planning	Private Bag X20 Springbok 8240	janniel@namakwa-dm.gov.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Mr Loubser for comment via telephone on the 13 December 2018 before 14 December 2018 to no avail. However he is only back by 14/1/2019. No one else was able to assist as most people are on leave and closed on the 14 December 2018. **EIA Phase** Access to an electronic copy of the report will be made available
ATNS						
Mr	de Lange	Phillip	Manager of Western and Northern Cape	Private Bag X15 Kempton Park 1620	phillip@atns.co.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Attempts were made to contact Mr de Lange for comment before 14 December 2018. Messages were left at his land line and cell phone numbers. Could not be reached by telephone on 13/12 and 14/12 **EIA Phase** Access to an electronic copy of the report will be made available

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
Mr	Smit	Ferdi	System Specialist Radar | Technical Services. CT International Airport	Private Bag X15 Kempton Park 1620	ferdis@atns.co.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Comment was received 19/11/2018 and 21/11/2018 **EIA Phase** Access to an electronic copy of the report will be made available
Ms	Simphiwe	Masilela	Obstacle Evaluator	Private Bag X15 Kempton Park 1620	ObstacleEvaluators@atns.co.za	
Ms	Johanna	Morobane	Manager	Private Bag X15 KEMPTON PARK 1620	JohannaM@atns.co.za	
SOUTH AFRICAN WEATHER SERVICE						

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
Ms	Boshielo	Nelly	South African Weather Service	Private Bag X097 Pretoria 1	Nelly.Boshielo@weathersa.co.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact. Ms Boshielo for comment via telephone on the 13 and 14 December 2018 to no avail. **EIA Phase** Access to an electronic copy of the report will be made available
SENTECH						
Mr	Koegelenberg	Johan	Broadcast Coverage Planner: RF Networks	Private Bag X06 Honeydew 2040	koegelenbergj@sentech.co.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Comments received 13/11/2018, 6/12/2018 and 14/12/2018 **EIA Phase** Access to an electronic copy of the report will be made available
Mr	Creese	Frank	Senior TCC Manager: Operations and Maintenance (Western Region)	Private Bag X06 Honeydew 2040	creesef@sentech.co.za	
Ms	Pretorius	Alishea	Site Acquisition and Environmental Specialist	Private Bag X06 Honeydew 2040	pretoriusa@sentech.co.za	

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
ESKOM						
Mr	Crous	Andre	Eskom Telecommunications	10 Jan Smuts Drive Pinelands 7404	andre.crous@eskom.co.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Comments received 15/11/2018 **EIA Phase** Access to an electronic copy of the report will be made available
Mr	Geeringh	John	Chief Planner	PO Box 1091 Johannesburg 2000	GeerinJH@eskom.co.za	
DEPARTMENT OF ENVIRONMENTAL AFFAIRS BIODIVERSITY						
Mr	Lekota	Seoka		Private Bag X447 Pretoria 1	slekota@environment.gov.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Comments received 14/12/2018 **EIA Phase** Access to an electronic copy of the report will be made available
Mr	Tshitwamulomoni	Stanley	Acting Director: Biodiversity Conservation	Private Bag X447 Pretoria 1	Tshitwamulomonis@environment.gov.za	
Ms	Musemburi	Constance	Assessing Officer	Private Bag X447 Pretoria 1	Musemburic@environment.gov.za	
Ms	Rabothata	Mmatlala		Private Bag X447 Pretoria 1	slekotamrabothata@environment.gov.za	
AGRI SA-NORTHERN CAPE						
Mr	Myburg	Henning	General Manager	PO Box 1094 Kimberley 8300	henning@agrink.co.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
						contact Mr Myburg for comment via telephone on the 13 and 14 December 2018 no avail. **EIA Phase** Access to an electronic copy of the report will be made available
DEPARTMENT OF WATER AND SANITATION						
Ms	Makungo	Ester	Environmental Officer	Private Bag X6101 Kimberley 8300	makungoe@dws.gov.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Mr Makungo and Mr Mahunonyane for comment via telephone on the 13 and 14 December 2018 no avail. **EIA Phase** Access to an electronic copy of the report will be made available
Mr	Mahunonyane	Moses	Director: Institutional Establishment	Private Bag X6101 Kimberley 8300	MahunonyaneM@dws.gov.za	
NORTHERN CAPE DEPARTMENT OF AGRICULTURE, LAND REFORM & RURAL DEVELOPMENT						
Mr	Alexander	Cloete		P.O.Box 65 Calvinia 8190	acloete@ncpg.gov.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Mr Steenkamp for comment via telephone on the 13 and 14 December 2018 no avail. However Mr Daniel Mitot indicated that Gert is no longer with the Department and Alexander Cloete is the correct person but he is on leave and will only be back on the 14th of January. · **EIA Phase**

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
						Access to an electronic copy of the report will be made available
DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES						
Northern Cape Department						
Ms	Mans	Jacoline	Chief Forester	Koelenhof 306 Schroder Street Upington, 8800	jacolinema@daff.gov.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Comments received 27/11/2018 **EIA Phase** Access to an electronic copy of the report will be made available
Provincial Department						
Ms	Buthelezi	Thoko	AgriLand Liaison	Private Bag X120 Pretoria 0001	ThokoB@daff.gov.co.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Mr Avenant for comment via telephone on the 13 and 14 December 2018 no avail. **EIA Phase** Access to an electronic copy of the report will be email to Ms Buthelezi and Ms Marubini going forward.
Ms	Mashudu	Marubini	Delegate of the Minister	Private Bag X120 Pretoria 0001	MashuduM@daff.gov.co.za	
DEPARTMENT OF MINERAL RESOURCES (DMR)						
Mr	Ravhogoni	Ntsundeni	Regional Manager	Private Bag x6093 Kimberley 8300	Ntsundeni.Ravhogoni@dmr.gov.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
						December 2018. Mr Ravhogni is on leave and will only be back the week of the 21st of January. **EIA Phase** Access to an electronic copy of the report will be made available
NORTHERN CAPE DEPT OF ENVIRONMENT AND NATURE CONSERVATION						
Mr	Fisher	Brian	Director Environmental Impact Management	Private Bag X86102 Kimberley 8300	bfisher@ncpg.gov.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Mr Fisher and Mr Mthombeni for comment via telephone on the 13.December 2018. Mr Mthombeni was reached on the 14th and he said he does not have the report and that someone else in the department may have it. The Department was closed to the 2nd of January. A follow up email was sent on the 8th January 2019 but no response has been received. **EIA Phase** Access to an electronic copy of the report will be made available
Mr	Mthombeni	Thulani		Private Bag X86102 Kimberley 8300	tmthombeni@ncpg.gov.za	
NORTHERN CAPE DEPT OF SPORT, ARTS & CULTURE: Heritage Resources Unit						
Mr	Lenyibi	Patrick	Manager: Heritage Resources	Private Bag X5004 Kimberley 8300	plenyibi@ncpg.gov.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Mr Lenyibi for comment via telephone on the 13 and 14 December 2018 no avail. **EIA Phase**

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
						Access to an electronic copy of the report will be made available
SANRAL - WESTERN REGION						
Ms	Abrahams	Nicole	Environmental Coordinator	Private Bag X19 7535	abrahamsn@nra.co.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Ms Abrahams for comment via telephone on the 13 and 14 December 2018 no avail. **EIA Phase** Access to an electronic copy of the report will be made available
NORTHERN CAPE DEPARTMENT OF ROADS AND PUBLIC WORKS						
Mr	Roelofse	Jaco	Director: Planning & Design	PO Box 3132 Kimberley 8300	roelofse.j@vodamail.co.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Mr Roelofse for comment via telephone on the 13 and 14 December 2018 no avail. **EIA Phase** Access to an electronic copy of the report will be made available
SAHRA: HEAD OFFICE						

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
Ms	Higgitt	Natasha	Heritage Officer: Northern Cape	PO Box 4637 Cape Town 8000	nhiggitt@sahra.org.za	Loaded to SAHRIS - 14 November 2018. Comments received 19 December 2018.
SQUARE KILOMETRE ARRAY						
Dr	Tiplady	Adriaan	Manager: Site Categorisation	PO Box 522 Saxonwold 2132	atiplady@ska.ac.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Dr Tiplady for comment via telephone on the 13 and 14 December 2018 no avail. **EIA Phase** Access to an electronic copy of the report will be made available
SA CIVIL AVIATION AUTHORITY (SA CAA)						
Mr	Kleynhans	Werner	PANS-OPS Manager	Private Bag X73 Halfway House 1684	strohl@caa.co.za	Comment Received 14/12/2018 It is noted that CAA will provide an official response by 11 January 2019 following a more detailed investigation to determine if the proposed wind farm will have an impact on the aviation safety critical navigation systems
Ms	Stoh	Lizell	Obstacle Specialist	Private Bag X73 Halfway House 1685	kleynhansw@caa.co.za	
TRANSNET FREIGHT RAIL						

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
Mr	Fiff	Sam	Environmental Manager: Freight Rail	PO Box 255 Bloemfontein 9300	sam.fiff@transnet.net	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Mr Fiff for comment via telephone on the 13 and 14 December 2018 no avail. **EIA Phase** Access to an electronic copy of the report will be made available
TELKOM						
Ms	Ihlaam	Peters		10 Jan Smuts Drive Pinelands 7404	ihlaamp@telkom.co.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Mr Thurling, Ms Bester and Ms van den Heever for comment via telephone on the 13 and 14 December 2018 no avail. **EIA Phase** Access to an electronic copy of the report will be made available
Ms	Bester	Amanda	Wayleave Officer	Private Bag X20700 Bloemfontein 9300	WayleaCR@telkom.co.za BesterAD@telkom.co.za	
Ms	van den Heever	Heleen	Ops Manager Central Region	Private Bag X20700 Bloemfontein 9300	vdheevhd@telkom.co.za	
ENDANGERED WILDLIFE TRUST						

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA) FOR THE PROPOSED 325MW RONDEKOP WIND ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND IN THE NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT SCOPING REPORT (DSR) & DRAFT ENVIRONMENTAL IMAPCT ASSESSMENT REPORT (DEIAR) TO ORGANS OF STATE FOR COMMENT						
TITLE	**NAME**	**SURNAME**	**POSITION**	**POSTAL ADDRESS**	**EMAIL ADDRESS**	**RESPONSE / RECEIPT OF COMMENTS**
Mr	Leeuwner	Lourens	Renewable Energy Project Manager	Private Bag X11, Modderfontein, 1609, Johannesburg	lourensl@ewt.org.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Mr Leeuwner for comment via telephone on the 13 and 14 December 2018 no avail. **EIA Phase** Access to an electronic copy of the report will be made available
WESSA						
Mr	Griffiths	Morgan	Environmental Governance Programme Manager	PO Box 12444, Centrahil, Port Elizabeth, 6006, South Africa	morgan.griffiths@wessa.co.za	Email received on 12 December stating that WESSA will not be submitting comments.
BIRDLIFE SOUTH AFRICA						
Ms	Stevens	Candice	Policy Manager	PO Box 515 Randburg 2125	advocacy@birdlife.org.za	**Scoping Phase** Access to an electronic copy of the report was emailed on 14 November 2018. Reminder of the DSR comment period ending was sent out on the 12th of December 2018. Attempts were thereafter made to contact Ms Ralston for comment via telephone on the 13 and 14 December 2018 no avail. **EIA Phase** Access to an electronic copy of the report will be made available
Ms	Ralston	Samantha		PO Box 515 Randburg 2125	energy@birdlife.org.za	

9 LAYOUT ALTERNATIVES

One of the aims of the Scoping Report was to identify alternatives to carry through to the EIA phase of the investigation for detailed assessment (as was discussed in **Section 1**). The selection of alternatives during the Scoping Phase helped to focus future investigations, both in terms of the environmental investigations required and the scope of the public participation process. All of the environmental specialists assessed (excluding bird and bats) the site during the scoping phase. Their assessments focussed on the proposed development site and included the identification of sensitive areas. These sensitive areas were used during the Scoping Phase to perform a preliminary comparison of layout alternatives. These layouts have been further investigated in the EIA phase of the project. The design and layout alternatives include; access road, construction camp and substation alternatives.

It should be noted that the layout alternatives for the EIA phase were based on both environmental constraints and design factors. The findings of the specialist studies and sensitivity mapping has been used to inform the layout of the proposed facility within the preferred site during the EIA phase.

9.1 Description and comparative Assessment of Alternatives

Due to anticipated advances in technology the 48 turbines will now be between 3MW and up to 8MW however the overall generation capacity of the facility will not change, nor will the hub height and rotor diameter of the individual turbines.

Table 138: Summary of Technical Details

PROJECT	TECHNICAL DETAILS	
Rondekop Wind Energy Facility	Turbines	▪ Up to 48 turbines (between 3MW and *up to* 8MW in nameplate capacity) ▪ Hub height: between 90 m and up to 140 m ▪ Rotor diameter: between 100 m and up to 180m ▪ Crane pad (90m x 50m) ▪ Foundation of 30m diameter and up to 5 m in depth ▪ Total footprint up to ~ 25 ha
	Access roads	▪ Up to 12m wide ▪ Total footprint up to ~ 73,2 ha of which ~39 ha is upgrading existing roads ▪ Six (6) alternatives, 2 per ridge; preference for Three (3) access roads, 1 per ridge
	Substation	▪ One (1) 33/132kV substation ▪ Total footprint ~2,25ha ▪ Six (6) alternatives
	Construction camp	▪ One (1) construction camp for use during construction phase ▪ Offices and other buildings for use during operational phase ▪ ~ 13 ha

PROJECT	TECHNICAL DETAILS	
		▪ Fences around construction camp will be ~ 6 m high ▪ Six (6) alternatives
	Electrical infrastructure	▪ Electrical transformers (690V/33kV) adjacent to each turbine (typical footprint of 2 m x 2 m but can be up to 10 m x 10 m at certain locations) to step up the voltage to 33kV. ▪ Underground 33kV cabling between turbines buried along access roads, where feasible, with overhead 33kV lines grouping turbines to crossing valleys and ridges outside of the road footprints to get to the onsite 33/132kV substation.
	Masts	▪ Up to 4 (the height will be the same as the final wind turbine hub height) wind measuring lattice masts

During the Scoping Phase all of the environmental specialists (excluding bird and bat) assessed the entire site of the proposed development and identified sensitive areas.

9.2 Layout Amendment

The majority of the studies undertaken during the scoping phase were conducted at an EIA level and as such included ground truthing verification of the proposed development site. The avifauna and bat studies have each been undertaken over a 12-month period, while an intensive Terrestrial ecology study was undertaken to further identify and define environmental constraints within the proposed development footprint. Based on the findings of the Terrestrial, Avifauna and Bat specialist assessments, the initial proposed WEF layout and associated infrastructure that was presented in the DSR and FSR was refined to further avoid environmental sensitivities.

The proposed changes as a result of the refined Terrestrial Ecology, Avifauna and Bat Assessment are addressed below and changes depicted in **Figure 54**, **Figure 50 and Figure 51** (Initial layout and initial sensitivity maps) and **Figure 52 and Figure 53** (refined layout and refined sensitivity maps) respectively:

Turbine Changes:

- Turbine 16: This turbine was located on the top of the summit of the ridge. Based on the terrestrial ecology assessment rocky outcrops have been designated as sensitive and so have mountain summits. It was recommended to shift the position of this turbine approximately 40 m westwards of its current position. The crane pad must also not affect this outcrop and should be orientated in a similar fashion relative to the new position as it was to the old position. This change has been made please refer to **Figure 54** below for new position.
- Turbine 44 and 43: The bird and bat specialist found that these turbines were located within the 200m identified no-go areas. This change has been made please refer to **Figure 54** below for new position.

All other turbine locations were found to be acceptable.

Road Alignment changes:

- Turbine 25 access road to crane pad: The access road onto the crane pad area at Turbine 25 was very close to the edge of the mountain slope. Although there is not a significant rocky outcrop at this point, there is a moderate outcropping of rocks at this point. However, the biggest concern is to minimize the risk of downslope erosion from the road, which would put a greater area at risk of degradation than just the road surface itself. It was therefore proposed by the ecologist that the access road be shifted inwards slightly to provide a buffer to the edge of the mountain slope. This change has been made please refer to **Figure 54** below for new position.
- Turbine 27 access road: The internal access road running past Turbine 27 crossed a rocky ridge / outcrop at the following approximate location: 32°45'31.57"S, 20°15'47.52"E. It was recommended by the ecologist for this alignment should be shifted slightly to attempt to avoid this outcrop, or else to cross it at a less significant location. This change has been made please refer to **Figure 54** below for new position.
- Road between turbine 28 and 29: The internal access road running between Turbine 28 and Turbine 29 crossed a rocky ridge / outcrop at the following approximate location: 32°45'51.43"S, 20°16'39.56"E. It was recommended by the ecologist for this alignment to be shifted slightly to attempt to avoid this outcrop. This change has been made please refer to **Figure 54** below for new position.
- Road between turbine 29 and 31: The internal access road running between Turbine 29 and Turbine 31 crosses a rocky ridge / outcrop at the following approximate location: 32°45'51.43"S, 20°16'39.56"E. It was recommended by the ecologist for this alignment to be shifted slightly to attempt to avoid this outcrop. This change has been made please refer to **Figure 54** below for new position.
- Access road North 1: This alignment was running parallel to and in and out of a drainage line. This alignment would have a large impact on this particular drainage line, which is avoidable by shifting the alignment slightly away from the drainage line and then crossing it perpendicularly at a single point. Adjusting this alignment would also improve the acceptability of Construction Camp Alternative 1. This change has been made please refer to Figure below for new position and construction camp:
- Access road North 2: This alignment is shown crossing a drainage line twice where it would be preferable to avoid the drainage line completely at this point, if technically possible. This alignment would have an impact on this particular drainage line, which is avoidable by shifting the alignment slightly away from the drainage line. This change has been made please refer to **Figure 54** below for new position.

Crane Pads

- Crane pad 29: The crane pad at Turbine 29 was located partially on the edge of a steep slope. If technically possible, it should be rotated slightly to be located more completely on the top of the flatter area, as shown in Figure 36. This is not a high priority suggestion and should only be considered if it does not result in adverse effects at other locations, for example, shifting the internal access road to a less favourable position. This change has been made please refer to **Figure 54** below for new position.
- Crane Pad 35: The crane pad at Turbine 35 was located partially on the edge of a steep slope with a minor rock outcrop. If technically possible, it should be rotated slightly to be located more completely on the top of the flatter area, as shown in **Figure 54**. This is not a high priority suggestion and should only be considered if it does not result in adverse effects at other locations, for example,

shifting the internal access road to a less favourable position. This change has been made please refer to **Figure 54** below for new position.

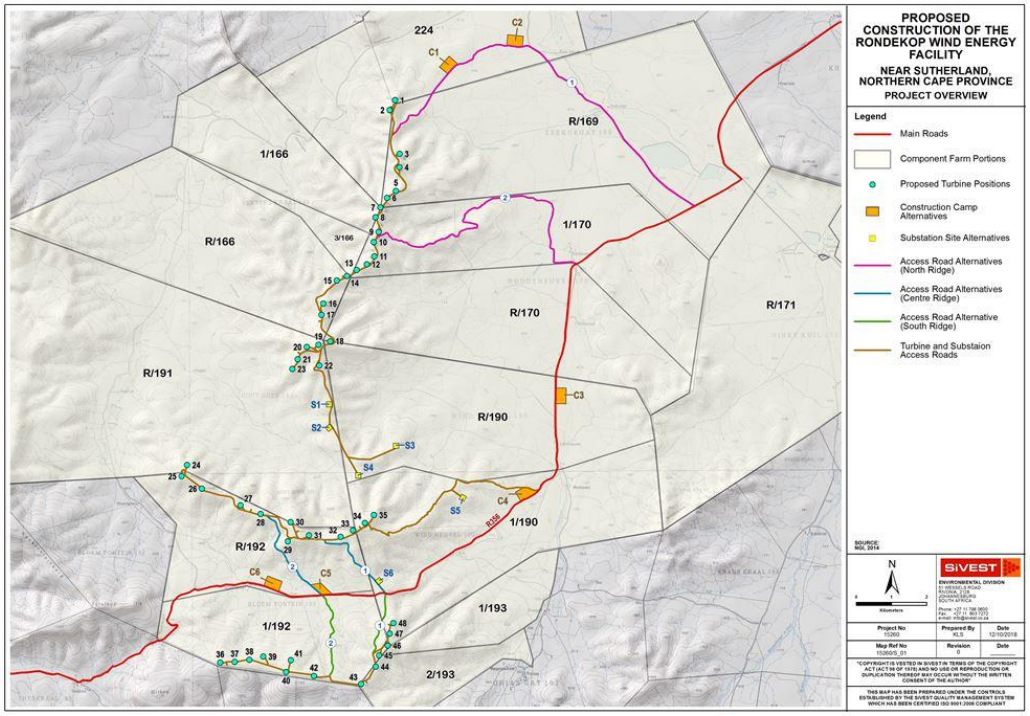

Figure 50: Initial Layout Map

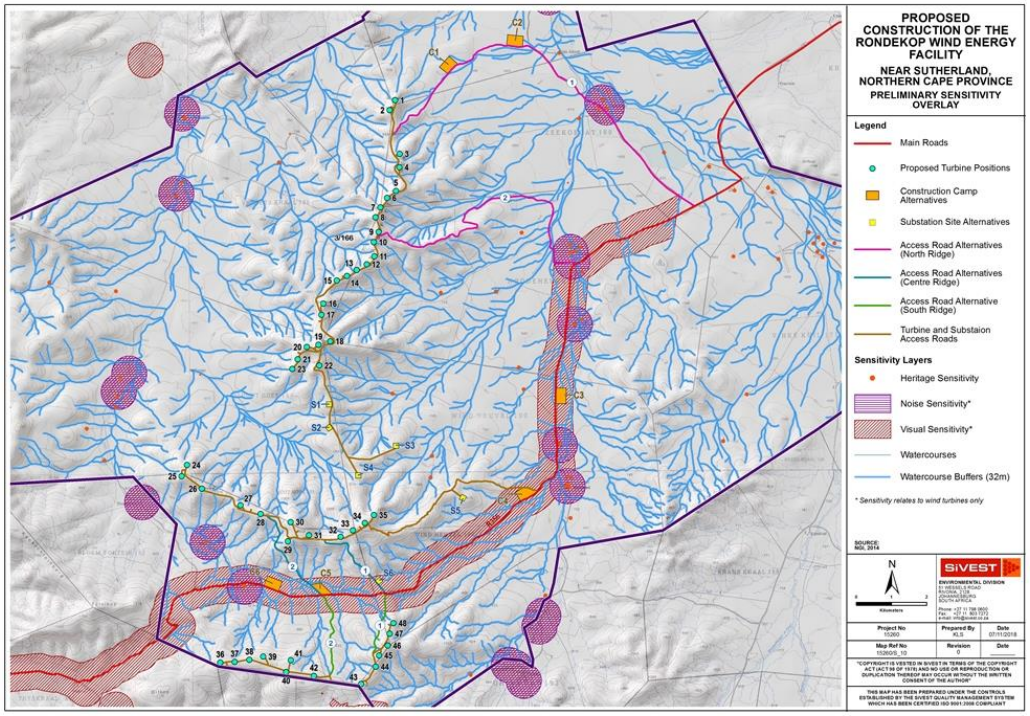

Figure 51: Initial Layout Map and sensitivity overlay

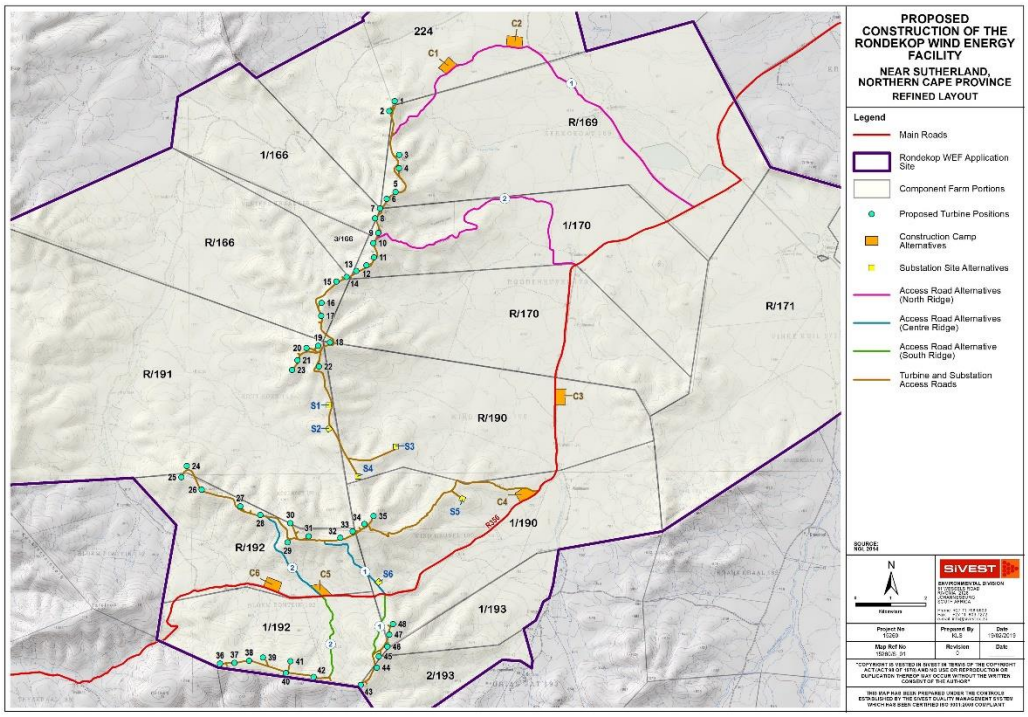

Figure 52: Refined Layout Map

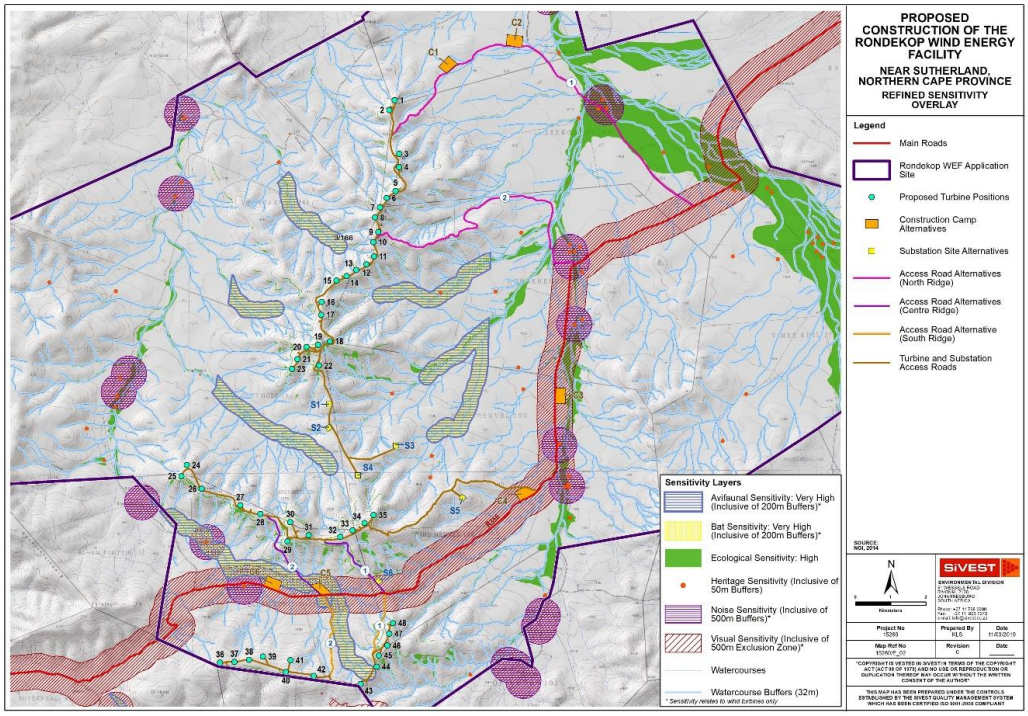

Figure 53: Refined Layout Map and refined sensitivity overlay

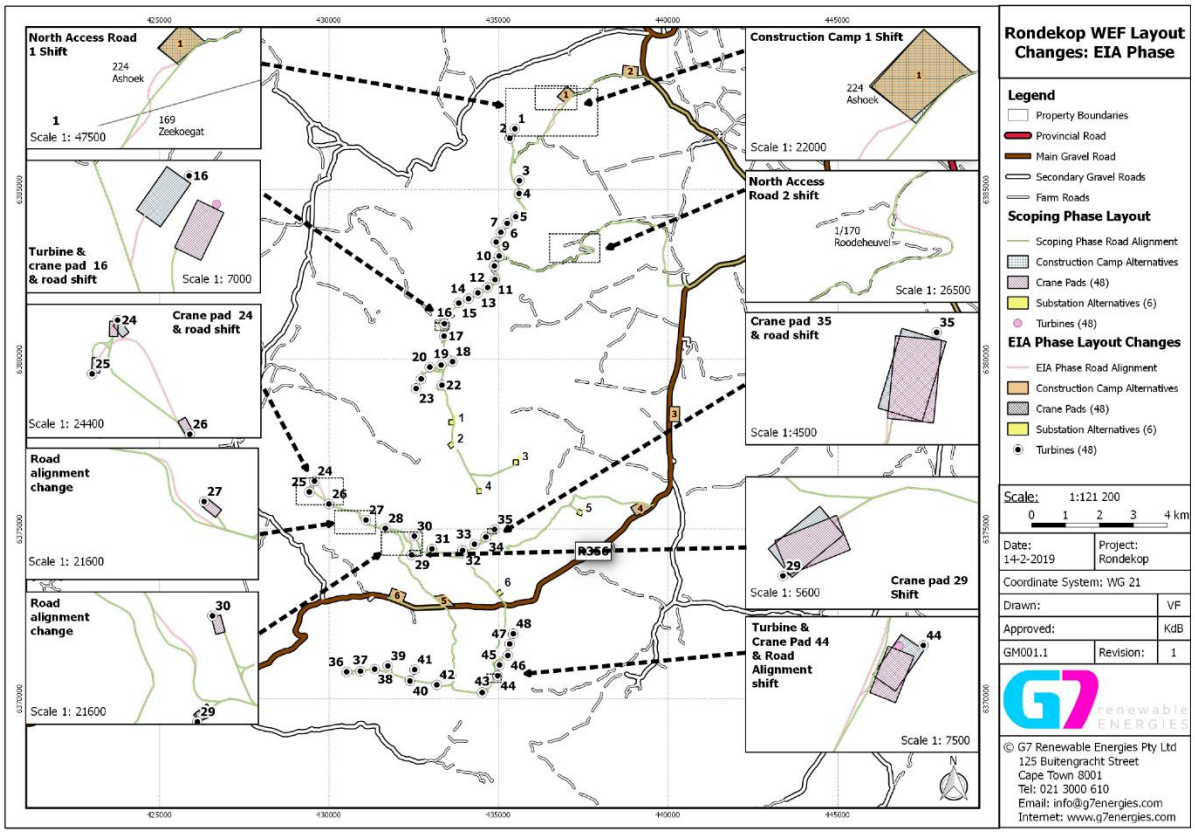

Figure 54: Initial Layout in comparison to the refined layout being put forward in the EIA phase, showing all layout changes.

All specialist assessed these layout changes and found that their previous reports still hold true. Letters from all specialist confirming this can be found in Appendix 6

Six (6) road alternatives, Six (6) Construction camp alternatives and Six (6) Substation alternatives were comparatively assessed by the specialists during the EIA phase.

The revised layout has been assessed by the specialists in their respective specialist. The assessments of the alternatives are provided in the table below:

Key

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Table 139: Comparative assessment of alternatives summary

ALTERNATIVE	ENVIRONMENTAL ASPECT										FATAL FLAW	Preferred
	Terrestrial Ecology	Aquatic Ecology	Visual	Bat	Birds	Social	Traffic	Noise	Agricultural and Soils	Heritage		
ACCESS ROADS ALTERNATIVES												
North Ridge Access Road Alternative 1	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	No preference	No preference	No preference	No preference	No	**YES**
North Ridge Access Road Alternative 2	Favourable	Preferred	Least preferred	Favourable	Favourable	Least preferred	No preference	No preference	No preference	No preference	No	No
Centre ridge Access Road Alternative 1	Least preferred	Least preferred	Preferred	Preferred	Preferred	Preferred	No preference	No preference	No preference	No preference	**Yes – Wetland**	No

ALTERNATIVE	ENVIRONMENTAL ASPECT										FATAL FLAW	Preferred
	Terrestrial Ecology	Aquatic Ecology	Visual	Bat	Birds	Social	Traffic	Noise	Agricultural and Soils	Heritage		
Centre ridge Access Road Alternative 2	Preferred	Preferred	Favourable	Favourable	Least preferred	Favourable	No preference	No preference	No preference	No preference	No	**YES**
Southern ridge Access Road Alternative 1	Least preferred	Preferred	Favourable	Preferred	Preferred	Favourable	No preference	No preference	No preference	No preference	No	No
Southern ridge Access Road Alternative 2	Preferred	Preferred	Preferred	Favourable	Least preferred	Preferred	No preference	No preference	No preference	No preference	No	**YES**
CONSTRUCTION CAMP ALTERNATIVES												
Construction Camp Alternative 1	Favourable	Favourable	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No
Construction Camp Alternative 2	Preferred	Preferred	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No
Construction Camp Alternative 3	Favourable	Preferred	Preferred	No preference	No preference	Preferred	No preference	No preference	No preference	No preference	No	**YES**
Construction Camp Alternative 4	Least preferred	Preferred	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No
Construction Camp Alternative 5	Least preferred	Favourable	Favourable	Least preferred	Least preferred	Favourable	No preference	No preference	No preference	No preference	No	No
Construction Camp Alternative 6	Favourable	Preferred	Favourable	Least preferred	Least preferred	Favourable	No preference	No preference	No preference	No preference	No	No
SUBSTATION ALTERNATIVES												

ALTERNATIVE	ENVIRONMENTAL ASPECT										FATAL FLAW	Preferred
	Terrestrial Ecology	Aquatic Ecology	Visual	Bat	Birds	Social	Traffic	Noise	Agricultural and Soils	Heritage		
Substation Alternative 1	Preferred	Preferred	Favourable	Favourable	Favourable	Favourable	No preference	No preference	No preference	No preference	No	**YES**
Substation Alternative 2	Least preferred	Preferred	Favourable	Favourable	Favourable	Favourable	No preference	No preference	No preference	No preference	No	No
Substation Alternative 3	Least preferred	Preferred	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No
Substation Alternative 4	Least preferred	Preferred	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No
Substation Alternative 5	Favourable	Preferred	Favourable	No preference	No preference	Favourable	No preference	No preference	No preference	No preference	No	No
Substation Alternative 6	Favourable	Preferred	Preferred	Preferred	Preferred	Preferred	No preference	No preference	No preference	No preference	No	No

10 ENVIRONMENTAL SENSITIVITIES

As part of the EIA, the layout for the WEF and associated infrastructure avoids the sensitive features identified by the specialists. The area that exclude these sensitive features are considered to be the Refined Layout depicting all alternatives for this project and no development may occur outside these areas.

It is important to note that should any alternative other than the preferred alternative be chosen for construction, subsequent to the issuing of an EA (should such authorisation be granted), would not be regarded as a change to the scope of work or the findings of the impact assessments undertaken during the EIA Phase. This is based on the understanding that the specialists assessed all alternatives and identified sensitivities, which will be avoided in the siting of the proposed infrastructure within the WEFsite. The Buildable Area is considered to be a "box" in which the project components can be constructed at whichever location without requiring an additional assessment or change in impact significance.

As mentioned above, all specialists identified site specific sensitive areas during the Scoping Phase of the EIA that were precluded from the Refined Layout. The sensitive areas were refined further in the EIA phase following the completion of the Terrestrial Ecology, Avifauna and Bat Assessments. The sensitive areas as identified by the various specialists overlaid on the layout alternatives are shown in the **Figure 55** below. Details of the individual environmental sensitivities is detailed below.

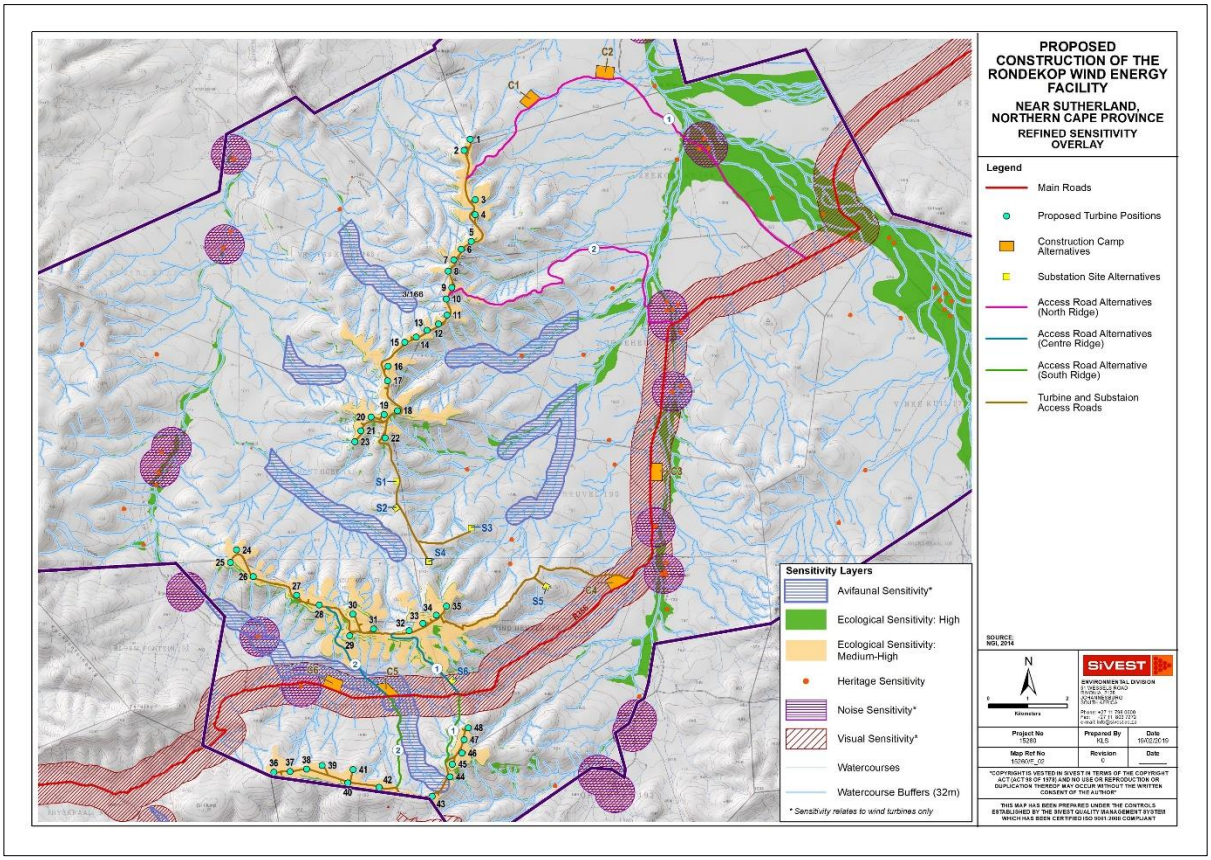

Figure 55: Sensitive areas as pertaining to all specialist studies.

10.1 Ecology Sensitivities

To determine sensitivity on site, local and regional factors were taken into account. There are some habitats on site that have been described as sensitive in their own right, irrespective of regional assessments. This includes primarily the dry stream beds and associated riparian zones and adjacent floodplains however a detailed assessment of these areas has been undertaken by an aquatic specialist. Rocky outcrops and steep slopes, especially at higher elevations are more sensitive than surrounding areas, mainly due to higher floristic diversity and the likelihood of plant species with low local abundance occurring there.

In terms of other species of concern, including both plants and animals (with the exception of the Riverine Rabbit that has already been discussed), there are no specific locations where conservation of habitat would benefit a specific species based on the existing data available. Both reptile species of concern, all mammal species of concern and all protected plant species described previously could occur on any part of the site, whether in the mountains or on the lowlands.

A summary of sensitivities that occur on site and that may be vulnerable to damage from the proposed project are as follows (**Figure 56**):

10.1.1 *Dry stream beds, including the associated riparian habitats and adjacent floodplains:*

There is a network of dry stream beds throughout the lower-lying areas of the study area, with smaller streams eventually joining together to form larger systems further downstream. In the mountain areas these start as dry drainage lines, but these are not mapped as part of this unit since they reflect the characteritstics of the surrounding vegetation rather than that of being a unique habitat. Where the dry streams occur as a unique habitat, they consist of a sandy or rocky bed, often unvegetatated or sparsely vegetated, bordered by a line of shrubs or small thorn trees. There is a continuum from the smallest streams to the larger “rivers”.

The riparian areas have a species composition and structure that is almost completely different to the surrounding landscape. The habitat contains a combination of bare rock and deeper sands, so it is able to support a flora that is adapted to these substrate conditions, in addition to the sporadic flooding and scouring that takes place in these habitats as a result of rare large rainfall events. The thorn trees (and other shrubs) occur here because they are able to root deeply to access underground water, a source that is not available to other terrestrial habitats. Although not necessarily floristically sensitive, the habitat that is derived under these ecological conditions is critically important for fauna, providing food and shelter as well as corridors for undetected movement. In times of drought, riparian areas may offer the only slightly green vegetation as a source of food. The deeper sands are important for burrowing animals and the shrubs and low trees offer shelter and browse.

Riparian habitats are disproportionately important in terms of the proportion of the area that they occupy in the landscape – they probably occupy 5-10% of the landscape in total, but provide a unique and important habitat for both flora and fauna. The plant species occurring within these habitats are not necessarily rare in a global sense, but degradation of this interconnected system can cause floristic loss and change in areas far removed from any impact. Maintenace of regional vegetation patterns

therefore is dependent on maintaining the health and functionality of this component of the landscape. For this reason, and for the utilitarian importance to fauna, the riparian vegetation is considered to be ecologically sensitive. In addition, if there is any likelihood of the Riverine Rabbit occurring on site then this is the habitat in which it would be found.

10.1.2 *Rock outcrops, Very steep slopes (mapped as scarp valleys in **Figure 56**) and High-lying areas within mountain vegetation (plateaus, crests and mountain summits in **Figure 56**).*

This habitat also falls primarily within Koedoesberge-Moordenaars Karoo, but in the southern half of the study area it also includes patches on the higher peaks of Central Mountain Shale Renosterveld. There is no regional difference in the sensitivity of these two vegetation types, but the pattern gives an indication of floristic variability on site. The steeper areas sometimes have less stable substrates with looser soils, associated with the development of loose scree slopes. The vegetation is critical in stabilizing these areas. Areas lower down on slopes are vulnerable to any instability on areas higher up. The topography also introduces variation in slope and aspect, with some slopes facing hotter northern or western directions and others facing cooler southern and eastern directions, all of which introduces ecological variation into the landscape, providing new habitats for different species. Due to the sedimentary origin of the substrates, there are often bands of more resistant rock layers at specific heights on the mountain slopes. These substraits manifest themselves as small cliffs and rocky outcrops. There is a known diversity relationship between increased surface rockiness and increased local floristic species richness, which is true for the current study area, and many of the rarer floristic sitings on site were within rocky areas.

Based on this information, a map of habitat sensitivity on site is provided in **Figure 57**. This shows main habitat sensitivity classes on site, namely HIGH for rock outcrops and riparian habitats, MEDIUM-HIGH for plateaus, crests and mountain summits and MEDIUM for midslopes and lowland vegetation.

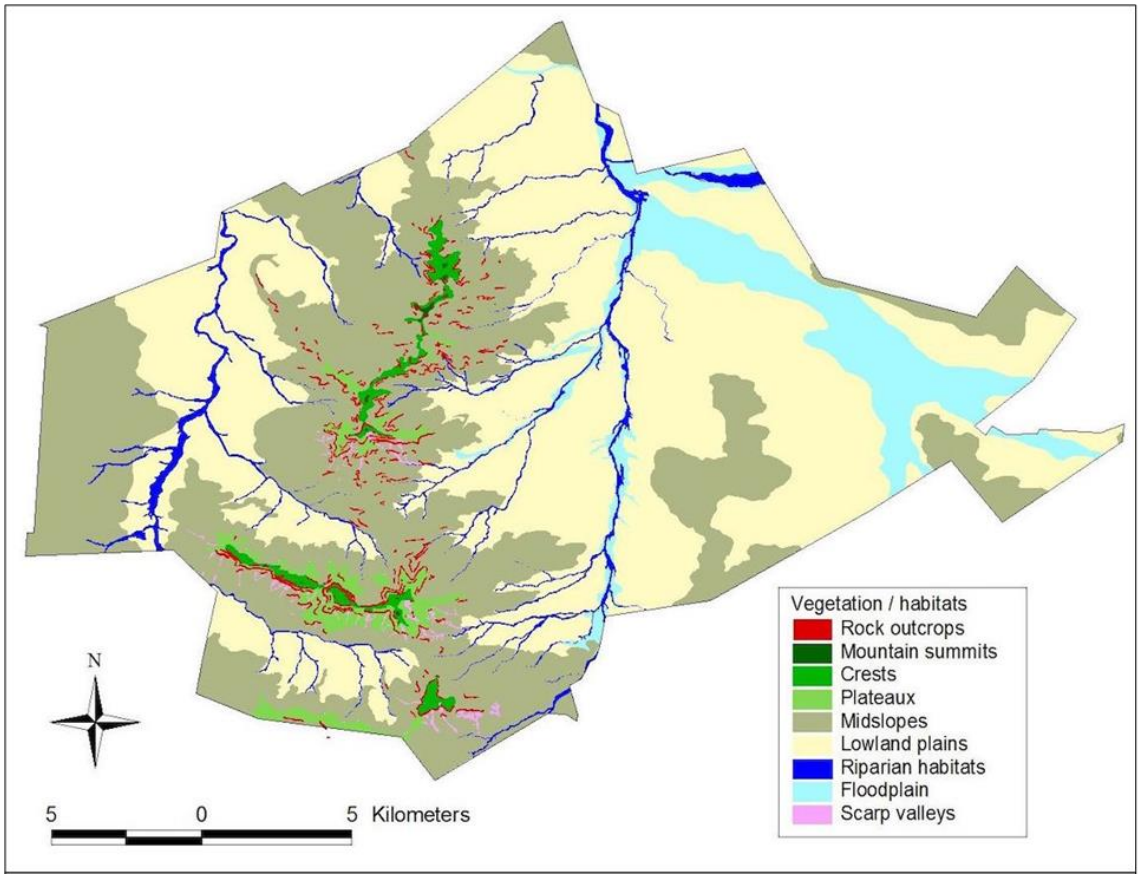

Figure 56: Sensitive areas as pertaining to all specialist studies.

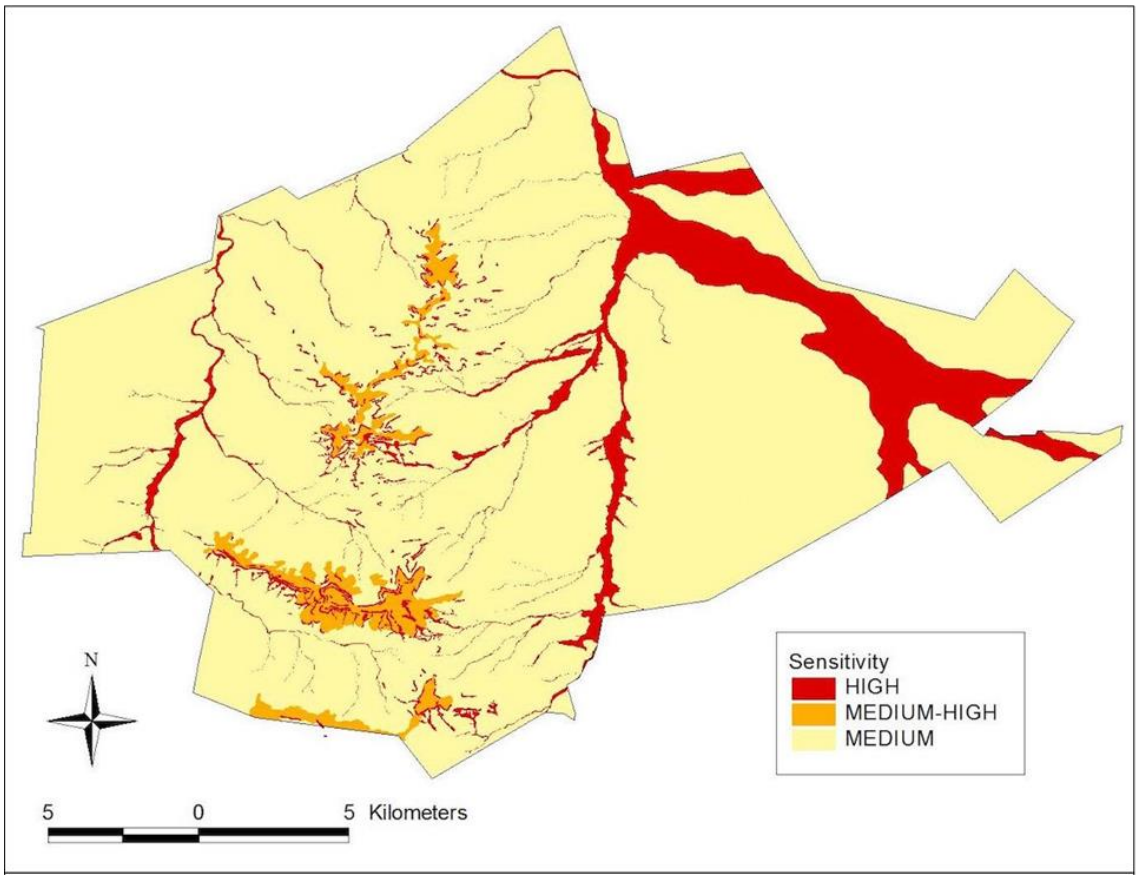

Figure 57: Habitat sensitivity of the study area.

10.2 Bird Sensitivity

Rocky hillsides characterise a large portion of the site due to the site being relatively mountainous. These areas may also be important for certain species that use these areas for nesting or thermalling, such as: Rock Martin *Hirundo fuligula*, Rock Kestrel and Verreauxs' Eagle, among others. For this reason, the site has been generally classified as one with medium sensitivity, with some areas considered to be very highly sensitive (i.e. no-go areas that should be avoided from wind turbine and substation installation) (**Figure 58**).

- Medium sensitivity (Acceptable for turbine placement and associated infrastructure, but with mitigation measures)
    - *Hillside and Ridges*: This type of biotope is frequently used by Accipitrids and Falcons, for soaring and hunting flights, in which a lot of potential collision risk movements (flight at rotor height) are observed.
    - *Natural vegetation*: Within the proposed Rondekop WEF site the area is mostly comprised of natural vegetation. Avifaunal community, especially raptors usually will forage in natural veld, as well as the passerine community use this biotope for nesting and foraging.
- Very High Sensitivity (No-Go areas for turbine and substation)

    Riverine thickets: This type of biotope showed a high importance for passerine species as well as for Raptors and soaring birds. Considering the scarceness and sensitivity of this vegetation type to land modifications, a 200 m protection buffer is considered around the margins of the waterlines with this type of vegetation. No turbine placement or substation placement is allowed to occur within these buffered zones. Although it is advised for Overhead Powerlines to avoid these buffered areas as much as possible, they are allowed to be built within these buffered regions, as long as they run parallel with any bird flightpaths, as opposed to a more perpendicular orientation that could increase the risk of collision. This should be further assessed by the specialist for approval once the powerline layout becomes available. Existing roads should be used/upgraded as far as possible, within these areas. Any new roads should cross perpendicular, if new roads cannot be avoided.

    - *Water bodies*: As these supply important sources of water, nesting and resting locations for many bird species (not only waterbirds), a 200m protection buffer is considered around any potential margins of water present within the study area.
    - *Sensitive Flight Paths*: as activity index thresholds are not fully understood and enforced in South Africa, nor presented in the most recent version of the bird monitoring guidelines (Jenkins *et a*l., 2015), it was determined that the best approach would be to follow the activity trends of familiar projects (from sites exhibiting similar characteristics). It was observed from a relatively nearby operational wind farm that high risk flights of priority species (where important fatalities were also noted) were generally orientated in areas where >1 contacts/hour were observed. As such, a grid analysis was conducted to determine the use of geographical space by certain bird species. It was subsequently decided that only sensitive species with >0.25 contacts per hour (precautionary approach) were to be considered in each 500x500m no-go square. A 200m buffer was then applied around each

square to account for potential sensitive flight paths occurring on the inner border of each square.

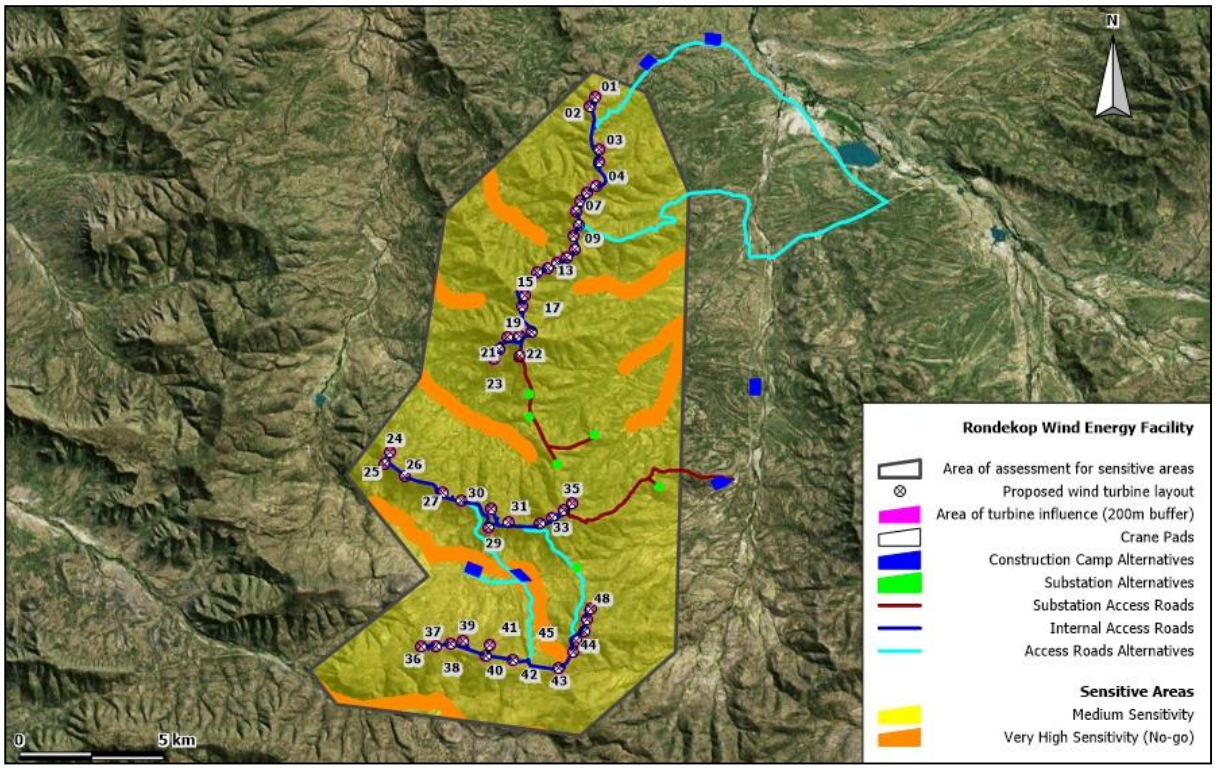

Figure 58: Sensitive areas identified for birds during the pre-construction monitoring campaign at Rondekop WEF, overlaid with the proposed development features

10.3 Bat Sensitivity

Very high sensitive areas (no-go areas) for bats are outlined in **Figure 59** and follow the recommendation from the South African Bat Assessment Advisory Panel (SABAAP; in Sowler *et al.* 2017). The no-go areas should exclude all new WEF-associated structures (wind turbines, roads, powerlines, substation infrastructures or other associated structures). However, it is important to note that road and powerline infrastructures can cross these areas, as long as it is at a perpendicular angle, and not parallel to the sensitive features. Should these areas be rivers or wetlands, then roads may cross them – as long as appropriate water-use licenses are obtained. Additionally, no wind turbine may be placed within 90m (maximum potential length of turbine blade length) of any identified no-go areas (due to the potential encroachment of these blades into the sensitive buffers).
Considering the Best practice recommendations, the sensitivity areas were delineated according to the buffer areas indicated in the "Bat Sensitivity Buffer Zone Recommendations" of the South African Bat Assessment Advisory Panel (SABAAP) (SABAAP 2013) and the 4.1 edition of the South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction:

- **Very High Sensitivity (No-Go areas)** - 200m around all potentially bat important features:
    - Along water lines, water bodies and associated riverine vegetation. Such features are important for bats, since they are likely to act as commuting routes, providing food

resources, likely to be associated with higher bat activity, and likely to favour the occurrence of dispersion routes, besides local commuting routes. A 200m buffer was considered around those features. It is recommended that should new infrastructures (including roads and electrical infrastructures) cross these features (including buffers), then they should not be routed to run parallel with them, but rather cross them perpendicularly, as far as possible. Additionally, this avoidance recommendation does not include the use of existing roads, as long as they are not upgraded in such a manner that will re-route them (to be more parallel with the feature) within those buffered areas. Additionally, water-use licences have to be obtained when new roads are proposed to be routed over rivers / wetland areas. No wind turbines or substations may be permanently placed within any buffered areas. Wind turbines in particular may not be located within 90m (longest potential blade length) of any sensitive buffered area.

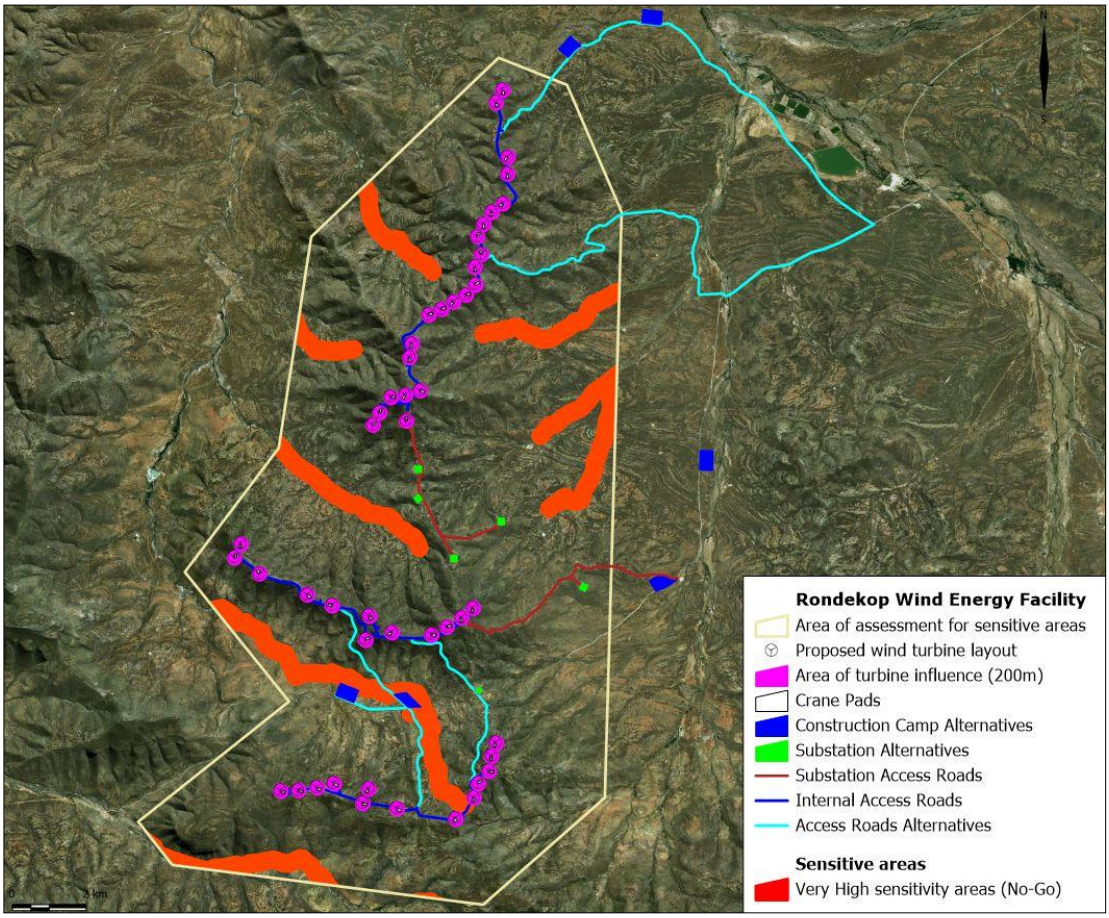

Figure 59: Sensitive areas identified for bats during the pre-construction monitoring campaign at Rondekop WEF, overlaid with the proposed development features.

10.4 Aquatic Sensitivity

The water bodies on site are deemed to be sensitive features. This study followed the approaches of several national guidelines with regards to wetland assessment (methods found in Section 4 of the Aquatic Assessment Report, Appendix 6). These have been modified by the author, to provide a relevant mechanism of assessing the present state of the study systems, applicable to the specific

environment and in a clear and objective manner, assess the potential impacts associated with the proposed development. This was coupled to a two-site visit conducted late September 2018, after some rainfall and or snow falls and at the start of the growth season for most plants.

As previously mentioned the site was assessed during a two site visit, to confirm the current state of the environment. This coincided with some rain, and the onset of the spring growth season. Due to the nature of the aquatic systems, this was enough to gain an understanding of these, coupled to information collected within the region from 2012 onwards by the report author in other portions of the same catchments.

Although the project site boundary spans several catchments, actual proposed development occurs within the following catchments within the Nama Karoo ecoregion (**Figure 60**):

1. E23B Windheuwel (Tankwa)
2. E23C Houthoek (Tankwa)
3. E23H Brak (Ongeluks)

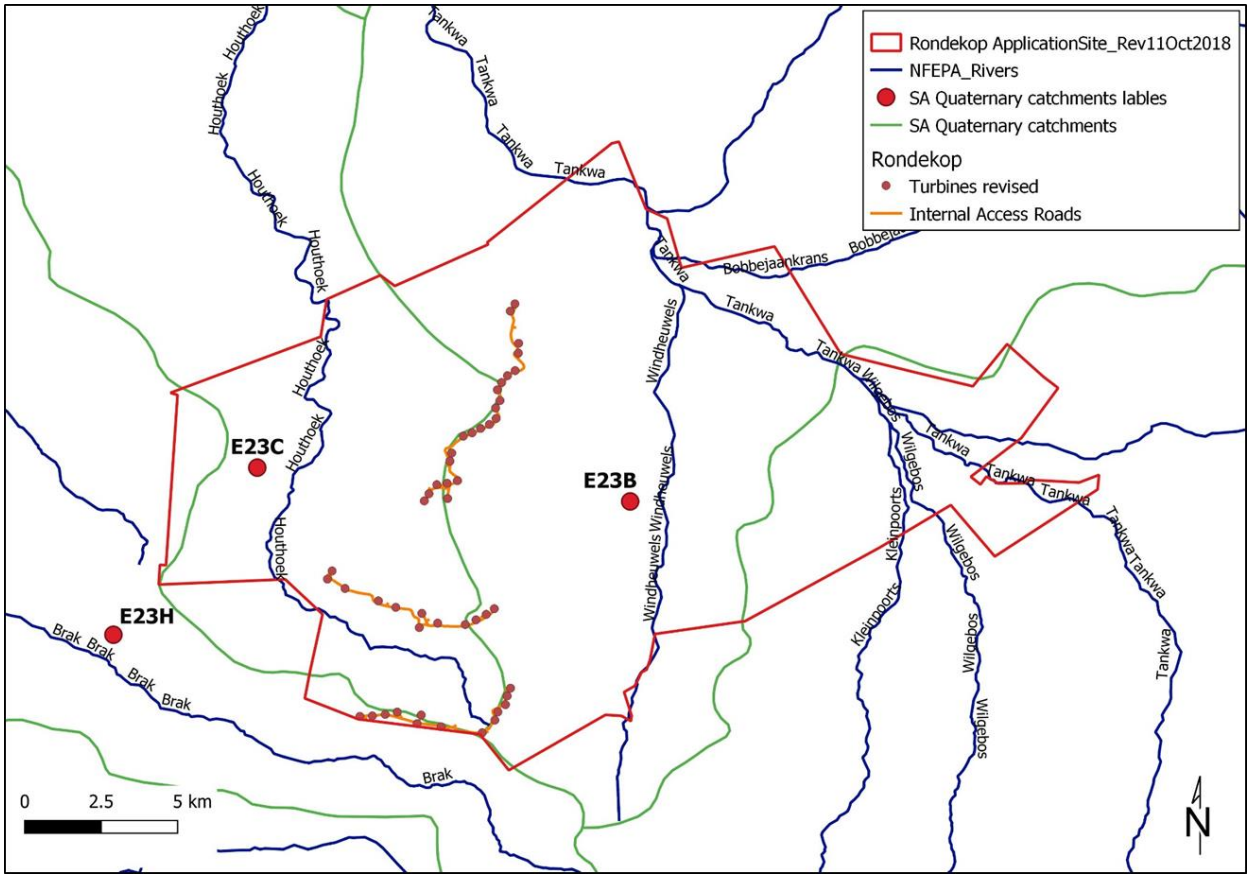

Figure 60: Project locality map indicating the various quaternary catchment boundaries (green line) in relation to the study area (Source DWS and NGI).

These catchments are characterised by several perennial watercourses and drainage lines associated with these mainstem systems listed above and located within the greater Tankwa, Brak or Ongeluks rivers catchments respectively.

Overall, these catchment and subsequent rivers / watercourses are largely in a natural state. Current impacts occur in localised areas and included the following:

- Erosion because of road crossings (Plate 1);
- Several farm dams (Figure 5); and
- Undersized culverts within present day road crossings (Plate 2).

Plate 1: River bed erosion below an existing culvert.

Plate 2: existing pipe culvert

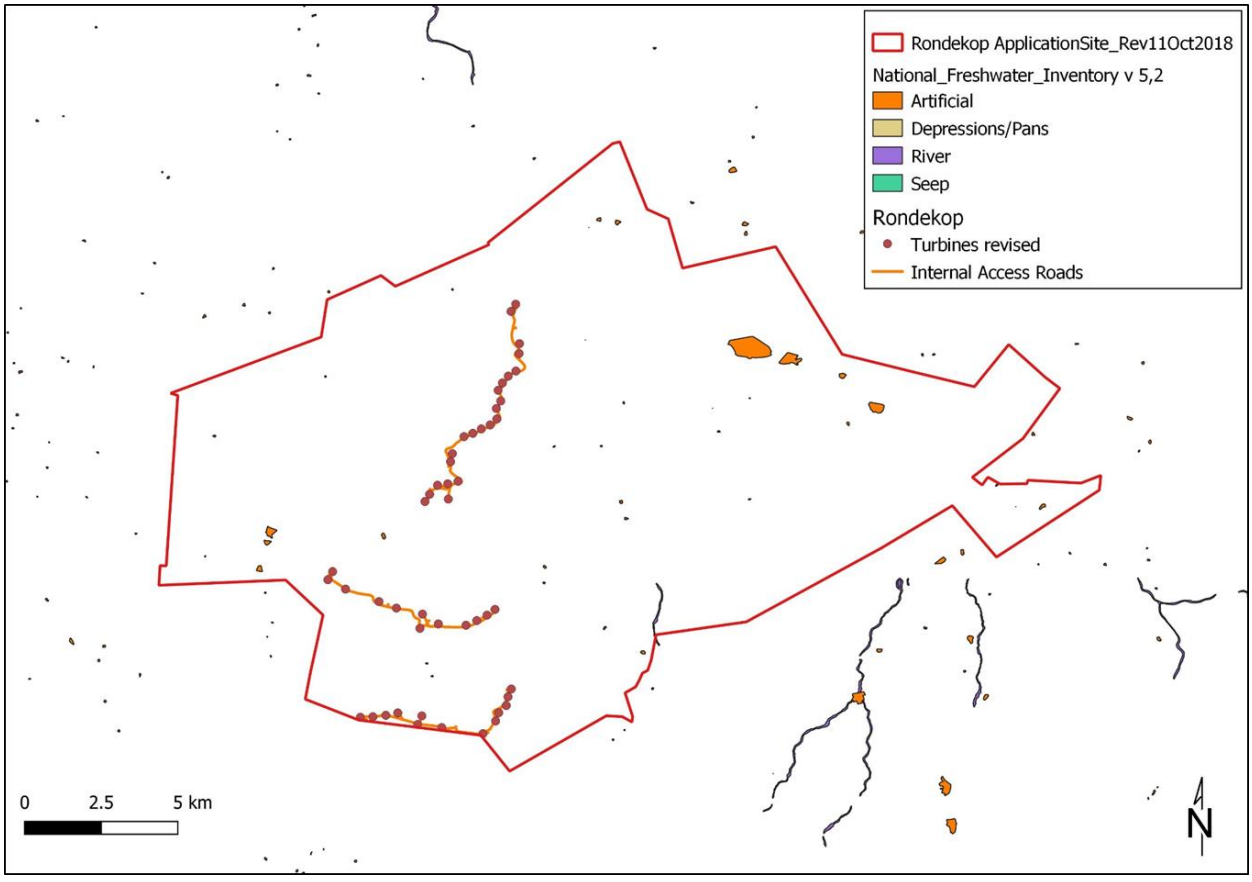

Figure 61: The various dams within or near the property identified in the National Wetland Inventory V5.2 (2018), with no natural wetlands being observed within the 500m of the boundary.

Absent from the study area were the typical Juncus wetlands (valley bottom wetland types – with and without channels) with the closest natural wetland system being more than 3 km from the site boundary.

Thus, the systems within the study area are alluvial systems, characterised as natural sediment transport mechanisms within the regional environment. The lack of many natural wetlands (pans and or valley bottom systems) was also substantiated by the National Wetland Inventory v5.2 spatial data. In terms of the NFEPA assessment, all of the watercourses are largely intact and of biological significance. This is largely due to these catchments falling within the headwaters of the Brak/ Ongeluks and Tankwa rivers respectively. However, as the study area systems are mostly ephemeral, these don't support any wide riparian zones and the vegetation associated with these watercourses was between 0.5 m and 12 m wide. Species consisted mostly of *Searsia* species (S. *undulata, lancea* & *crenata*) and *Vachellia karroo*. Where broader river valleys occur, *Tamarix usenoides* and *Galenia africana* were observed, while in narrow areas in the higher lying watercourses, *Salix mucronata* were also noted.

The survey area falls within Upstream FEPAs, as systems, outside of the project area, such as the Brak, Ongeluks, Houthoek and Tankwa rivers located downstream are important regionally (and are supported hydrologically by the study area systems.

The proposed layout for the Rondekop WEF was assessed has a limited impact on the aquatic environment as the proposed structures for the most part have either avoided the delineated watercourses except for existing access roads that will make use of existing roads crossing watercourses. Where any road upgrades are required it is understood that these current crossings may be upgraded by increasing the current size of the culverts and providing additional erosion protection, thus a possible net benefit to the local aquatic systems may result. The actual requirements and designs will be finalized in the detail design phase. It is therefore recommended that these positions are assessed in the EMP walk down phase to provide detailed mitigations to the engineers as and when required.

Further, no aquatic protected or species of special concern (flora) were observed during the site visit. Therefore, based on the site visit the significance of the impacts assessed for the aquatic systems after mitigation would be LOW.

10.5 Agriculture and Soils

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 project area is classified with land capability evaluation values that range from 1 to 7, with the range between 2 and 5 covering the majority of the area. The land capability is limited by the very low climatic moisture availability, the rugged terrain, and the shallow, rocky soils.

Table 140: Details of the 2017 Land Capability classification for South Africa.

Land capability evaluation value	Description
1	Very Low
2	
3	Very Low to Low
4	

Land capability evaluation value	Description
5	Low
6	Low to Moderate
7	
8	Moderate
9	Moderate to High
10	
11	High
12	High to Very High
13	
14	Very High
15	

Due to the very low agricultural potential of the site, and the consequent very 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 is no preference for all the WEF turbine locations and the associated infrastructure and all alternatives can be supported.

There are no conditions resulting from this assessment that need to be included in the Environmental Authorisation, apart from the mitigation measures proposed:

- Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.
- Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there.

10.6 Noise Sensitivity

As aerodynamic broadband sound is typically the largest component of wind turbine acoustic emissions and the sound generally increases with rotor speed, along with construction related noise impacts, a noise assessment is required to provide a comprehensive and detailed Noise Impact Assessment (NIA) that presents and evaluates the noise impact of the wind turbines under different operating conditions.

The results of the study indicate that the following conclusions can be drawn:

a) There will be a short-term increase in noise in the vicinity of the site during the construction phase as the ambient noise level will be exceeded by vehicle operations.
b) The area surrounding the construction sites will be affected for short periods of time in all directions, should numerous construction equipment be used simultaneously.
c) The number of construction vehicles that will be used in the project will add to the existing ambient levels and will most likely cause a disturbing noise for a limited time. The exact number of construction vehicles is not known at present. The duration of impact will however be short-term.

d) The day/night time SANS 10103:2008 noise limit of 45dB(A) will not be exceeded at any of the noise sensitive areas.
e) The night time guideline noise limit of 35dB(A) will in all likelihood not be exceeded at any of the noise sensitive areas except for NSA 15 and 16 above 5m/s windspeed, as wind noise masking will occur as the wind speed increases. Although these homesteads are only occupied for 3 – 4 Months of the year during winter when grazing is optimal.
f) All turbine positions met the 500 m setback distance from noise sensitive receptors.
g) The cumulative impacts will not exceed the day/night time SANS 10103:2008 noise limit of 45dB(A).
h) The cumulative impacts will not exceed the night time SANS 10103:2008 noise limit of 35dB(A).

The construction phase and operational phase will have a very low noise impact on the noise sensitive receptors.

The following is recommended:
a) The noise impacts are re-modelled when the final turbine layout and turbine type is determined only if the chosen turbine has a higher sound power level than the type modelled in this report or if a turbine is moved substantially closer to a noise sensitive receptor (>100m).
b) Periodic noise measurements are taken during the construction and operational phases as per the intervals described in Table 16 and 17.

Table 141: Overall impact rating.

Environmental parameter	Issues	Rating prior to mitigation	Average	Rating post mitigation	Average
Noise impacts during Construction	Noise could impact the receptors	-7	-7	-7	-7
Noise impacts during Operations	Noise could impact the receptors	-10	-10	-7	-7
			-8.5		-7
			Low Negative Impact		Low Negative Impact

10.7 Visual Sensitivity

Visual Sensitivity can be defined as the inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (i.e. topography, landform and land cover), the spatial distribution of potential receptors, and the likely value judgements of these receptors towards a new development (Oberholzer: 2005). A viewer's perception is usually based on the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational tourism) which may be based on this aesthetic appeal.

In order to assess the visual sensitivity of the area SiVEST has developed a matrix based on the characteristics of the receiving environment which, according to the Guidelines for Involving Visual and

Aesthetic Specialists in the EIA Processes, indicate that visibility and aesthetics are likely to be 'key issues' (Oberholzer: 2005).

Based on the criteria in the matrix (**Table 142**), the visual sensitivity of the area is broken up into a number of categories, as described below:

i) **High** - The introduction of a new development such as a Wind Energy Facility would be likely to be perceived negatively by receptors in this area; it would be considered to be a visual intrusion and may elicit opposition from these receptors

i) **Moderate** - Presence of receptors, but due to the nature of the existing visual character of the area and likely value judgements of receptors, there would be limited negative perception towards the new development as a source of visual impact.

ii) **Low** - The introduction of a new development would not be perceived to be negative, there would be little opposition or negative perception towards it.

The table below outlines the factors used to rate the visual sensitivity of the study area. The ratings are specific to the visual context of the receiving environment within the study area.

Table 142: Environmental factors used to define visual sensitivity of the study area

FACTORS	**RATING**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Pristine / natural character of the environment										
Presence of sensitive visual receptors										
Aesthetic sense of place / scenic visual character										
Value to individuals / society										
Irreplaceability / uniqueness / scarcity value										
Cultural or symbolic meaning										
Scenic resources present in the study area										
Protected / conservation areas in the study area										
Sites of special interest present in the study area										
Economic dependency on scenic quality										
Local jobs created by scenic quality of the area										
International status of the environment										
Provincial / regional status of the environment										
Local status of the environment										
**Scenic quality under threat / at risk of change										

**Any rating above '5' for this specific aspect will trigger the need to undertake an assessment of cumulative visual impacts.

Low							**Moderate**							**High**
10	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**140**	**150**

Based on the above factors, the study area is rated as having a moderate visual sensitivity, mainly due to the natural, scenic character of the area. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is

likely to be sensitive to visual impacts and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

As described below, no formal protected areas, leisure-based tourism activities or sensitive receptor locations were identified in the study area and relatively few potentially sensitive receptors were found to be present due to the low population density.

10.7.1 *Visually Sensitive Areas on the Site*

During the scoping phase, all project specialists were requested to indicate environmentally sensitive areas within the application site. The aim of this exercise was to identify those areas of the application site which should be precluded from the WEF development footprint. From a visual perspective, these would be areas where the establishment of wind turbines or other associated infrastructure would result in the greatest probability of visual impacts on potentially sensitive visual receptors.

As previously mentioned, the visual prominence of a tall structure such as a wind turbine would be exacerbated if located on a ridge top or high lying plateau. Layout plans for the Rondekop WEF show that turbine placement is largely concentrated on the higher lying ridges and plateaus and as such the development is likely to be highly visible from much of the surrounding area. A preliminary visibility analysis (Figure 62) based on this turbine layout identified a relatively extensive viewshed, with high levels of visibility from a significant number of locations. This does not necessarily mean that the ridges and plateaus should be precluded from any development and as such, further analysis was conducted to determine likely visual sensitivity in relation to the potentially sensitive receptor locations in the study area.

Using GIS-based visibility analysis, it was possible to determine which sectors of the site would be visible to the highest numbers of receptor locations in the study area. This analysis was weighted to account for the distance of the receptor from the nearest turbine. Hence, although certain areas of the site are highly visible, the sensitivity rating reduces with increasing distance from the affected receptors. The resultant visual sensitivity rating, as depicted in Figure 63 below, shows very few areas of high visual sensitivity on the site. This is largely as a result of the distance of the turbines from the nearest potentially receptor locations.

This rating should be viewed against the fact that the study area as a whole is rated as having a moderate visual sensitivity. As such, areas of high sensitivity are not considered to be no go areas, but rather should be viewed as zones where the number of turbines should be limited, where possible, as the turbines will still be highly visible.

It should be noted that this sensitivity rating applies to turbine development only. The visual impacts resulting from the associated infrastructure are considered to have far less significance when viewed in the context of multiple wind turbines and as such the infrastructure has been excluded from the sensitivity analysis.

It should be further noted that the visibility analysis is based purely on topographic data available for the broader study area and does not take into account any localised topographic variations or any existing infrastructure and / or vegetation which may constrain views. In addition, the analysis does not take into account differing perceptions of the viewer which largely determine the degree of visual impact being experienced. The visual sensitivity analysis should therefore be seen as a conceptual representation or a worst-case scenario which rates the visibility of the site in relation to potentially sensitive receptor locations.

In addition to the sensitivity ratings, 500 m exclusion zones have been delineated around the existing residences in the study area and along the R356 main road (for turbine placement). It is recommended that no wind turbines should be allowed to be developed within these buffer zones so as to prevent a significantly adverse impact of shadow flicker on the local residents and on motorists using the R356.

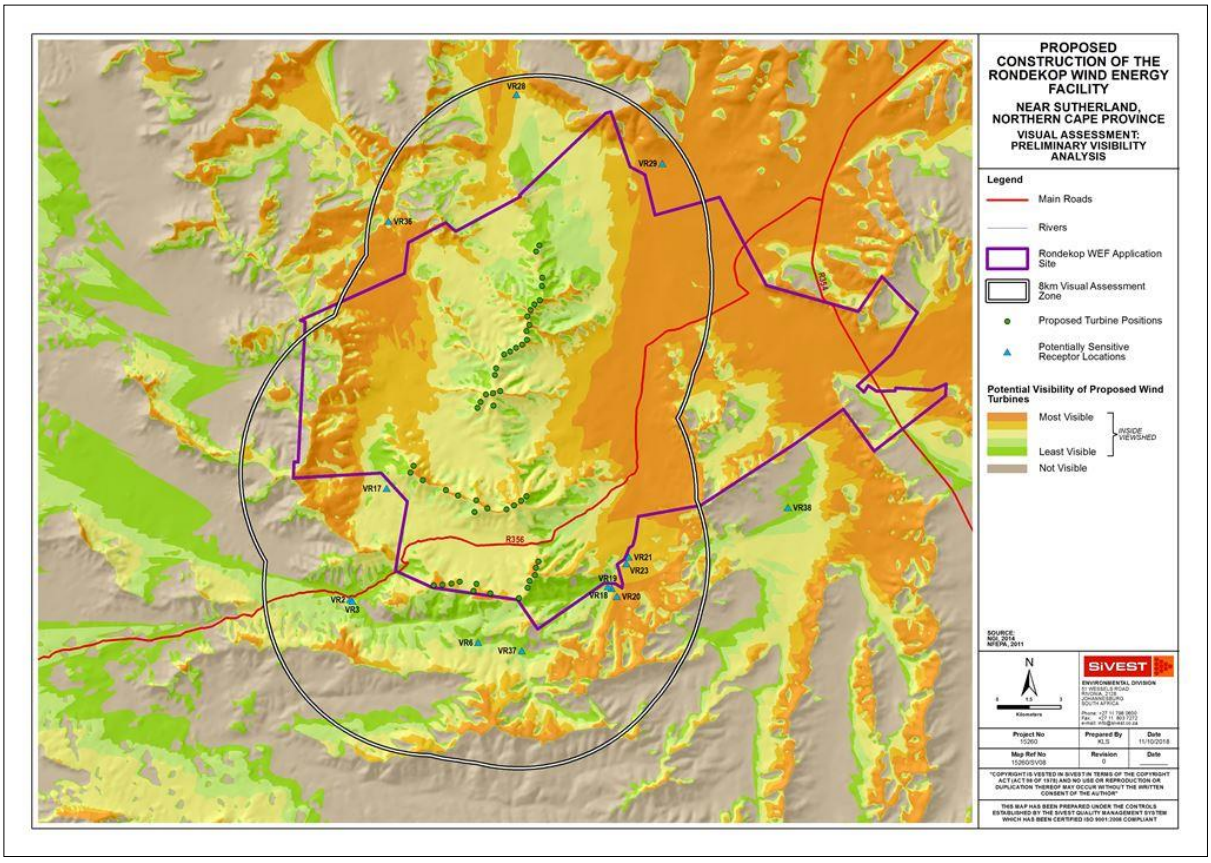

Figure 62: The turbine layout identified a relatively extensive viewshed, with high levels of visibility from a significant number of locations

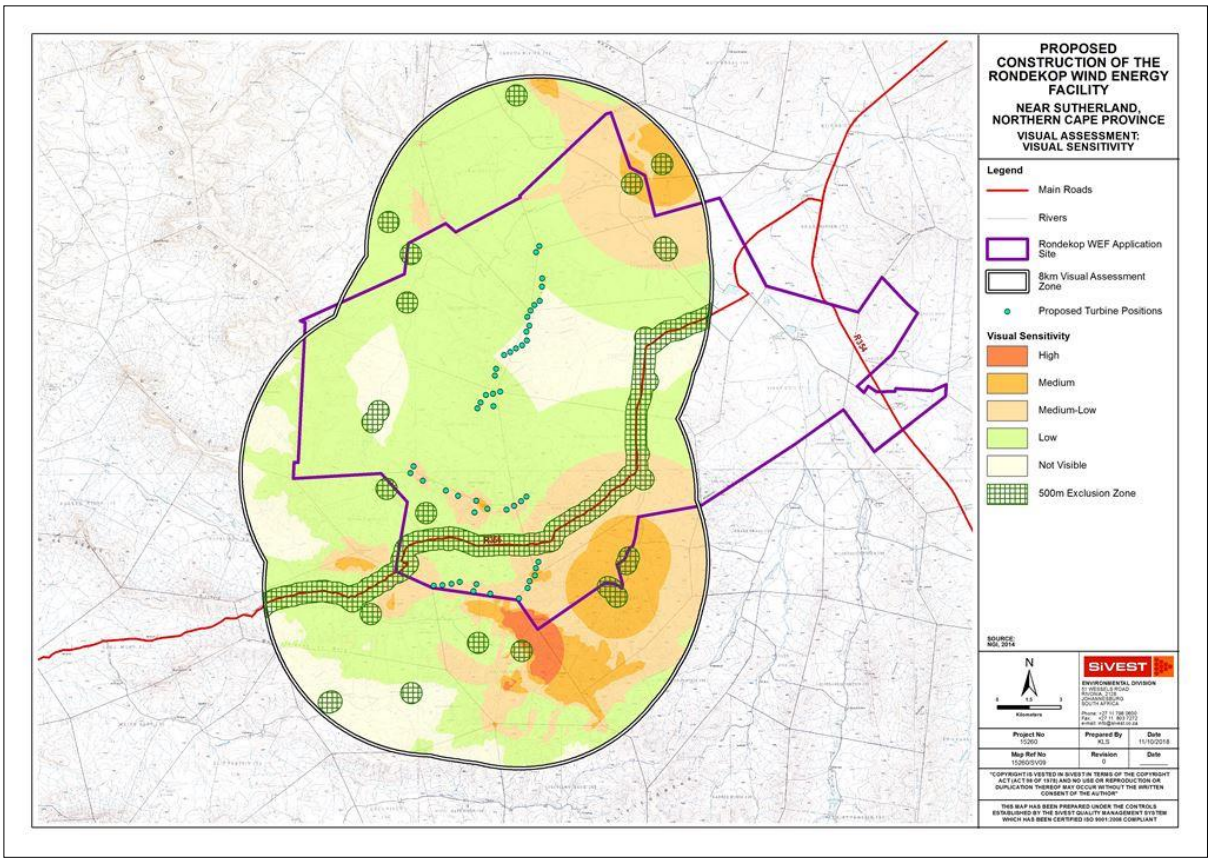

Figure 63: Visual sensitivity rating shows very few areas of high visual sensitivity on the site

10.7.2 *Sensitive Visual Receptors*

A sensitive receptor location is defined as a location from where receptors would potentially be impacted by a proposed development in a negative manner. Adverse impacts often arise where a new development is seen as an intrusion which alters the visual character of the area and affects the 'sense of place'. The degree of visual impact experienced will however vary from one receptor to another, as it is largely based on the viewer's perception.

A distinction must be made between a receptor location and a sensitive receptor location. A receptor location is a site from where the proposed development may be visible, but the receptor may not necessarily be adversely affected by any visual intrusion associated with the development. Less sensitive receptor locations include locations of commercial activities and certain movement corridors, such as roads that are not tourism routes. More sensitive receptor locations typically include sites that are likely to be adversely affected by the visual intrusion of the proposed development. They include; tourism facilities, scenic sites and residential dwellings in natural settings.

The identification of sensitive receptors is typically based on a number of factors which include:

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity;
- the presence of leisure-based (especially nature-based) tourism in an area;

- the presence of sites or routes that are valued for their scenic quality and sense of place;
- the presence of homesteads / farmsteads in a largely natural setting where the development may influence the typical character of their views; and
- feedback from interested and affected parties, as raised during the public participation process conducted as part of the EIA study.

As the visibility of the development would diminish exponentially over distance receptor locations which are closer to the WEF would experience greater adverse visual impact than those located further away. Zones of visual impact were therefore delineated based on distance bands measured from the proposed turbine positions. Based on the height and scale of the project, the distance intervals chosen for these zones of visual impact are as follows:

- 0 – 2 km (high impact zone)
- 2 – 5 km (moderate impact zone)
- 5 km – 8 km (low impact zone)

Preliminary desktop assessment of the study area identified thirty-one (31) potentially sensitive visual receptors, mostly existing farmsteads. These dwellings are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these dwellings, however their sentiments toward the proposed development are unknown. As previously mentioned, the receptors were identified by way of a desktop assessment and it was not possible to verify the status of these receptors during the field visit. A such, it is possible that some of the locations identified are sheep sheds or abandoned dwellings and are therefore not actually receptors.

Four (4) receptors were excluded from the assessment as they were found to be outside the viewshed of the turbine layout. A further fourteen (14) receptors were removed from the assessment as they are situated on the application site and it is known that the land owners have consented to the proposed development. Accordingly, residents at these locations would not perceive the WEF in a negative light and as such they have been removed from the list of potentially sensitive receptors.

One receptor (VR38), located approximately 4 km outside the visual assessment zone, was later included in the assessment in response to preliminary feedback received from the I&APs.

The remaining fourteen (14) potentially sensitive receptors are shown in Figure 64 below.

No leisure or nature-based activities were identified in the study area and none of the identified receptor locations were considered to be sensitive receptors.

The primary thoroughfare in the study area is the R356 main road which traverses the study area in a south-west to north-east direction. This is a gravel road, primarily used as an access route by the local farmers and is not valued or utilised for its scenic or tourism potential. As a result, this road is not considered to be visually sensitive.

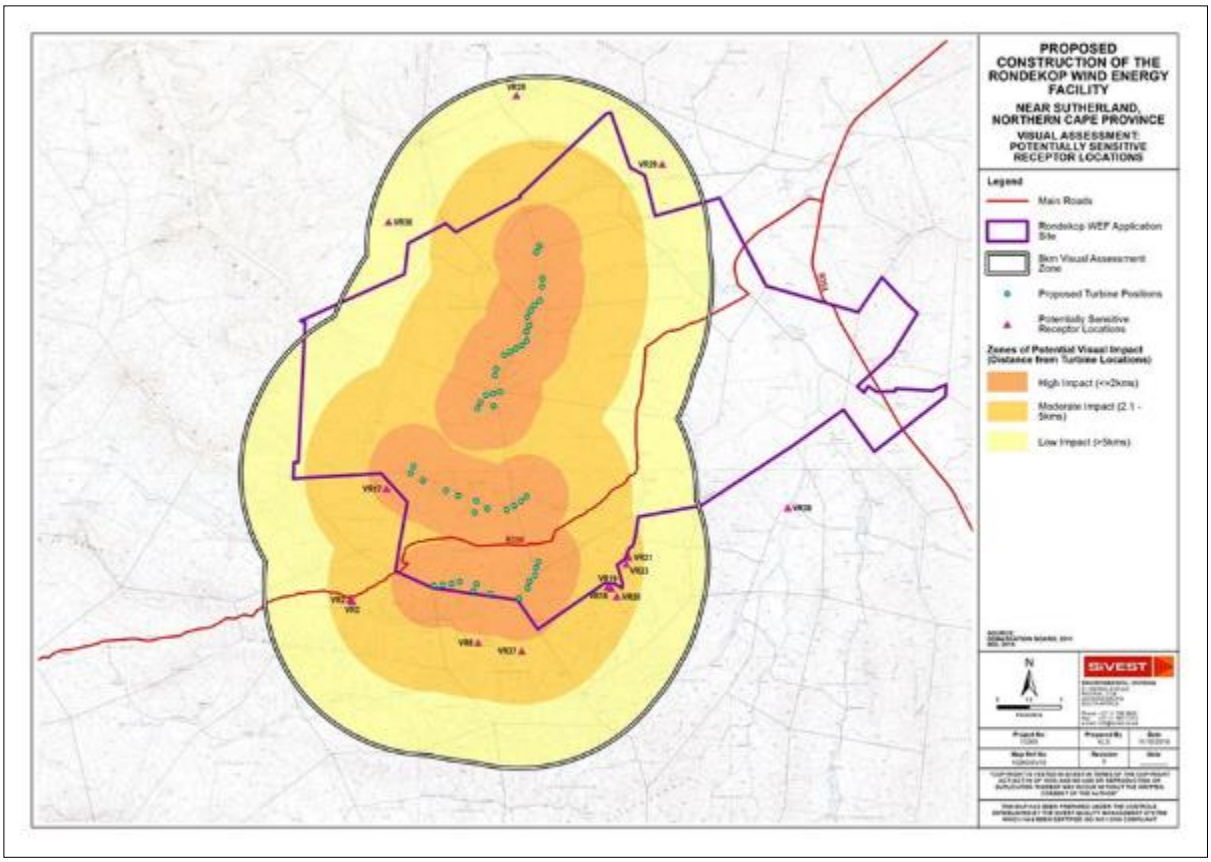

Figure 64: Potentially Sensitive Visual Receptors within the study area

10.8 Heritage and Palaeontology Sensitivities

10.8.1 *Heritage*

The archaeological resources identified within the proposed development site comprise a small number of Stone Age surface artefact scatters. These are primarily from the Later Stone Age (LSA), although Middle Stone Age (MSA) material was also identified. All these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered. Based on findings from a range of other heritage reports in the area, these types of sites are to be expected in this region.

The remaining heritage features included buildings and stone walled structures that are likely the result of early European settlement in the area. Most of these features are likely over 60 years of age and for this reason are protected by current heritage law.

Even though heritage features were detected within the development area, serious mitigation measures will not be required except for the implementation of a chance-finds protocol.

10.8.2 *Palaeontology*

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle from the 1st - 3rd October 2018. Access to all of the locations of the proposed site proved to be difficult. However, as many as possible of the proposed infrastructure locations were investigated. Exposed rock

layers were visually inspected but there were no visible evidence of fossiliferous outcrops. For this reason, an overall low palaeontological sensitivity is allocated to the development footprint. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the Rondekop WEF development will be of a low significance in palaeontological terms. It is therefore considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction of the development may be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

The overall impact of the WEF and its associated infrastructure, on the heritage and palaeontological resources identified during this report, is seen as **low** after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised. It is consequently recommended that no further palaeontological and heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. There are no preferences in terms of the proposed layout alternatives as none of them will affect known heritage resources thus no mitigation measures will be required, except for the implementation of a chance-finds protocol

10.9 Traffic Sensitivity

It is critical to ensure that abnormal load vehicles will be able to move safely and without obstruction along preferred routes.Thus identification of sensitive areas in terms of traffic impacts were identified, these included:

- Intersections with limited turning radii
- Sections of the road with sharp horizontal curves or steep gradients
- Gravel sections of the haulage routes must remain in good condition
- Narrow bridges, roads, cattle grids

Traffic related impacts are only envisaged during the construction and decommissioning phases and were identified as follows:

- The construction phase traffic, although significant, will be temporary and impacts are considered to have a **low significance**.
- During operation, it is expected that staff and security will periodically visit the facility. It is assumed that approximately less than ten (10) full-time employees will be stationed on site. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.
- The traffic generated during the decommissioning phase will be lower than the construction phase traffic and the impact on the surrounding road network will also be **low**.

The potential mitigation measures mentioned in the construction and decommissioning phases are:

  - Dust suppression
  - Component delivery to/ removal from the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.

- The use of mobile batch plants and quarries near the site would decrease the impact on the surrounding road network.
- Staff and general trips should occur outside of peak traffic periods.
- A “dry run” of the preferred route.
- Design and maintenance of internal roads.
- Any low hanging overhead lines (lower than 5.1m) e.g. Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.

The construction and decommissioning phases of a WEF are the only significant traffic generators and therefore noise and dust pollution will be higher during these phases. The duration of these phases is short term i.e. the impact of the WEF traffic on the surrounding road network is temporary and WEFs, when operational, do not add any significant traffic to the road network.

11 ENVIRONMENTAL MONITORING AND AUDITING

The Environmental Management Programme (EMPr) becomes a tool by which compliance on the proposed site can be measured against. In order to utilise this tool, environmental monitoring needs to take place with regular audits against the EMPr to ensure that all aspects are attended to.

Environmental monitoring establishes benchmarks to judge the nature and magnitude of potential environmental and social impacts.

Some of the key parameters for monitoring and auditing of the proposed project include the following *inter alia*:

- Impacts on Terrestrial Ecology;
- Impacts on Avifauna;
- Impacts on Bats;
- Impacts to Agriculture and Soils;
- Noise impacts due to the construction and operation of the wind farm;
- Visual impacts on the area imposed by the components of the facility;
- Impacts on heritage resources, including archaeology, paleontology and the cultural landscape;
- Positive and negative socio- economic impacts; and
- Impacts on Traffic.

The overall objective of environmental and social monitoring is to ensure that mitigation measures are implemented and that they are effective. Environmental and social monitoring will also enable responses to new and developing issues of concern. The activities and indicators that have been recommended for monitoring are presented in the EMPr.

The objectives of this EMPr are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;

- To identify measures that could optimise beneficial impacts;
- To create management structures that address the concerns and complaints of I&APs with regards to the development;
- To establish a method of monitoring and auditing environmental management practices during all phases of development;
- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management and Environmental Management System (EMS) ISO 14001 Principles;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Ensure that the safety recommendations are complied with;
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon; and
- Specify time periods within which the measures contemplated in the EMPr are implemented, where appropriate.

The EMPr Seeks to highlight the following:

- Avoiding impacts by not performing certain actions;
- Minimising impacts by limiting aspects of an action;
- Rectifying impacts through rehabilitation, restoration, etc. of the affected environment;
- Compensating for impacts by providing substitute resources or environments;
- Minimising impacts by optimising processes, structural elements and other design features;
- Provide ongoing monitoring and management of environmental impacts of a development and documenting of any digressions /good performances; and
- The EMPr is a legally binding document that all parties involved in the project must be made aware of.

Environmental monitoring will be carried out to ensure that all construction activities comply and adhere to environmental provisions and standard specifications, so that all mitigation measures are implemented. The contractor shall employ an officer responsible for implementation of social/environmental requirements. This person will maintain regular contact with the local / district Environmental Officers. The contractor and applicant will have a responsibility to ensure that the proposed mitigation measures are properly implemented during the construction phase.

A monitoring programme will be implemented for the duration of the lifecycle of proposed development. This programme will include:

- Monthly Audits During the Construction Phase
- According to the EMPr, EA and permit conditions which will be conducted by the ECO. These audits can be conducted randomly and do not require prior arrangement with the project manager.
- Compilation of an audit report with a rating of the compliance with the EMPr. This report will be submitted to the relevant authorities.
- Annual Audits conducted during the Operational Phase.
- Undertaken by the ECO.

The environmental monitoring program will operate through the preconstruction, construction, and operation phases. It will consist of a number of activities, each with a specific purpose with key indicators and criteria for significance assessment.

11.1 Planning and Design Phase

- Ensures that the design of the wind farm responds to the identified environmental constraints and opportunities.
- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- Ensures that adequate regard has been taken of identified environmental sensitivities, as well as any landowner and community concerns and that these are appropriately addressed through design and planning (where applicable).
- Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.
- Ensures that the best environmental options are selected for the wind farm.

11.2 Construction Phase

- Ensures that construction activities are properly managed in respect of environmental aspects and impacts.
- Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, and effects on local residents.
- Minimises the impact on the indigenous natural vegetation, protected tree species, and habitats of ecological value.
- Minimises impacts on fauna using the site.
- Minimises the impact on heritage sites should they be uncovered.

11.3 Operation Phase

- Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
- Enables the wind farm operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.
- Minimises impacts on fauna.

11.4 Decommissioning Phase

At the end of the operational phase of the proposed WEF, the WEF may be decommissioned, or repowered (redesigned and refitted to operate for a longer period). The aim of the decommissioning phase would be to return the site to its original pre-construction condition. In the unlikely event that decommissioning is required (i.e. the facility becomes outdated oir the land is required for other purpose), the decommissioning phase will be undertaken in line with the EMPR and the site will be rehabilitated to its original pre-construction condition.

All the components of the wind turbines are considered to be reusable or recyclable. In the event of the Rondekop WEF being decommissioned the components will be reused, recycled or disposed of in accordance with the relevant regulatory requirements, the turbines may also be traded or sold as there is an active second-hand market for wind turbines or in the event that sale is not possible then the turbines may be used as scrap metal. It must be noted that the decommissioning phase of the proposed development will also create skilled and unskilled employment opportunities.

Monitoring should be undertaken at a number of levels (Figure 65). Firstly, it should be undertaken by the Contractor at work sites during construction, under the direction and guidance of the Supervision Consultant who is responsible for reporting the monitoring to the implementing agencies. It is not the Contractor's responsibility to monitor land acquisition and compensation issues. It is recommended that the Contractor employ local full time qualified environmental inspectors for the duration of the Contract. The Supervision Consultant should include the services of an independent environmental and monitoring specialist on a part time basis as part of their team.

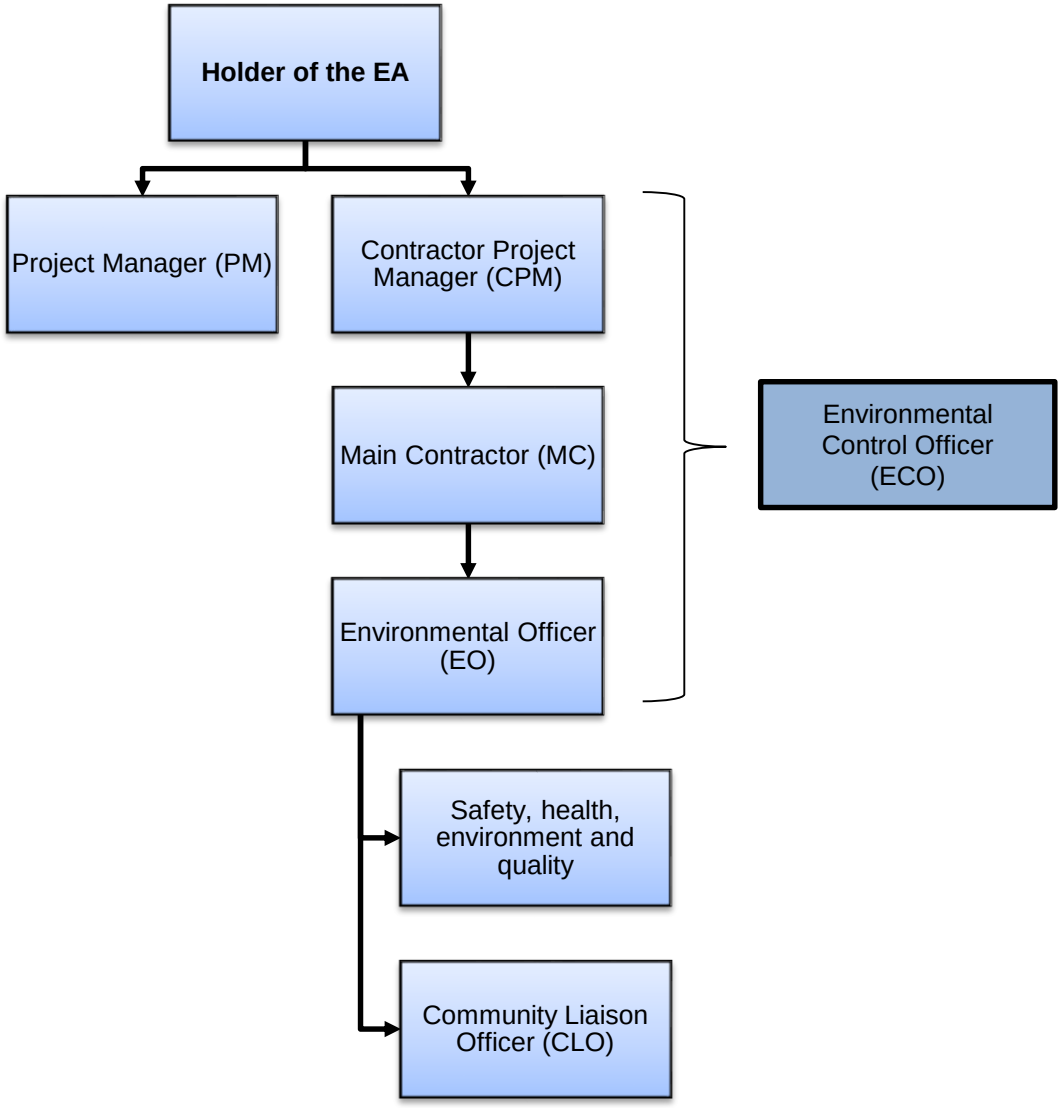

Figure 65: Organogram indicating the organisational structure

Environmental monitoring is also an essential component of project implementation. It facilitates and ensures the follow-up of the implementation of the proposed mitigation measure, as they are required. It helps to anticipate possible environmental hazards and/or detect unpredicted impacts over time.

Periodic ongoing monitoring will be required during the life of the Project and the level can be determined once the Project is operational.

The Draft EMPr is included in **Appendix 8**.

12 COMPLIANCE WITH EQUATOR PRINCIPLES

The Equator Principles (EP) are a financial industry benchmark for determining, assessing and managing social and environmental risk in project financing. A number of banks, exchanges and organisations worldwide have adopted the EPs as requirements to be undertaken for project funding on application and approval. Furthermore, certain funding institutions have not formally adopted the EPs, but require clients to be compliant with them in order to qualify for loans. The EPs are summarised below:

Table 143: IFC 2012 Performance Standards

Performance Standard	Intent and objective	Requirements	Project Specific Applicability
Assessment and Management of Environmental and Social Risks and Impacts (1)	Underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders. **Objectives:** ▪ To identify and evaluate environmental and social risks and impacts of the project. ▪ To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, 5 and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment.	▪ Policy ▪ Identification of Risks and Impacts Management Programmes ▪ Organisational Capacity and Competency ▪ Emergency Preparedness and Response ▪ Monitoring and Review ▪ Stakeholder Engagement ▪ External Communication and Grievance Mechanism	A formal Environmental and Social Management System will be compiled in the future.

Performance Standard	Intent and objective	Requirements	Project Specific Applicability
	▪ To promote improved environmental and social performance of clients through the effective use of management systems. ▪ To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately. ▪ To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.	▪ Ongoing Reporting to Affected Communities	
Labour and Working Conditions (2)	▪ Looks at the working conditions by following these principles; ▪ To establish and maintain the worker-management relationship (including specifically a human resources policy). ▪ To promote fair treatment, non-discrimination and equal opportunity of employees (and some contractors) and meet national employment laws. ▪ To protect the workforce by addressing child labour and forced labour.	▪ Working Conditions and Management of Worker Relationship ▪ Protecting the Work Force ▪ Occupational Health and Safety ▪ Workers Engaged by Third Parties ▪ Supply Chain	A Formal human resource and labour policies will be compiled in the event that the project is developed in the future.

Performance Standard	Intent and objective	Requirements	Project Specific Applicability
	▪ To promote healthy and safe working conditions.		
Resource Efficiency and Pollution Prevention (3)	▪ To avoid and minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities. ▪ To promote the reduction of emissions that contributes to climate change.	▪ Resource Efficiency ▪ Pollution Prevention	The requirements for PS 3 have been addressed in both the EIA process and EMPr. The project will have zero emissions and contributes to the reduction of greenhouse gases by offering an alternative to coal-based energy supply. Pollution prevention is discussed and assessed in the EIA Report and measures are provided in the EMPr.
Community Health Safety and Security (4)	▪ To avoid or minimise risks to and impacts on the health and safety of the local community during the project life cycle from both routine and non-routine circumstances. ▪ To ensure that the use of security personnel is carried out in a legitimate manner that avoids or minimizes risks to the community's safety and security.	Community Health and Safety Security Personnel	The requirements included in PS 4 have been addressed in the EIA process and the development of the EMPr. The following generic plans have been included in the EMPr andEmergency Response Plan; All plans will be made site specific as part of the financial close process, in the event that the project is developed in the future. Furthermore a Health and Safety Plan will be implemented during construction.

Performance Standard	Intent and objective	Requirements	Project Specific Applicability
Land Acquisition and Involuntary Resettlement (5)	▪ To avoid or at least minimize involuntary resettlement wherever feasible by exploring alternative project designs. ▪ To mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of land by; (i) providing compensation for loss of assets at replacement cost, and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. ▪ To improve or at least restore the livelihoods and standards of living of displaced persons. ▪ To improve living conditions among displaced persons through provision of adequate housing with security of tenure at resettlement sites.	Displacement Private Sector Responsibilities Under Government-Managed Resettlement	No resettlement applicable
Biodiversity Conservation and Sustainable Management of Living Natural Resources (6)	▪ To promote and conserve biodiversity. ▪ To avoid the introduction of alien invasive species. ▪ To promote sustainable management and use of natural resources (NRM).	▪ Protection of Conservation of Biodiversity ▪ Management of Ecosystem Services ▪ Sustainable Management of Living Resources	The requirements included in PS 6 have been addressed via numerous specialist studies and the findings and assessment associated with these aspects have been discussed in the EIA process. The EMPr incorporates mitigation measures from the specialist reports to ensure that aspects such

Performance Standard	Intent and objective	Requirements	Project Specific Applicability
		▪ Supply Chain	as conservation of biodiversity and alien plants control are considered.
Indigenous People (7)	▪ To foster full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples (IP). ▪ To avoid impacts or where avoidance is not feasible, minimize, mitigate and compensate in a culturally appropriate fashion and within the framework of successful good faith negotiation (a form of stakeholder engagement requiring approval of both parties). ▪ To establish and maintain effective relationships with IPs over the course of the project.	▪ Circumstances Requiring Free, Prior and Informed Consent ▪ Mitigation and Development Benefits ▪ Private Sector Responsibilities where Government is Responsible for Managing Indigenous Peoples Issues	The requirements included in PS 7 have been addressed in the EIA process and the development of the EMPr. An extensive public participation process is undertaken as part of the EIA process which engages all stakeholders, authorities and interested and affected persons who may be affected. Furthermore a Social Study was undertaken and recommendations from this study incorporated into the EMPr.
Cultural Heritage (8)	▪ To protect cultural heritage from adverse impacts of project activities and support its preservation. ▪ To promote the equitable sharing of benefits from the use of cultural heritage in business activities.	▪ Protection of Cultural Heritage in Project Design and Execution ▪ Project's Use of Cultural Heritage	The requirements included in PS 8 have been addressed through a cultural heritage study that was undertaken as part of the EIA process. Recommendation and mitigation measures from this study are incorporated into the EMPr.

12.1 Assessment Results

This section details the current compliance level with which the WEF project meets with the EPs and the related Performance Standards which are outlined below.

The coding key is as follows:

Compliance Level			
Clear			
Not assessed/ determined	Not compliant	Partially compliant	Compliant

Table 144: WEF compliance level in terms of EPs and related performance standards.

Principles	**Compliance Level**	**Reference**
General, Performance Standard 1 Environmental & Social Reporting		
1. Baseline Information		Refer to **Section 4**– Technical Details and – **Section 5** Description of the receiving environment
2. Alternatives (Assessment of alternatives)		Refer to **Section 9**
3. Impacts and risks		Refer to **Section 6** and **7**
4. Global impacts	N/A	N/A
5. Legal requirements		Refer to **Section 1.6** for legal requirements and guidelines
6. Transboundary	N/A	N/A
7. Disadvantaged / vulnerable groups		Addressed in **Appendix 6G** as part of the Social Impactscoping assessment. This will be addressed as part of the EMPr during the EIA phase
8. Third party		Refer to **Appendix 6G**
9. Mitigation measures		Addressed in **Section 6 and 7**. These will be addressed as part of the EMPr.
10. Documentation process		Refer to **Section 8**
11. Action Plans		Partially addressed in **Section 13** No major Action Plans required as mostly generic mitigation measures have been required.
12. Organisational capacity		Refer to **Appendix 1**
13. Training		Refer to **Appendix 1**

Principles	Compliance Level	Reference
14. Grievance mechanism		Refer to **Appendix 1,** The applicant will commit to full compliance with this standard when financial closure has been reached. The applicant is fully aware of the implications of this standard and this information will be made available in due course as part of the development planning for the project.
15. Report content		Refer to **Section 1**
Performance Standard 2, Labour & Working Conditions		
1. Human Resource Policy		Refer to **Appendix 1**. The applicant commit to full compliance with this standard when financial closure has been reached. The applicant is fully aware of the implications of this standard and this information will be made available in due course as part of the development planning for the project.
2. Working relationship		Refer to **Appendix 1**.
3. Working conditions with and terms of employment		Refer to **Appendix 1**.
4. Workers organisation		Refer to **Appendix 1**.
5. Non-discrimination and equal opportunities		Refer to **Appendix 1**. Partly addressed in **Section 6 and 7** as part of the Social Impact assessment. This issue will also be addressed as part of the EMPr
6. Grievance mechanism		Refer to **Appendix 1**. To be addressed as part of the EMPr
7. Occupational Health and Safety		Refer to **Appendix 1**. To be addressed as part of the EMPr
8. Non-employee workers		Refer to **Appendix 1**. To be addressed as part of the EMPr
9. Supply Chain		Refer to **Appendix 1**. To be addressed as part of the EMPr
10. Labour Assessment Component of a Social and Environmental Assessment		Refer to **Appendix 1**. To be addressed as part of the EMPr
Performance Standard 3, Pollution		
1. Pollution Prevention, Resource Conservation and Energy Efficiency		Refer to EMPr in **Appendix 8**.
2. Wastes		Refer to EMPr in **Appendix 8**.

Principles	Compliance Level	Reference
3. Hazardous material		Refer to EMPr in **Appendix 8**.
4. Dangerous substances		Refer to EMPr in **Appendix 8**.
5. Emergence preparedness and response		Refer to EMPr in **Appendix 8**. The applicant commit to full compliance with this standard when financial closure has been reached. The applicant is fully aware of the implications of this standard and this information will be made available in due course as part of the development planning for the project.
6. Technical guidance – ambient considerations		Refer to **Appendix 1**.
7. Greenhouse gas emissions		N/A. No greenhouse gas emissions will result from the proposed development apart from the manufacturing of the turbine components and limited emissions during construction phase.
Performance Standard 4, Health & Safety		
1. Hazardous materials safety		Refer to EMPr in **Appendix 8**.
2. Environmental and natural resource issues		Refer to **Sections 6** and **7.**
3. Emergency preparedness and response		Refer to EMPr in **Appendix 8**. The applicant commit to full compliance with this standard when financial closure has been reached. The applicant is fully aware of the implications of this standard and this information will be made available in due course as part of the development planning for the project.
Performance Standard 5, Land Acquisition		Refer to **Sections 4** and **5.**
Performance Standard 6, Biodiversity		Refer to **Section 5.2.1, and Section 7.1** which summarises the findings of the Biodiversity Impact Assessment Study
Performance Standard 7, Indigenous People		Refer to **Section 5.15** which detail the findings of the Social Impact assessment. In addition, **Section 8** describes public participation.
Performance Standard 8, Cultural Heritage		Refer to **Section 5.14**

It is important to note that, some of the issues listed per performance standard in the table above will only be addressed during the pre-construction and construction phase of the project.

13 CONCLUSIONS AND RECOMMENDATIONS

Rondekop Wind Farm is proposing to construct a Wind Energy Facility (WEF) and associated infrastructure near Sutherland in the Northern Cape Province of South. The proposed development will consist of a 325MW maximum export capacity and if referred to as Rondekop Wind Energy Facility (Rondekop WEF). The overall objective of the proposed development is to generate electricity to feed into the National Grid.

The EIA for the proposed development has been conducted in accordance with the EIA Regulations, 2014 as amended promulgated in terms of Chapter 5 NEMA, 1998. A preferred layout has been identified which is less environmentally sensitive and will result in the least environmental impact

Various feasible layout alternatives were identified including access road alternatives, substation location alternatives and construction camp location alternatives. One location alternative and one technology alternative were considered. All alternatives were assessed against the no-go alternative i.e. status quo.

The majority of the studies undertaken during the scoping phase were conducted at an EIA level and as such included ground truthing verification of the proposed development site. The avifauna and bat studies have each been undertaken over a 12-month period, while an intensive Terrestrial ecology study was undertaken to further identify and define environmental constraints within the proposed development footprint. Based on the findings of the Terrestrial, Avifauna and Bat specialist assessments, the initial proposed WEF layout and associated infrastructure that was presented in the DSR and FSR was refined to further avoid environmental sensitivities

Detailed mitigation and management measures have been developed in the EIA phase and put forward in the Environmental Management Programme (EMPr). Should this project receive a positive environmental authorisation, the EMPr will guide the project proponent and appointed contractor(s) through the final design, construction and operational phases of the proposed project.

The findings of the specialist studies undertaken within this EIA provide an assessment of both the benefits and potential negative impacts anticipated as a result of the proposed Rondekop WEF. The findings conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding. Areas of special concern have however been identified which will require site specific mitigation measures to reduce impacts. These are included within the EMPr to ensure that these areas receive special attention.

It was determined during the EIA that the proposed project will result in limited potential negative impacts and certain positive impacts. A preferred layout has been identified which is less environmentally sensitive and will result in the least environmental impact.

A detailed public participation process was followed during the EIA process which conforms to the public consultation requirements as stipulated in the EIA Regulations, 2014. In addition, all issues raised by I&APs will be captured in the FEIAr and where possible, mitigation measures provided in the EMPr to address these concerns.

13.1 Summary of Specialist Findings and recommendations

A summary of the findings for each identified environmental impact evaluated in the context of the proposed development (both biophysical and social) is provided in the table below.

Table 145: Summary of environmental issues identified in Specialist Studies

Specialist Studies	Summary of Impacts
Terrestrial Ecology	The following impacts have been identified: **Design Phase Impacts** *Direct impacts* Direct impacts include the following: • Loss and/or fragmentation of indigenous natural vegetation due to clearing. **Construction Phase Impacts** *Direct impacts* • Direct impacts include the following: • Loss and/or fragmentation of indigenous natural vegetation due to clearing; • Loss of individuals of plant species of conservation concern and/or protected plants; • Loss of faunal habitat and refugia; • Direct mortality of fauna due to machinery, construction and increased traffic; • Displacement and/or disturbance of fauna due to increased activity and noise levels; • Increased poaching and/or illegal collecting due to improved access to area; • Effects on physiological functioning of vegetation due to dust deposition; and • Impact on integrity of Critical Biodiversity Areas. *Indirect impacts* Indirect impacts during the construction phase include the following: • Establishment and spread of alien invasive plants due to the clearing and disturbance of indigenous vegetation; • Changes to behavioural patterns of animals, including possible migration away or towards the project area; and • Increased runoff and erosion due to clearing of vegetation, construction of hard surfaces and compaction of surfaces, leading to changes in downslope areas. **Operational Phase Impacts** *Direct impacts* • Ongoing direct impacts will include the following: • Continued disturbance to natural habitats due to general operational activities and maintenance; and

Specialist Studies	Summary of Impacts
	• Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with infrastructure. *Indirect impacts* These will include the following: • Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors; • Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape; and • Changes to behavioural patterns of animals, including possible migration away or towards the project area. **Decommissioning Phase Impacts** *Direct impacts* These will include the following: • Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites; • Direct mortality of fauna due to machinery, construction and increased traffic; • Displacement and/or disturbance of fauna due to increased activity and noise levels; and Effects on physiological functioning of vegetation due to dust deposition. *Indirect impacts* These will occur due to renewed disturbance due to decommissioning activities, as follows: • Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors; • Changes to behavioural patterns of animals, including possible migration away or towards the project area. **Cumulative Impacts** These include the following: • Cumulative impacts on indigenous natural vegetation due to clearing; • Cumulative impacts on individuals of plant species of conservation concern and/or protected plants; • Cumulative impacts on ecological processes; • Cumulative impacts on fauna; • Cumulative impacts due to establishment and spread of alien invasive plant species; • Cumulative impacts due to loss of protected animals; and • Cumulative impacts on Critical Biodiversity Areas and conservation planning.

Specialist Studies	Summary of Impacts
	Biodiversity patterns on site have been established to a high level of detail and with a high degree of confidence as it is based on two weeks of field surveys on site and a detailed desktop assessment, where after the following has been concluded: • No threatened plant or animal species are likely to be affected by the proposed project; • A number of plant species protected according to Provincial legislation will be affected, but these are all common and / or widespread species, none of which are of conservation concern. The presence of these species triggers a permit requirement, but does not affect rare or threatened species; • The vegetation types affected by the project are widespread and have been transformed overall to a small degree. They are therefore of low conservation concern. The amount of transformation due to the proposed project is small in absolute terms and also relative to the overall distribution of the regional vegetation; • There are habitats on site that have been identified as being of higher sensitivity and value than the general vegetation, including rocky outcrops and riparian vegetation. These have all been mapped in detail and all attempts made to ensure that the project affects these areas to the smallest degree possible, including shifting infrastructure, where possible. Residual impacts on these areas of elevated sensitivity are small compared to the distribution of these on site. • The only matter of concern for the site is the presence of Critical Biodiversity Areas, mostly CBA2 Important areas, within which approximately half of the project falls. The CBAs include vegetation and floristic patterns that are virtually identical to parts of the site that are not included in the CBA. The total area affected by the project that falls within CBAs is relatively insignificant in comparison to the overall extent of the CBA. Nevertheless, mitigation measures have been proposed to minimise this potential loss of habitat as much as possible, including changes to the location of infrastructure to avoid sensitive sites. At the site-specific scale, some sensitivities have been identified, primarily related to natural habitat, but also to some individual (protected) species. Many of these can be minimised or avoided with the application of appropriate mitigation or management measures, including, in some cases, slight shifts of infrastructure positions. There will be residual impacts, primarily on natural habitat. Overall based on the vegetation found on the site and the detailed site assessment, the impact to this vegetation is considered low due to the presence of this vegetation on other ridges in the area. The amount of habitat that will be lost to the project is insignificant compared to the area in hectares of the regional vegetation type that occurs on site and over the entire geographical range of the vegetation type. In most cases, the exact location of important biodiversity features has been identified in the field at a high level of confidence and suggestions made to relocate proposed infrastructure to avoid these.

Specialist Studies	Summary of Impacts
	From this perspective it is unlikely that the proposed project will have an unacceptable impact on the natural environment. Based on the analysis provided in this report, the conclusion is that the project should be authorised (inclusive of all project alternatives).
Avifauna	The pre-construction bird monitoring programme methodology implemented covered all four seasons for the bird community on the site, as recommended by the *Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa* (Jenkins *et al*., 2015), therefore providing a solid baseline for the establishment of the future assessments. Site visits confirmed the occurrence of a relatively high abundance of Accipitrid and Falcon species. The results have shown that both groups have a constant presence at the site throughout the year and spend a high proportion of their time and/or number of contacts at rotor height in comparison with the other groups of species. It is also important to note that their activity was largely associated with the hillside and escarpment areas, where most of the potential collision risk movements were observed. A total of eight (8) species confirmed on site may be of special concern for having an unfavourable conservation status in South Africa: Black Harrier *Circus maurus*, Ludwig's Bustard *Neotis ludwigii*, Martial Eagle *Polemaetus bellicosus* – Endangered; Black Stork *Ciconia nigra*, Verreauxs' Eagle *Aquila verreauxii* – Vulnerable; Karoo Korhaan *Eupodotis vigorsii*, Maccoa Duck *Oxyura maccoa*, Greater Flamingo *Phoenicopterus roseus* – Near Threatened (Taylor *et al*., 2015). Sensitive areas identified at the proposed site considered the relevant aspects collected through the bird monitoring programme, including: relevant activity of sensitive species and associated potential for collision recorded in areas of hillsides and escarpments; particular association of passerine species and other relevant sensitive species to riverine thickets and water features; association of red-listed species with their potential breeding/roosting locations. This allowed for establishing avoidance areas (areas with very high sensitivity for birds). The main direct impacts identified to potentially occur are: increased habitat loss, increased fatalities due to collision with various project infrastructures, and increased disturbance/displacement effects. The overall significance of these impacts expected to occur during the construction, operation, and decommissioning phases, is expected to be medium before mitigation, and low after mitigation – as seen in the summary table below. Rondekop WEF is considered to be located in an area of medium sensitivity with some habitat features of very high sensitivity in terms of the bird community present. It is considered that the impacts can be minimised to the maximum extent possible, mostly through the avoidance of very high sensitive areas, and through mitigation measures within areas of medium sensitivity.

Specialist Studies	Summary of Impacts
	Presently, the potential impacts to birds is not anticipated to be of a high significance, provided that the aforementioned avoidance/mitigation measures are followed. As such, no fatal flaws were identified for this project, and the project may be authorised from an avifaunal perspective, subject to the proposed mitigation measures listed below being followed.
Bats	12-month pre-construction monitoring programme was undertaken in accordance with the best practice pre-construction monitoring guidelines. Results of the pre-construction bat monitoring indicate that the bat activity at the proposed Rondekop WEF area is in general low at ground and rotor level. One (1) species with confirmed occurrence is perceived as having a potential high risk of collision with wind turbines (according to Sowler *et al.,* 2017) due to their behaviour, i.e. *Tadarida aegyptiaca*. Three (3) other species with confirmed presence in the area raise concerns regarding their probability of fatalities, as they have a medium-high risk of collision with wind turbines: *Neoromicia capensis*, *Miniopterus fraterculus* and *Miniopterus natalensis*. Additionally, *Miniopterus natalensis* is a migrant species that can use air space at rotor level height during migration periods being prone to collision during these events. These are all "Near Threatened" or "Least Concern" species, according to the South African Red List (Friedmann & Daly, 2004b). Sensitive areas identified at the proposed site considered the presence of specific features and habitat that may have an increased bat activity, including: waterbodies, watercourse lines and associated riverine vegetation, which are important for bats, since they are likely to act as commuting routes, providing food resources, likely to be associated with higher bat activity. This allowed for establishing avoidance areas (areas with very high sensitivity for bats). The main direct impacts identified to potentially occur are: increased habitat loss, increased fatalities due to collision with turbine blades or barotrauma, and increased disturbance/displacement effects. The overall significance of these impacts expected to occur during the construction, operation, and decommissioning phases, is expected to be medium before mitigation, and low after mitigation. Rondekop WEF is considered to be located in an area of low sensitivity with some habitat features of very high sensitivity in terms of the bat community present. It is considered that the impacts can be minimised to the maximum extent possible, mostly through the avoidance of very high sensitive areas. Presently, the potential impacts to bats is not anticipated to be of a high significance, provided that the aforementioned avoidance/mitigation measures are followed. As such, no fatal flaws were identified for this project, and the project may be authorised from a bats perspective, subject to the proposed mitigation measures listed being followed.

Specialist Studies	Summary of Impacts
Aquatic Ecology	The aquatic assessment of the proposed Rondekop WEF included the delineation of any natural waterbodies on the properties in question, as well as an assessment of the potential consequences of the proposed layout on the surrounding watercourses. The report indicates the significant watercourses within the site and recommends that any activities within these areas or the 32 m buffer will require a Water Use License (WUL) (possible General Authorisation [GA]) under Section 21 c & i of the National Water Act (Act 36 of 1998). An assessment of the proposed layout for the Rondekop WEF found that the proposed activities would have the potential to create erosion and as such, the report includes recommended mitigation measures. Five (5) of the six (6) proposed access road alternatives are considered preferred as they either make use of existing roads and tracks or the overall impact with mitigation would be LOW. One wetland was found on Centre Ridge Road Alternative 1 by the Terrestrial Ecologist and thus this alternative 1 is no longer supported. Construction Camp Alternatives 2, 3 and 4 are considered to be preferred alternatives as they all avoid the watercourses and their respective buffers. Alternatives 1 and 5 however are rated as favourable alternatives since they will require minimal micro-siting to avoid watercourse buffer. All the proposed substation site alternatives are considered preferred as they all avoid the watercourses and their respective buffers. Overall, it was concluded that the proposed WEF would seemingly have limited impact on the aquatic environment as the proposed structures for the most part have either avoided the delineated watercourses, except for existing access roads that will make use of existing roads crossing watercourses. The use of any existing roads and upgrading thereof will further support this conclusion. One wetland was found within the site and no aquatic protected or species of special concern (flora) were observed during the site visit.
Agriculture and Soils	The agriculture and soils assessment concluded that all agricultural impacts of the proposed development are assessed as being of low significance. This is because of the limited agricultural potential of the proposed development site, which is a function of the climate, terrain and shallow soils and the fact that grazing can continue in tandem with the WEF. The fact that the footprint of disturbance of the wind farm is limited to a very small proportion of the surface area also limits the agricultural impact. The study area has low agricultural sensitivity because of its low potential. No parts of the site need to be excluded from the proposed development and no buffers are required.

Specialist Studies	Summary of Impacts
	Because of the low agricultural impacts and the agricultural uniformity of the site, the assessment found no material difference between the significance of impacts of any of the proposed alternatives. Therefore, from an agricultural impact perspective, there are no preferred alternatives, and all the proposed alternatives are acceptable.
Noise	The Noise Impact Assessment involved a literature review, desktop modelling and baseline monitoring of the ambient noise levels at the site. The results of the study indicate that the following conclusions can be drawn: • There will be a short-term increase in noise in the vicinity of the site during the construction phase as the ambient noise level will be exceeded by vehicle operations. • The area surrounding the construction sites will be affected for short periods of time in all directions, should numerous construction equipment be used simultaneously. • The number of construction vehicles that will be used in the project will add to the existing ambient levels and will most likely cause a disturbing noise for a limited time. The exact number of construction vehicles is not known at present. The duration of impact will however be short-term. • The day/night time SANS 10103:2008 noise limit of 45Db (A) will not be exceeded at any of the noise sensitive areas. • The night time guideline noise limit of 35dB(A) will in all likelihood not be exceeded at any of the noise sensitive areas except for NSA 15 and 16 above 5m/s windspeed, as wind noise masking will occur as the wind speed increases. Although these homesteads are only occupied for 3 – 4 Months of the year during winter when grazing is optimal. However, the assessment did not consider masking effect and considered a 125m hub height. A higher hub height and the masking effect of wind could reduce the noise impact. Therefore, the turbines may all be authorized. • The impact of low frequency noise and infra sound will be negligible and there is no evidence to suggest that adverse health effects will occur as the sound power levels generated in the low frequency range are not high enough to cause physiological effects. • All turbine positions met the 500 m setback distance from noise sensitive receptors. • The cumulative impacts will not exceed the day/night time SANS 10103:2008 noise limit of 45dB(A). • The cumulative impacts will not exceed the night time SANS 10103:2008 noise limit of 35dB(A). The construction phase and operational phase will have a very low noise impact on the noise sensitive receptors.

Specialist Studies	Summary of Impacts
	It was concluded that, provided that the mitigation measures presented in the noise specialist study are implemented effectively, the noise from the turbines at the identified noise sensitive areas is predicted to be less than the 35 dB(A) night limit and 45 dB(A) day/night limit for rural areas presented in SANS 10103:2008. This will be confirmed with onsite measurements at NSA 15 and 16 during the operational phase, as above 5m/s the turbine noise exceeds the night limit. The wind masking noise will however mitigate this impact. The overall noise impact with recommended mitigation is expected to be negative and of very low significance before and after mitigation.
Visual	A visual study was conducted to assess the magnitude and significance of the visual impacts associated with the development of the proposed Rondekop WEF. Overall the sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with rural elements. As such, WEF development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present in the study area. The area is not however typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. The proposed development will have a high level of impact on one (1) of these receptors and a medium level of impact on twelve (12) identified receptors. The assessment revealed that the proposed WEF will have an overall Low Negative visual impact during construction and an overall negative medium visual impact during operation, with relatively few mitigation measures available to reduce the visual impact. The associated WEF infrastructure would have a Low Negative visual impact during both the construction and operation phases. Although several renewable energy developments and infrastructure projects, either proposed or under construction, were identified within a 50 km radius of the Rondekop WEF, it was determined that only two of these would have any significant impact on the landscape within the visual assessment zone. Both of these WEFs (Kudusberg WEF and Kareebosch WEF) are directly adjacent to the Rondekop WEF. It is anticipated that this concentration of facilities will alter the inherent sense of place and introduce an increasingly industrial character into a largely rural area. This will result in significant cumulative impacts, rated as negative medium during both construction and operation phases of the project. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. The impact should also be viewed in light of the project being proposed partially within a REDZ.
Heritage	Due to the nature of cultural remains, a systematic controlled-exclusive surface survey was conducted on foot and in a vehicle, over a period of four days by two archaeologists from PGS. The fieldwork was conducted on the 20th-24th September

Specialist Studies	Summary of Impacts
	2018. An additional site assessment was also conducted by a Palaeontologist from Banzai Environmental on the 1st – 3rd October 2018. The locations of five (5) individual heritage sites were identified during the field survey, all of them falling within the boundaries of the study area. **Archaeology** The archaeological resources identified within the proposed development site comprise a small number of Stone Age surface artefact scatters. These are primarily from the Later Stone Age (LSA), although Middle Stone Age (MSA) material was also identified. All these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered. Based on findings from a range of other heritage reports in the area, these types of sites are to be expected in this region. The remaining heritage features included buildings and stone walled structures that are likely the result of early European settlement in the area. Most of these features are likely over 60 years of age and for this reason are protected by current heritage law. Even though heritage features were detected within the development area, serious mitigation measures will not be required except for the implementation of a chance-finds protocol. However, if the development layout is altered, this position will need to be revaluated. **Paleontology** The proposed Rondekop development site is underlain by the Abrahamskraal Formation (Adelaide Subgroup, lower Beaufort Group, of the Karoo Supergroup) and the Waterford Formation of the Ecca Group (Karoo Supergroup). According to the PalaeoMap on SAHRIS the Abrahamskraal and Waterford Formations have very high Palaeontological sensitivities while the Ecca has a moderate Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website). Access to all the locations of the proposed site proved to be difficult. However, as many as possible locations were investigated with no visible evidence of fossiliferous outcrops. For this reason, an overall low palaeontological sensitivity is allocated to the development footprint. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the Rondekop WEF development will be of a low significance in palaeontological terms. It is therefore considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction of the development may be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

Specialist Studies	Summary of Impacts
	The proposed development, as well as all alternatives have a similar geology and therefore there is no preferences on the grounds of palaeontological fossil heritage for any specific layout among the different options under consideration. **Cultural Landscape** The visual assessment completed by Gibb *et al* (2018) for the Rondekop WEF characterised the study area as a "typical of a Karoo or "platteland" landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa." They do however find that visual impacts on the cultural landscape would be reduced by the fact that the area is very remote and there are no significant tourism enterprises attracting visitors into the study area. In addition, the nearest major scenic route, the R354, is outside the 8km visual assessment zone and is not expected to experience any visual impacts from the proposed WEF. The cultural landscape in this area is therefore considered to be of low significance and the impacts on the cultural landscape of low significance. **General** In the event that significant heritage resources are discovered during site clearance, construction activities must stop in the immediate vicinity of the find, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures. The overall impact of the WEF and its associated infrastructure, on the heritage resources identified during this report, is seen as low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised. There are no preferences in terms of the proposed layout alternatives as none of them will affect known heritage resources thus no mitigation measures will be required, except for the implementation of a chance-finds protocol. However, if the development layout is altered, this position will need to be revaluated.
Social Impact	A social impacts assessment was undertaken to consider the positive and negative impacts associated with the proposed development. The social impacts associated with the project were identified as follows; **Construction Phase Impacts** *Health and social wellbeing* • Annoyance, dust noise and shadow flicker • Increase in crime • Increased risk of HIV infections • Influx of construction workers • Hazard exposure.

Specialist Studies	Summary of Impacts
	Quality of the living environment • Disruption of daily living patterns • Disruptions to social and community infrastructure • Transformation of the sense of place. *Economic* Job creation and skills development Socio-economic stimulation. **Operational Phase Impacts** *Quality of the living environment* • Transformation of the sense of place. *Economic* • Job creation and skills development • Socio-economic stimulation. **Cumulative Impacts** *Health and social wellbeing* • Risk of HIV and AID; *Quality of the living environment* • Sense of place; • Service supplies and infrastructure *The Economy* • Job creation and skills development and • Socio-economic stimulation It was concluded that most of the impacts apply over the short term to the construction phase of the project. All of these impacts can be mitigated to within acceptable ranges and there are no fatal flaws associated with the construction of the project. Positive impacts can be enhanced. Although the project will be highly visible and is likely to change the sense of place of the area over the operational phase, it will also have significant benefits in respect of the supply of renewable energy into a grid system heavily reliant on coal powered systems. In this sense the project forms part of a national effort to reduce South Africa's carbon emissions and thus carries with it a significant benefit. Considering the impacts identified, it is evident that the cumulative impacts associated with changes to the social environment of the region are more significant than those

Specialist Studies	Summary of Impacts
	attached to the project. On a negative front there are two issues associated with developments in the region that are of most concern. The first of these issues is the change to the sense of place of an area that was once considered a pristine region of South Africa. The second is the potential, through an influx of labour and an increase in transportation to constructions sites, of the risk for the prevalence of HIV to rise in an area that has the lowest HIV prevalence rate in South Africa. It is important that the relevant authorities recognise these issues and find ways of mitigating them to ensure that they do not undermine the benefit that renewable energy projects bring, both to the region as well as to the country as a whole. From a Socio-Economic perspective the impacts associated with the proposed WEF are considered to be overall of medium significance with the negative impacts being are able to be mitigated to acceptable levels with the implementation of the recommended mitigation measures. The project fits well with the investment into renewable energy finding strong support in the National Development Plan and thus filtering down through other national, provincial and municipal legislation and documentation. The project is also quite likely to have a positive effect on the national and regional economy. There are no obvious fatal flaws associated with the proposed development at a social level. All the proposed layout alternatives appear to be acceptable, and there should be no problem with the proposed development proceeding with environmental authorisation. It is unlikely that any further assessment will be required from a Socio-economic perspective.
Traffic	A transport study assessed the potential impact of activities related to the delivery of the turbine components and associated supporting infrastructure to site, equipment and material and staff transportation for the construction and operation and decommissioning phases of the proposed Rondekop WEF. It was determined that the main transport impacts will be during the construction and decommissioning phases of a WEF where the delivery of the infrastructure will generate significant traffic. The duration of these phases are short term i.e. the impact of the traffic on the surrounding road network is temporary and when the WEF is operational, do not add any significant traffic to the road network. The traffic impact on the surrounding network is therefore deemed low. Traffic generated by the construction activities of the WEF will however have a significant impact on the road infrastructure, albeit of a short-term nature. Additionally, the construction of the WEF will create dust and noise pollution that will have a low (short term) impact during the construction and decommissioning phases. Mitigation measures were proposed to minimize potential impacts.

Specialist Studies	Summary of Impacts
	All access road alternatives are considered suitable. It should be noted that there is no preference between the construction camp and substation alternatives presented as these do not affect or have any impact on the traffic on the surrounding road network. In conclusion, it was stated that the development is supported from a transport perspective provided that the recommendations and mitigations contained in the report are adhered to.

Figure 66: Rondekop WEF sensitivity map.

The results of the specialist studies have indicated that preferred options contain no fatal flaws as a result of the proposed project. Additionally, the specialists comparatively assessed the alternatives as provided in **Figure 67 and Figure 68** the results of the comparative assessment are summarised below in **Table 146**

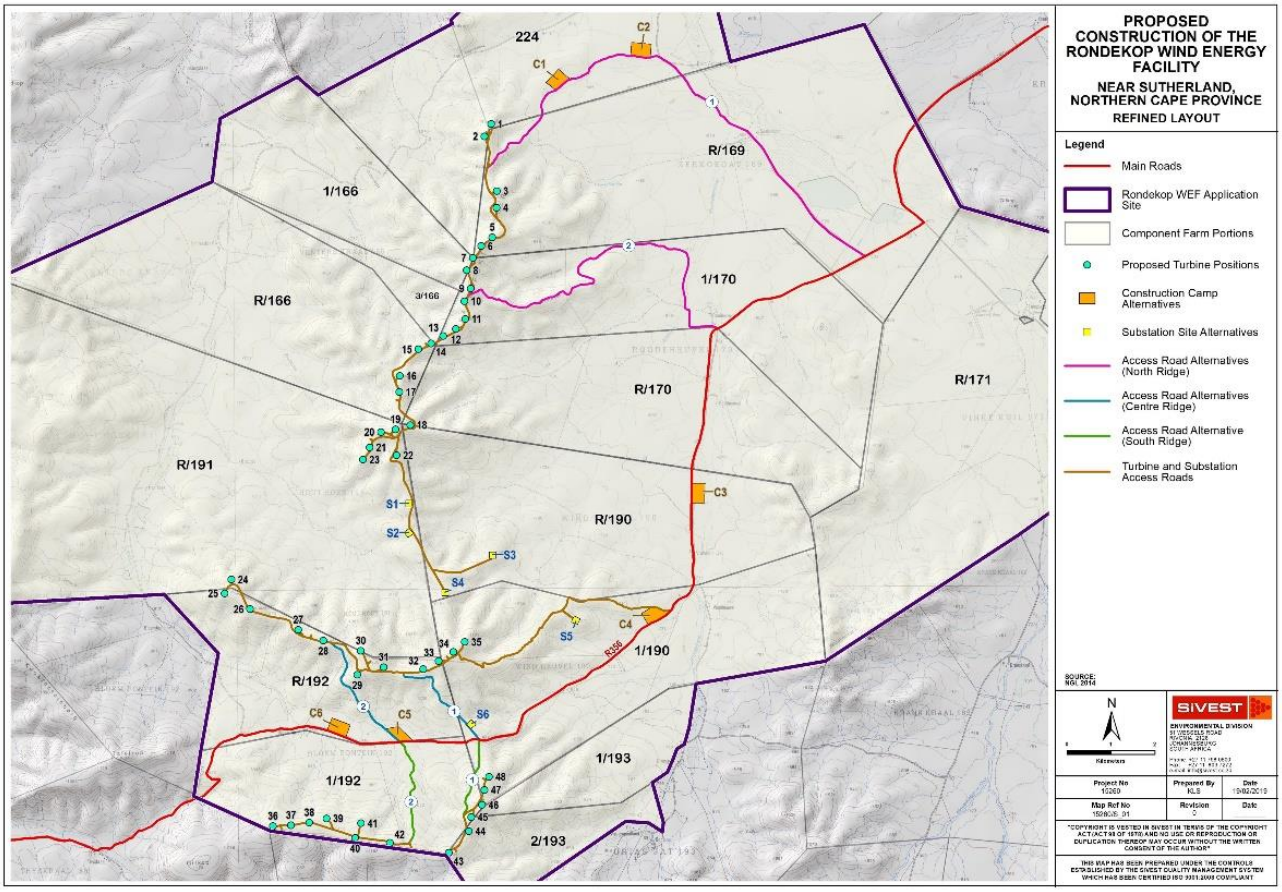

Figure 67: Refined Layout Map

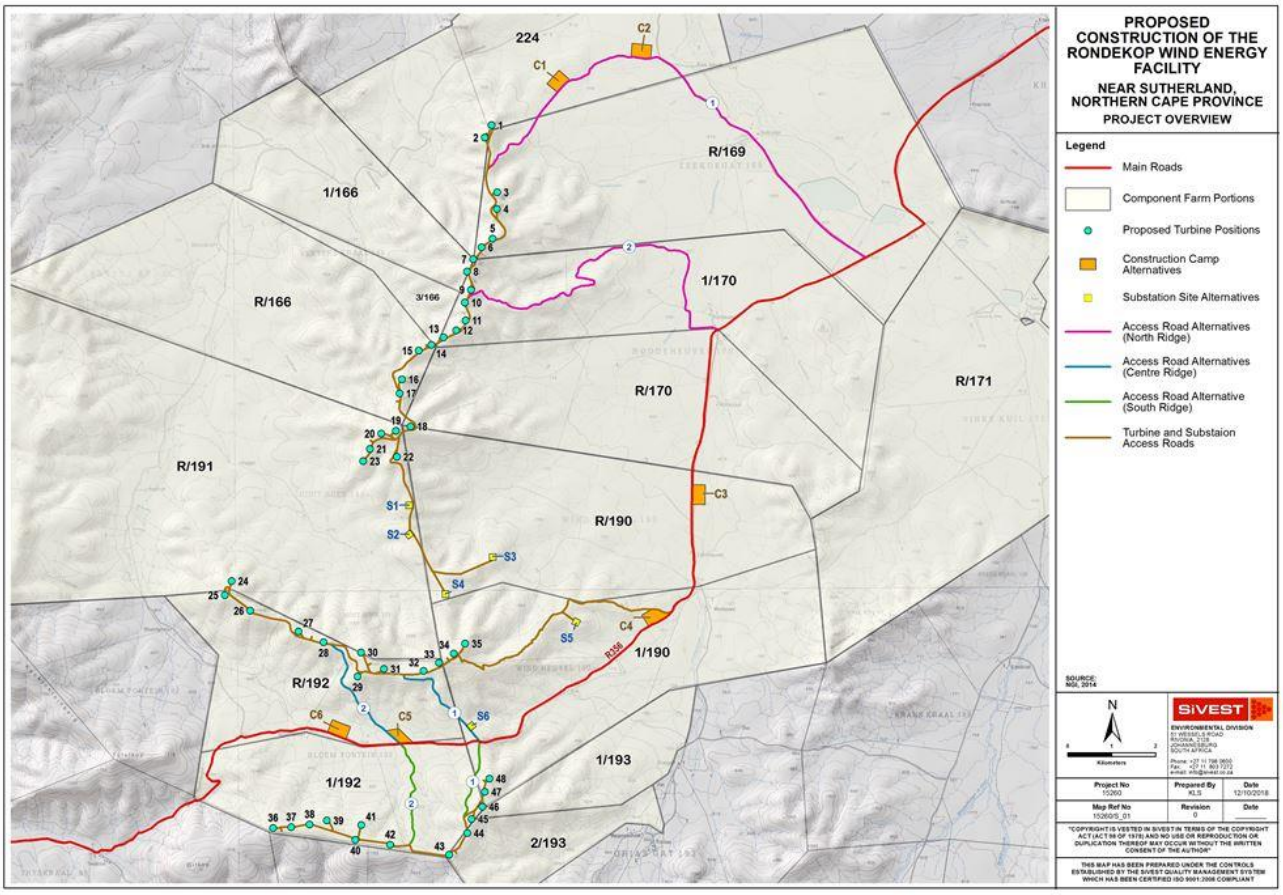

Figure 68: Initial Layout Map

Table 146:Summary of comparative assessment of EIA Phase layout alternatives

ALTERNATIVE	ENVIRONMENTAL ASPECT										FATAL FLAW	Preferred
	Terrestrial Ecology	Aquatic Ecology	Visual	Bat	Birds	Social	Traffic	Noise	Agricultural and Soils	Heritage		
ACCESS ROADS ALTERNATIVES												
North Ridge Access Road Alternative 1	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	No preference	No preference	No preference	No preference	No	**YES**
Centre ridge Access Road Alternative 2	Preferred	Preferred	Favourable	Favourable	Least preferred	Favourable	No preference	No preference	No preference	No preference	No	**YES**
Southern ridge Access Road Alternative 2	Preferred	Preferred	Preferred	Favourable	Least preferred	Preferred	No preference	No preference	No preference	No preference	No	**YES**
CONSTRUCTION CAMP ALTERNATIVES												
Construction Camp Alternative 3	Favourable	Preferred	Preferred	No preference	No preference	Preferred	No preference	No preference	No preference	No preference	No	**YES**
SUBSTATION ALTERNATIVES												
Substation Alternative 1	Preferred	Preferred	Favourable	Favourable	Favourable	Favourable	No preference	No preference	No preference	No preference	No	**YES**

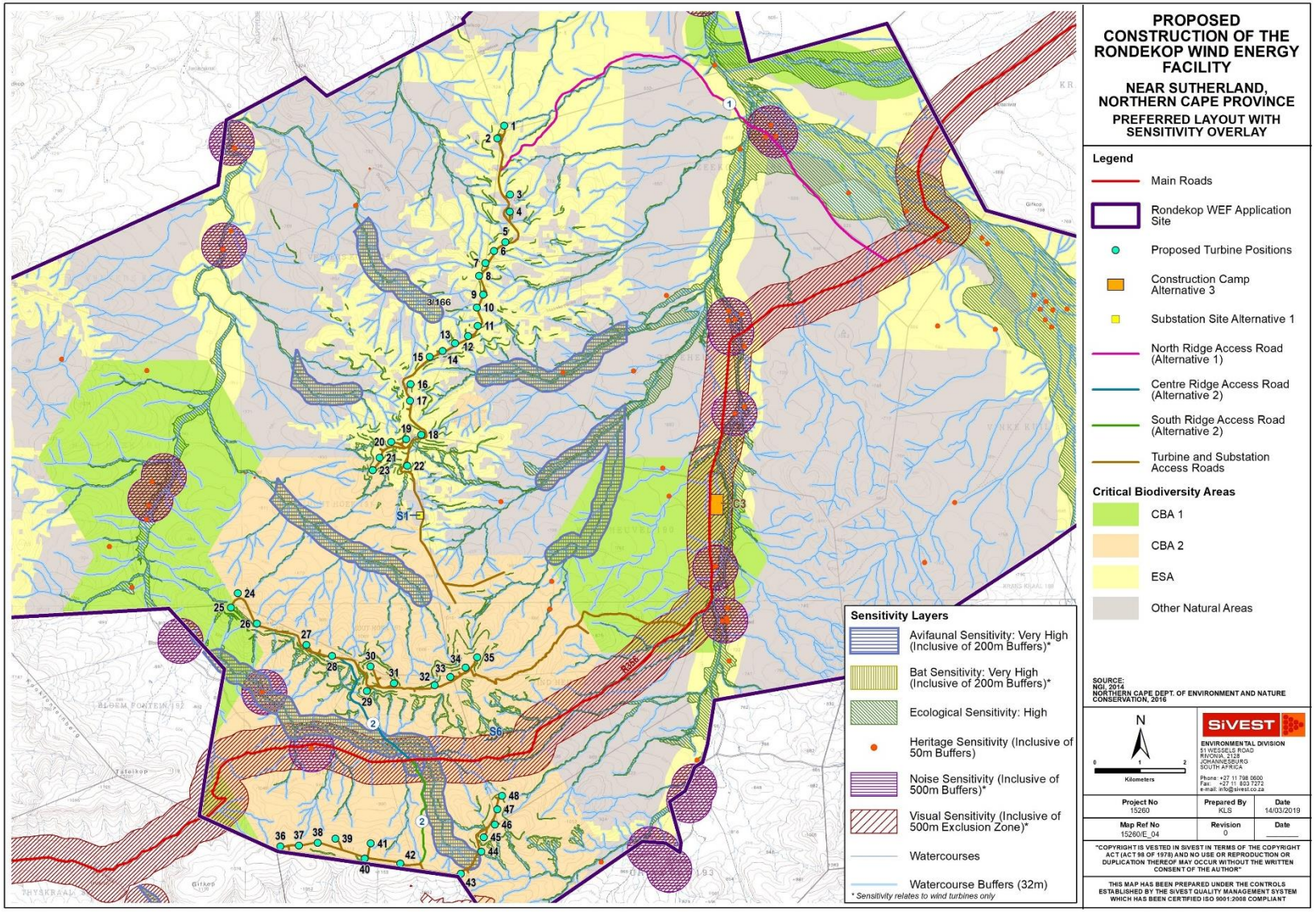

Figure 69: Proposed Layout Alternatives assessed in the EIA phase in relation to the Sensitive Areas

It is important to note that the preferred site layout provided above is only the EIA phase layout and therefore not the final layout for the proposed development.

It is the opinion of the EAP that the information and data provided in this DEIAr is sufficient to enable the DEA to consider all identified potentially significant impacts and to make an informed decision on the application. Furthermore, it is the opinion of the EAP that based on the findings of the EIA that the proposed development should be granted an EA and allowed to proceed provided the following conditions are adhered to:

- All feasible and practical mitigation measures recommended by the various specialists must be implemented.
- All micro siting of the turbines and associated infrastructure must be repositioned within the application site and must exclude all sensitive areas identified by the specialists as shown in **Figure 67**.
- Where applicable monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists.
- The final layout should be submitted to the DEA for approval prior to commencing with construction.
- Final EMPr **should be** approved by DEA prior to commencing with construction.

SiVEST, as the EAP, is therefore of the view that:

- **North Ridge Access Road Alternative 1** is preferred from a terrestrial and aquatic ecology, visual, avifauna, bat and social perspective. The other specialists have no preferences.
- **Centre Ridge Access Alternative Road 2** is preferred from a terrestrial and aquatic ecology perspective as there is a permanent wetland located on Alternative 1 deeming it fatally flawed. This alternative is considered favourable from a visual, bat and social perspective. Apart from the avifaunal specialist, the other specialists have no preferences. It is considered least preferred from an avifaunal point of view but is acceptable for development, as long as appropriate mitigation measures are put in place, such as only building roads to cross sensitive areas perpendicularly.
- **South Ridge Access Road Alternative 2** is preferred from a terrestrial and aquatic ecology, visual and social perspective. This alternative is considered favourable from a bat perspective. It is considered least preferred from an avifaunal point of view but is acceptable for development, as long as appropriate mitigation measures are put in place, such as only building roads to cross sensitive areas perpendicularly. The other specialists have no preferences.
- **Construction Camp Alternative 3** is preferred from an aquatic, visual and social perspective. Furthermore, this alternative is considered favourbale from an ecology perspective and not flawed by any other specialist. This is also the closest to all the development ridges therefore providing easy access to all the ridges to get the WEF components to their destination and thus is preferred from a technical perspective
- **Substation Alternative 1** is preferred from and aquatic and terrestrial ecology perspective. It is also in the centre of the proposed development project. The more central the substation is in the site the less electrical losses are incurred. Thus, this alternative is preferred from a technical perspective The new revised 48 turbine layout has been deemed to be preferred when compared to the originally proposed layout in the FSR, based on assessments undertaken by the specialists. A cumulative impact assessments of similar developments in the area was

undertaken by the specialists. Based on their findings the cumulative impacts associated with the proposed development will be low.Through the implementation of mitigation measures, together with adequate compliance monitoring, auditing and enforcement thereof by the appointed ECO as well as competent authority, the potential detrimental impacts associated with the proposed project can be mitigated to acceptable levels and the project can therefore proceed.

The date on which the activity will commence cannot be determined at this stage as they are based on the timeframes dictated by the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bid windows. The date of the next round of bid submissions has not yet been announced. The construction of the Rondekop WEF and associated infrastructure is dependent on being selected as a preferred bidder or entering into an offtake agreement with a different energy consumer. The project will therefore require an environmental authorisation of at least 10 years.

It is trusted that the DEIAr provides adequate information to the I&APs to provide input and for the competent authority to make an informed decision regarding the proposed project.

13.2 Decision-Making Authority Consultation

The stages at which the competent authority will be consulted are as follows:

- Submission of DEIAr for comment;
- Submission of FEIAr for decision making; and
- Decision from competent authority regarding the application.

Additional consultation may occur with the DEA during the EIA process should the need arise.

13.3 Cumulative Impact Assessment

The potential cumulative impact of the proposed WEF in combination with other renewable energy facilities in the area have been identified and assessed per environmental aspect in **Section 7** of this DEIR. In addition, mitigation measures were identified to address the cumulative impact, where possible. The Specialist reports include a detailed cumulative impact assessment, including a review of other specialist studies conducted for renewable energy projects in the area. The recommendations contained in the specialist reports reflect the mitigation measures provided in the DEIAr and EMPr. Cumulative impacts are also rated as part of the impact rating system and used to determine the significance of the impacts.

13.4 Environmental Management Programme (EMPr)

In accordance with the EIA Regulations (Appendix 4) a draft Environmental Management Programme (EMPr) has been included within the EIA Report. The EMPr includes the mitigation measures formulated by the various specialists and all information as required in **Appendix 4** of the EIA Regulations. The EMPr can be found in **Appendix 8.**

14 WAY FORWARD

The DEIAR was circulated for public participation for a period of 30 days from 20 March 2019 until 24 April 2019. The comments received, will be collated into an updated C&RR that will include a response from the EAP. The FEAIr including the an updated C&RR, and EMPr will be submitted to the DEA in early May 2019, the DEA will have 107 days to either accept or refuse the project.

All I&APs are invited to register as I&APs in order to be kept informed throughout the process. I&APs can do so by contacting SiVEST Environmental Division:

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