RONDEKOP WIND FARM (PTY) LTD

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

Draft Scoping Report

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Version Number:	**1**
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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		
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° 42' 41.604"	E20° 19' 53.961"

Refer to **Appendix 8A** 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 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 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:

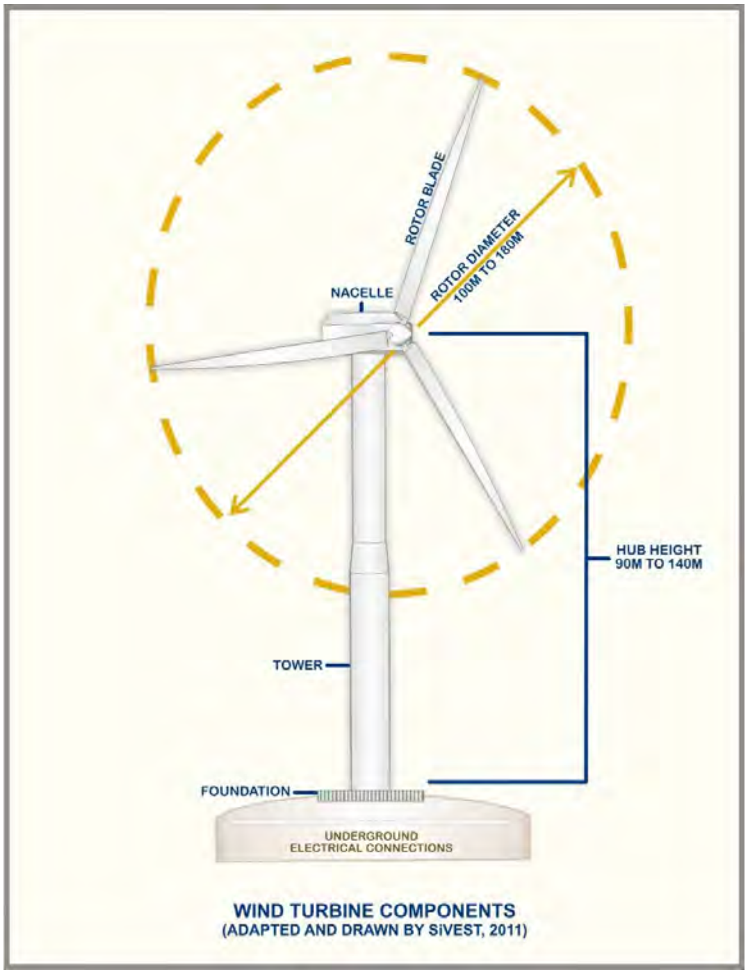

Figure ii. Example of a Wind Turbine with specifications as proposed by Rondekop Wind Farm (Pty) Ltd.

EXPORT CAPACITY: The project will have a maximum export capacity up to 325MW

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'). The proposed development will consist of a 325MW maximum export capacity Wind Energy Facility referred to as Rondekop Wind Energy Facility. 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 and amended on 7 April 2017, various aspects of the intended development are considered listed activities which may 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 WEFand associated infrastructure.

The proposed WEF development is located partially within the Komsberg Renewable Energy Development Zone (REDZ 2), one of the eight 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 WEF 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).

All relevant legislation and guidelines (including Equator Principles) will be consulted during the EIA process and will be complied with at all times.

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

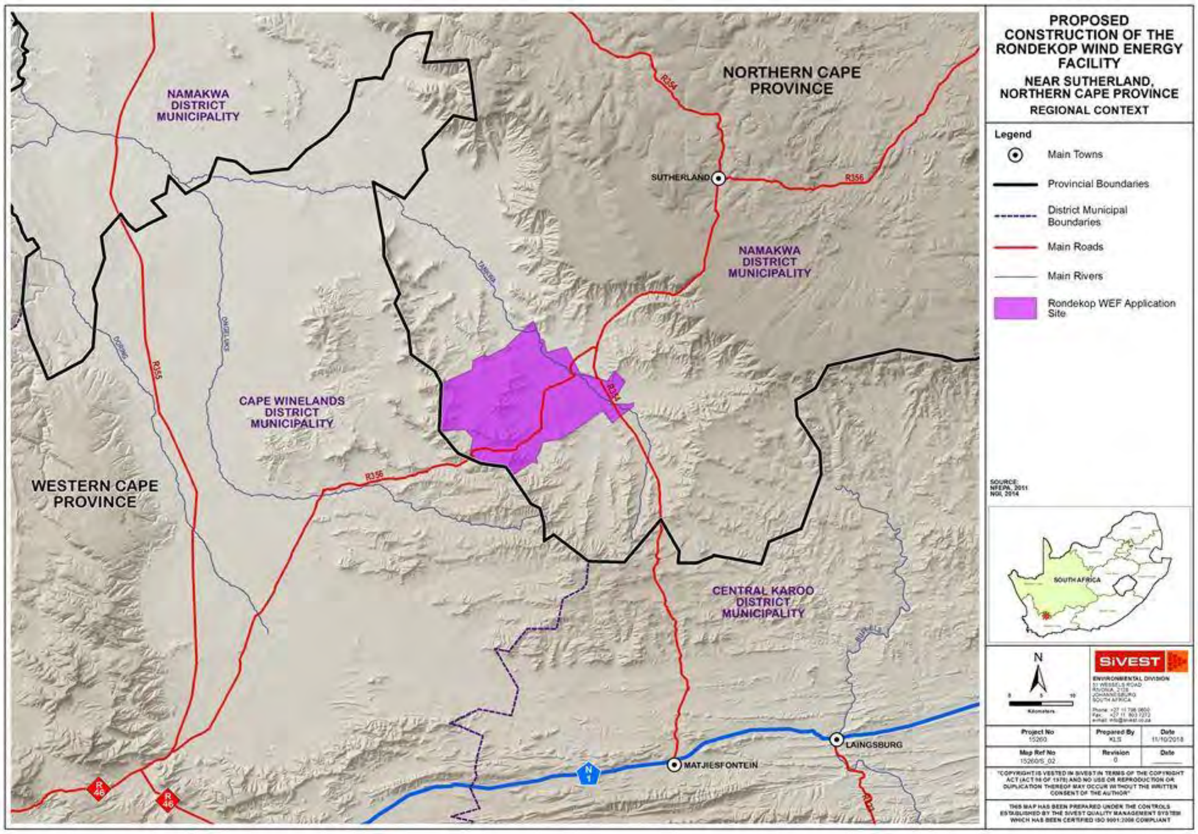

Figure iii: Rondekop WEF in the regional context

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Midpoint	S32° 42' 41.604"	E20° 19' 53.961"

Refer to **Appendix 8A** for the full project coordinates.

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 not be limited to, access roads, one onsite 33/132kV substation and a construction camp. The total footprint of the proposed facility would be ~114 ha spread over 17 properties.

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

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

These studies were also undertaken to inform the impact assessment to take place in the EIA phase of the proposed development. In the Scoping Phase, the specialists assessed the entire application site, while the EIA phase specialist assessments will focus on specific impacts of the proposed turbine locations and WEF infrastructure in detail.

Based on the scoping studies which were 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 will be further assessed during the EIA phase. The table below summarises the specialist findings of the Scoping Report for the entire project.

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.

	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.
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. All the 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**. 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. No wetlands were found within the site and no aquatic protected or species of special concern (flora) were observed during the site visit.
Avifauna	Information on the micro habitat level was obtained through a pre-construction monitoring programme which was conducted over four seasons between November

	2015 and November 2016 in compliance with the best practice pre-construction monitoring guideline. Bird activity recorded in the development area during these surveys was very low. The highest number of species recorded was 43, in the autumn of 2016. Of the total species list, five species have a conservation status of concern in South Africa: Black Harrier *Circus maurus* and Martial Eagle, *Polemaetus bellicosus* (Endangered); Black Stork *Ciconia nigra* and Verreauxs' Eagle *Aquila verreauxii* (Vulnerable); Greater Flamingo *Phoenicopterus roseus* (Near Threatened). The findings of this monitoring programme are presently being verified and updated and the potential impacts of the proposed WEF will only be assessed once the new information is available. However, the final impact assessment will be included in the EIA phase.
Bats	Information on the micro habitat level was obtained through a pre-construction monitoring programme which was conducted over four seasons between November 2015 and November 2016 in compliance with the best practice pre-construction monitoring guideline. There were low detections (7%) of bat species considered to have a high collision risk in the area of the proposed WEF during winter. Widespread detections were however recorded in summer (78 in the area of the proposed WEF). The remaining detections in summer were of medium and medium-high collision risk groups of bats, in similar proportions. To date, the low collision risk group presents very low detections in the area. Bat activity at ground level was generally higher than activity detected in the microphones installed at rotor height. However, the levels of activity indicate a potential high risk of fatality caused by the WEF, according to the most recent version of the Best Practice Guidelines (Sowler *et al.*2016). The findings of this monitoring programme are presently being verified and updated and the potential impacts of the proposed WEF will only be assessed once the new information is available. However, the final impact assessment will be included in the EIA phase.
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 <u>not</u> 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.

	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.
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. 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.

Socio-economic	A socio-economic impacts assessment was undertaken to consider the positive and negative impacts associated with the proposed development. The socio-economic 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 ▪ 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 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**. 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.

Terrestrial Ecology	The terrestrial ecology assessment will be undertaken in a phased approached namely desktop assessment coupled with a reconnaissance assessment (scoping assessment) to be followed by a detailed site walkthrough of the entire project footprint to inform the impact assessment. The findings of the scoping assessment are summarised as follows: ▪ The study area is situated in an area with moderately to steeply sloping topography. Habitat on site is in a largely natural state and is in a remote and rural environment. There is very little transformation or degradation on site. ▪ There are two regional vegetation types occurring in the project study area, Koedoesberge-Moordenaars Karoo (most of the area), and Central Mountain Shale Renosterveld (small patches in the southerns side). Both vegetation types are listed in the scientific literature as Least Threatened and neither is listed in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011). ▪ All habitat in the southern half of the study area is mapped as “Critical Biodiversity Area” (CBA) in the Provincial Conservation Plan and most of the northern half is mapped as “Ecological Support Area” (ESA). The remaining natural vegetation on site therefore has high value for conservation of vegetation in the Province according to the broadscale CBA maps. ▪ Habitats on site were divided into three units, namely “Mountain Vegetation”, “Plains Vegetation” and “Riparian Vegetation”, the latter associated with dry stream beds. The vegetation on site was found to be a succulent dwarf shrubland that resembles the description for Koedoesberg-Moordenaars Karoo, but with a trend of increasing diversity and structural variation with increased elevation and increased surface rockiness. This means that mountain vegetation, especially the highest peaks, have the highest local diversity and greatest variation in species composition. ▪ There is one plant species protected according to the National Environmental Management: Biodiversity Act (Act No 10. Of 2004) (NEM:BA) that was found on site. This is *Hoodia gordonii*, which could potentially occur in other localities on site. ▪ There are a number of plant species occurring on site that are protected according to the Northern Cape Nature Conservation Act (Act 9 of 2009). It is likely that additional protected species occur there that were not observed during the field survey. None of these are of conservation concern, but a permit is required from the Provincial authorities to destroy them. ▪ There are no protected tree species that are likely to occur in the study area. ▪ A total of 56 mammal species have a geographical distribution that includes the general study area in which the site is found. Of the species currently listed as threatened or protected, the following are considered to have a medium probability of occurring on site, based on habitat suitability: Honey Badger (Near Threatened), Black-footed Cat, Leopard, Cape Fox and Riverine Rabbit

	(Critically Endangered). Given the nature of the proposed project and the fact that many of the species of concern are relatively mobile, few threatened, near threatened or protected mammal species are likely to be significantly negatively impacted by activities on the site. The species that could potentially be affected by habitat disturbance or degradation, due to its specific habitat requirements, is the Riverine Rabbit, however when considering that Riverine Rabbits require vast extents of plains to thrive and the wind farm infrastructure are focussed on the mountainous areas, the concern is very low. ▪ The site contains habitat that is suitable for a small number of frog species, although none are listed or protected species. ▪ A total of 74 reptile species have a geographical distribution that includes the general study area in which the site is found. Two reptile species of conservation concern could potentially occur in the study area, as follows: the Karoo Dwarf Tortoise (NT), and the Armadillo Girdled Lizard (protected). ▪ A preliminary sensitivity map of the site was produced that identifies areas of high sensitivity that should be taken into account during activities on site. This includes watercourses and their associated riparian vegetation, and areas mapped as Critical Biodiversity Areas. Other areas that were not mapped but considered to be sensitive are any steep slopes and any rock outcrops or ridges The following potential impacts were identified, and potential mitigation measures were recommended. These impacts will be further assessed during the EIA phase with a full assessment of the impacts and mitigation measures included. **Construction Phase 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; ▪ Effects on physiological functioning of vegetation due to dust deposition; ▪ Increased poaching and/or illegal collecting due to increased access to the area. *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; ▪ 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 *Ongoing direct impacts will include the following:* ▪ Continued disturbance to natural habitats due to general operational activities and maintenance; ▪ Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with infrastructure; *Indirect impacts 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; ▪ Changes to behavioural patterns of animals, including possible migration away or towards the project area; ▪ Positive potential impact on climate change due to generation of electricity without the need for coal mining or burning of coal, currently the main form of power generation in South Africa. **Decommissioning Phase Impacts** Decommissioning direct impacts 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; ▪ Effects on physiological functioning of vegetation due to dust deposition; Indirect decommissioning impacts 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; ▪ Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape; ▪ Changes to behavioural patterns of animals, including possible migration away or towards the project area; **Cumulative Impacts** 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; ▪ Positive cumulative impact on climate change. The report concludes that there are some sensitivities on site related to natural habitat and to individual species, but that these can be minimised or avoided with the application of appropriate mitigation or management measures. There will be residual impacts, primarily on natural habitat, but 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 therefore the residual impacts are considered acceptable, on condition local sensitivities of biodiversity importance are avoided. On this basis it is recommended that the project be authorised.
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. All access road alternatives are considered suitable. Access road alternative **North Ridge 1** is deemed the **preferred** access road to the North Ridge as it is an existing farm road. Access alternatives **Centre Ridge 1** and **South Ridge 1** are the **preferred** access road for the Centre ridge and South Ridge respectively as these roads are shorter and therefore less expensive to upgrade and maintain. 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.

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 negative low 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 negative low 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.

Way forward

The Draft Scoping Report were made available for public participation to all Interested and Affected Parties (I&APs) from 14 November 2018 until 14 December 2018. All comments received will be responded to in a comments and responses report (which will be included in the FSR) prior to sending the Final Scoping Report to the decision-making authority, namely the national Department of Environmental Affairs (DEA).

The DEA must accept or reject the scoping assessment or make further recommendations for the assessment. Should DEA accept the scoping assessment, the project will proceed to the EIA phase.

A Plan of Study for EIA phase is detailed within the scoping assessment report outlining the methodology to be implemented during the EIA phase. Based on the above-mentioned studies, the Scoping Report has identified several aspects that warrant further investigation in the EIA Phase. These are as follows:

- Avifauna Assessment (Impact Assessment reporting);
- Bat Assessment (completion of pre-construction monitoring);
- Terrestrial Ecology Impact Assessment.

All I&APs will be provided a second opportunity to partake in the process during the public participation process during the EIA phase.

To register as an Interested and / or Affected Party (I&AP) and / or to obtain additional information please submit your name, contact details (telephone number, postal address and email address) and the interest which you have in the application to SiVEST as per the details below and please reference the ‘Rondekop WEF” in your correspondence. SiVest shall keep all registered I&APs informed of the process.

Hlengiwe Ntuli - SiVest
SiVEST Environmental
Tel: (011) 798 0600
P O Box 2921
Fax: (011) 803 7272
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Website: www.sivest.co.za

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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	- Astronomically 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
EHS	- Environmental, Health, and Safety
FSR	- Final Scoping Report
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	- Late 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
REIPPP	- 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 (**Figure 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 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 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 in 2017).

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;
- 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;
- 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 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 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, and as amended on 7th April 2017. 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.

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

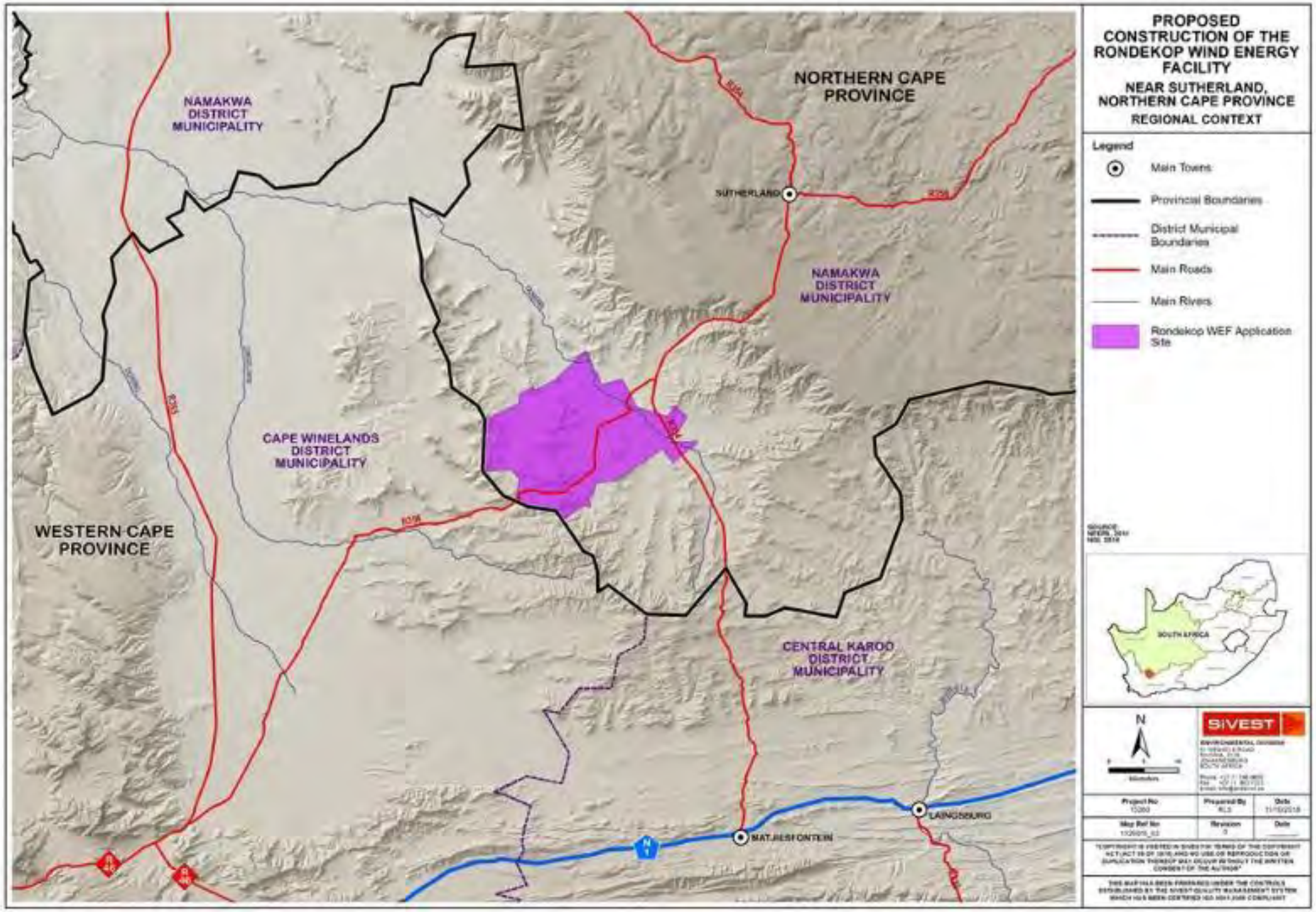


Figure 1: Rondekop WEF in the regional context.

1.1Objectives of the Scoping Phase

The NEMA EIA Regulations, 2014 (as amended) state that the objective of the Scoping Phase is to:

(a) identify the relevant policies and legislation relevant to the activity;
(b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
(c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
(d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
(e) identify the key issues to be addressed in the assessment phase;
(f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
(g) identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

A Scoping Report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process. The content requirements for a Scoping Report (as provided in Appendix 2 of the EIA Regulations 2014), as well as details of which section of the report fulfils these requirements, are shown in **Table 1** below.

Table 1: Content requirements for a Scoping 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 1.4** on **page 6**. The expertise (including curriculum vitae) of the EAP and full project team are including in **Appendix 2**.
(b) the location of the activity, including- (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name;	The location (including 21 digit Surveyor General codes) of the proposed project is detailed on **page *iii*** of the report, as well as in **section 5.2** on **page 68**.

Content Requirements	Applicable Section
(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	
(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 68**, and the site locality is shown in **section 5.2** on **page 68**. 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 68**. 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 activities to be undertaken, including associated structures and infrastructure;	The listed and specified activities triggered as per NEMA are detailed in **section 3.1.3** on **page 30**. The technical project description is included in **section 2** on **page 8**. 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 proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	A description of all legal requirements and guidelines is provided in **section 3** on **page 29**. 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 location;	The need and desirability of the proposed project is discussed in **section 4** on **page 52**.
(h) a full description of the process followed to reach the proposed preferred activity, site and location within the site, including - (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical,	A description of the alternatives considered in terms of the Regulations is included in **section 2.3** on **page 15**. A preliminary assessment of layout alternatives is included in **section 6** On **page 115**. The public participation process followed is detailed in **section 8** on **page 229** Additionally, all public participation documents are included in **Appendix 7**. This will include a summary of issues raised by I&AP's, and the responses to their comments. A full description of the environmental

Content Requirements	Applicable Section
biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	attributes within the application site is included in **section 5** on **page 68**. The impacts, risks and mitigation associated with each alternative are assessed in **section 6.2** on **page 120**. The methodology used in identifying the impacts and risks associated with each alternative is included in **section** Error! Reference source not found. on **page 115**. 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 and 6.3** on **page 120**. The outcome of the site selection matrix is included in **section 4.4** on **page 65**. A concluding statement indicating the preferred alternatives is contained in **section 7.1** on **page 214**
(i) a plan of study for undertaking the environmental impact assessment process to be undertaken, including- (i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; (ii) a description of the aspects to be assessed as part of the environmental impact assessment process; (iii) aspects to be assessed by specialists; (iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists; (v) a description of the proposed method of assessing duration and significance; (vi) an indication of the stages at which the competent authority will be consulted;	The plan of study for the EIA phase is included in **section** Error! Reference source not found. on **page 263** A description of alternatives to be considered is included in **section 11.7**on **page 274** A summary of the aspects to be assessed is included in **section 11.3** on **page** Error! Reference source not found. The description of the proposed EIA phase methodology is in **section** Error! Reference source not found.on **page 264**. An indication of planned authority consultation is contained in **section 11.2** on **page 263**. The particulars of the planned public participation process are included in

Content Requirements	Applicable Section
(vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and (viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process; (ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	**section 11.9** on **page 276**. All tasks to be undertaken during the EIA phase are described in **section** Error! Reference source not found. on **page 248**.
(j) an undertaking under oath or affirmation by the EAP in relation to- (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and (iii) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	The EAP affirmation is included in **Appendix 3**.
(k) an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties (I&APs) on the plan of study for undertaking the environmental impact assessment;	The plan of study will be included within this DSR which will be made available for review and comment by I&APs. Should any I&APs identify any issues or concerns with respect to the plan of study for undertaking the EIA, it will be updated accordingly.
(l) where applicable, any specific information required by the competent authority; and	At this stage there is no specific information required by the competent authority. However a record of authority consultation is kept in **section 1.3** on **page 6**, and should there be any specific information requested, this will be detailed in the same section.
(m) any other matter required in terms of section 24(4)(a) and (b) of the Act.	All requirements in terms of section 24(4)(a) and (b) of the Act have been met in this report.

1.2 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:

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

These studies were also 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. However, three specialist studies will be updated to inform the EIA phase, namely avifauna, bat and terrestrial ecology.

Key issues relating to the proposed site are discussed below in **Section 5**.

1.3 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. Following the allocation of the DEA reference number, this will be included in the FSR.

1.4 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 Scoping Report are detailed in **Table 2** below.

Table 2: Project Team

Name	Organisation	Role
Andrea Gibb	SiVEST	Project Coordinator, EAP
Shivani Naidoo	SiVEST	Environmental Consultant
Kerry Schwartz	SiVEST	GIS, Mapping and Visual
Nicolene Venter	Savannah	Meeting Facilitator

Name	Organisation	Role
Scott Masson	SRK	Visual Peer Review
Hlengiwe Ntuli	SiVEST	Public Participation Consultant
Johann Lanz	Private	Agriculture & Soils
Brian Colloty	EnviroSci (Pty) Ltd	Aquatic Ecology
Craig Campbell	Bioinsight	Birds & Bats
Wouter Fourie	PGS Heritage	Heritage, Archaeology & Cultural Landscape
Dr Brett Williams	Safetech	Noise Impact
Elize Butler	Banzai Environmental for PGS Heritage	Palaeontology
Neville Bews	Dr Neville Bews & Associates	Socio-Economic
David Hoare	David Hoare Consulting	Terrestrial Ecology
Iris Wink/ Adrian Johnson	JG Afrika	Traffic Impact Assessment

As per the requirements of the NEMA (2014, amended in 2017), the details and level of expertise of the persons who prepared the DSR are provided in **Table 3** below.

Table 3: Expertise of the EAP

Environmental Practitioner	SiVEST (Pty) Ltd – Andrea Gibb
Contact Details	andreag@sivest.co.za
Qualifications	BSc Landscape Architecture and BSc (Hons) Environmental Management
Expertise	Andrea has 9.5 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	SiVEST (Pty) Ltd – Shivani Naidoo
Contact Details	shivanin@sivest.co.za
Qualifications	BSc Geography and BSc (Hons) Geography and Environmental Management
Expertise	Shivani joined SiVEST in January 2013 and holds the position of Environmental Consultant in the Pietermaritzburg office. Shivani specialises in the field of Environmental Management and has been involved in the compilation of Environmental Impact Assessments (EIAs) and Basic Assessments (BAs) since joining SiVEST. 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**.

1.5 Draft Scoping Report Structure

This Draft Scoping Report (DSR) is structured as follows:

- **Chapter 1** introduces the project and explains the objectives of the Scoping Phase. The chapter also outlines the relevance of the Equator Principles as well as the IFC Performance Standards and points out the specialist studies for the project. It describes the authority consultation thus far. Furthermore, the chapter discusses the experience of the Environmental Assessment Practitioners (EAP), including specialists, who have contributed to the report.
- **Chapter 2** presents the technical description of the project, including a description of alternatives being considered.
- **Chapter 3** expands on the relevant legal ramifications applicable to the project and describes relevant development strategies and guidelines.
- **Chapter 4** provides explanation to the need and desirability of the proposed project.
- **Chapter 5** provides a description of the region in which the proposed development is intended to be located. Although the chapter provides a broad overview of the region, it is also specific to the application. It contains descriptions of the site and the specialist studies are also summarised.
- **Chapter 6** identifies potential impacts associated with the proposed Wind Energy Facility. The chapter further identifies these impacts per specialist study and discusses potential cumulative impacts.
- **Chapter 7** discusses layout alternatives, including how they relate to sensitive areas identified by specialists and provides a preliminary comparison of alternatives.
- **Chapter 8** describes the Public Participation Process (PPP) undertaken during the Scoping Phase and tables issues and concerns raised by Interested and Affected Parties (I&APs).
- **Chapter 9** provides an assessment of the report in terms of the Equator Principles.
- **Chapter 10** provides a conclusion to the DSR and recommendations to be addressed in further assessment.
- **Chapter 11** describes the environmental impact reporting phase of the EIA (i.e. the way forward for this study and includes the Plan of Study for EIA).
- **Chapter 12** lists references indicated in the DSR.

2 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 6.5MW 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 hardstanding 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 potential 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 **Chapter 7** and are presented in the Plan of Study for the EIA Phase (**Chapter 11**).

2.1 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:

- Ashoek No 224
- Portion 1 and Remainder of Bloem Fontein No 192
- Portion 1 of Lange Huis 174
- Remainder of Hout Hoek No 191
- Portion 1 and Remainder of Roodeheuvel No 170
- Portion 1 and 2 of Urias Gat No 193
- Remainder of Vinke Kuil 171
- Portion 1, 3 and Remainder of Venters Kraal No 166
- Portion 1 and Remainder of Wind Heuvel No 190
- Remainder of Zeekoegat No 169
- Remainder of Farm 220

The project site has been identified based on wind resource, grid connection suitability, competition, flat topography, land availability 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.

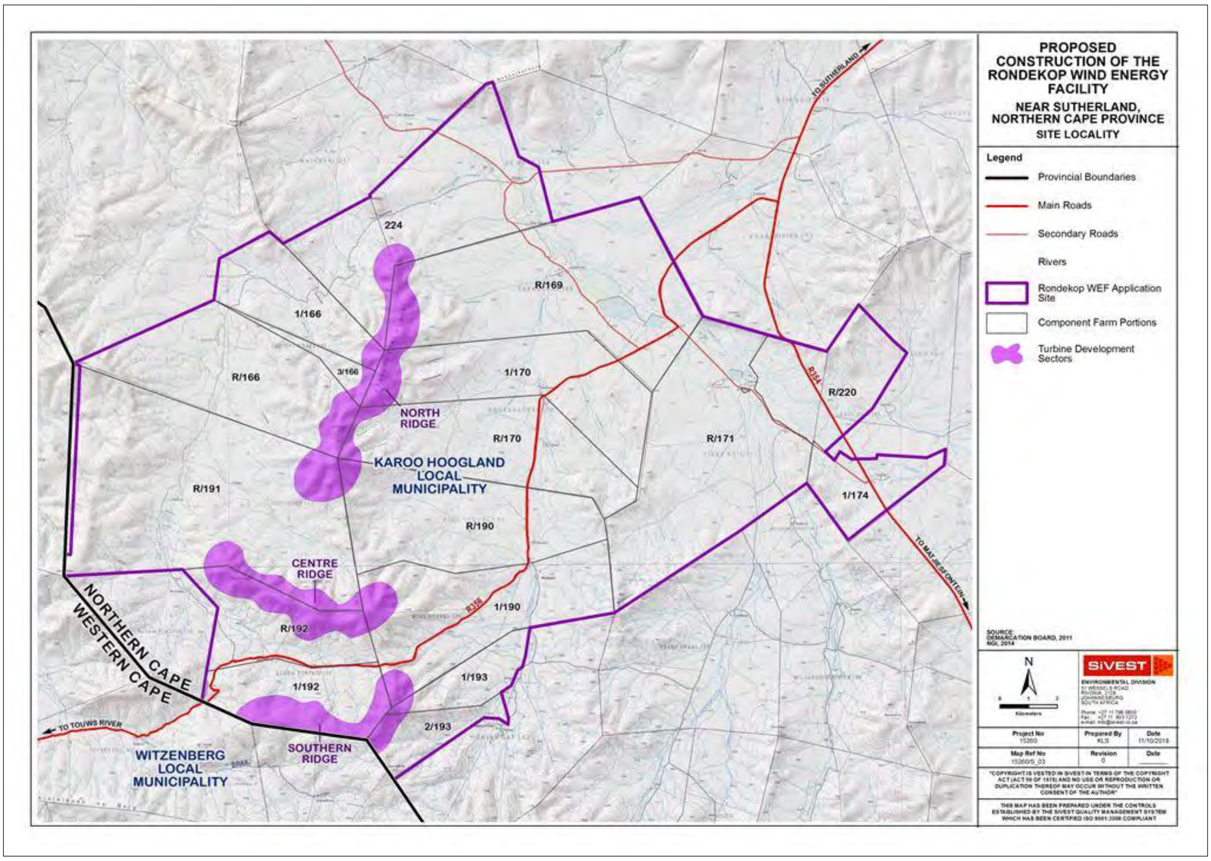


Figure 2: Proposed Wind Energy Facility site locality map

2.2 Wind Energy Facility Technical details

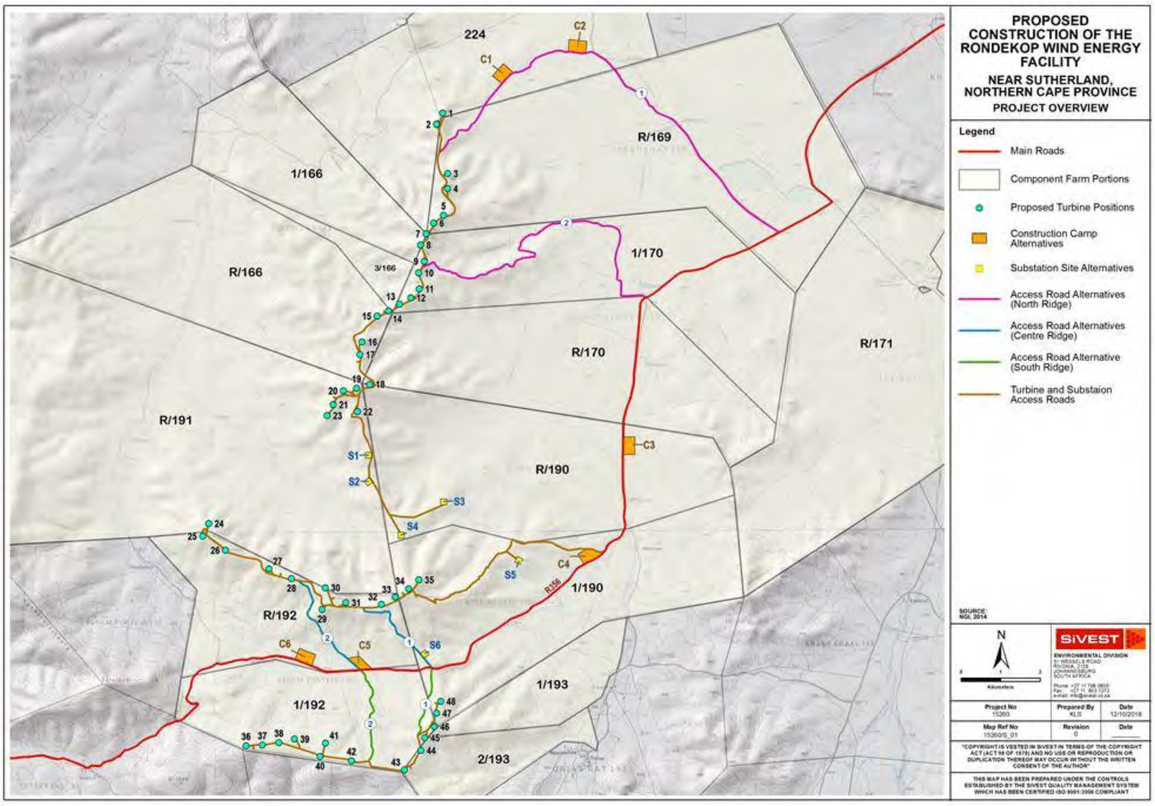


Figure 3: Proposed Wind Energy Facility Layout map

The key technical details and infrastructure required is presented in the table below (**Table 4).**

Table 4: Rondekop Wind Energy Facility summary of key components

Project	**DEA Reference**	**Farm name and area**
Rondekop Wind Energy Facility	To be announced	▪ Ashoek No 224 ▪ Remainder of Bloem Fontein No 192 ▪ Portion 1 of Bloem Fontein No 192 ▪ Portion 1 of Lange Huis 174 ▪ Remainder of Hout Hoek No 191 ▪ Remainder of Roodeheuvel No 170 ▪ Portion 1 of Roodeheuvel No 170 ▪ Portion 1 of Urias Gat No 193 ▪ Portion 2 of Urias Gat No 193 ▪ Remainder of Vinke Kuil 171 ▪ Remainder of Venters Kraal No 166 ▪ Portion 1 of Venters Kraal No 166 ▪ Portion 3 of Venters Kraal No 166 ▪ Remainder of Wind Heuvel No 190 ▪ Portion 1 of Wind Heuvel No 190 ▪ Remainder of Zeekoegat No 169 ▪ Remainder of Farm 220 ▪ Northern Cape Province ▪ Karoo Hoogland Local Municipality ▪ Namakwa District Municipality

Project	DEA Reference	Farm name and area
	Turbines	▪ Up to 48 turbines (between 3MW and 6.5MW 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 are upgrading existing roads
	Substation	▪ One 33/132kV substation ▪ Total footprint ~2,25ha
	Construction camp	▪ One 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
	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

2.2.1 *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 6.5MW, 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 140m and a rotor diameter of up to 180m (Figure 3). Each wind turbine will have a foundation diameter of up to 30m 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.

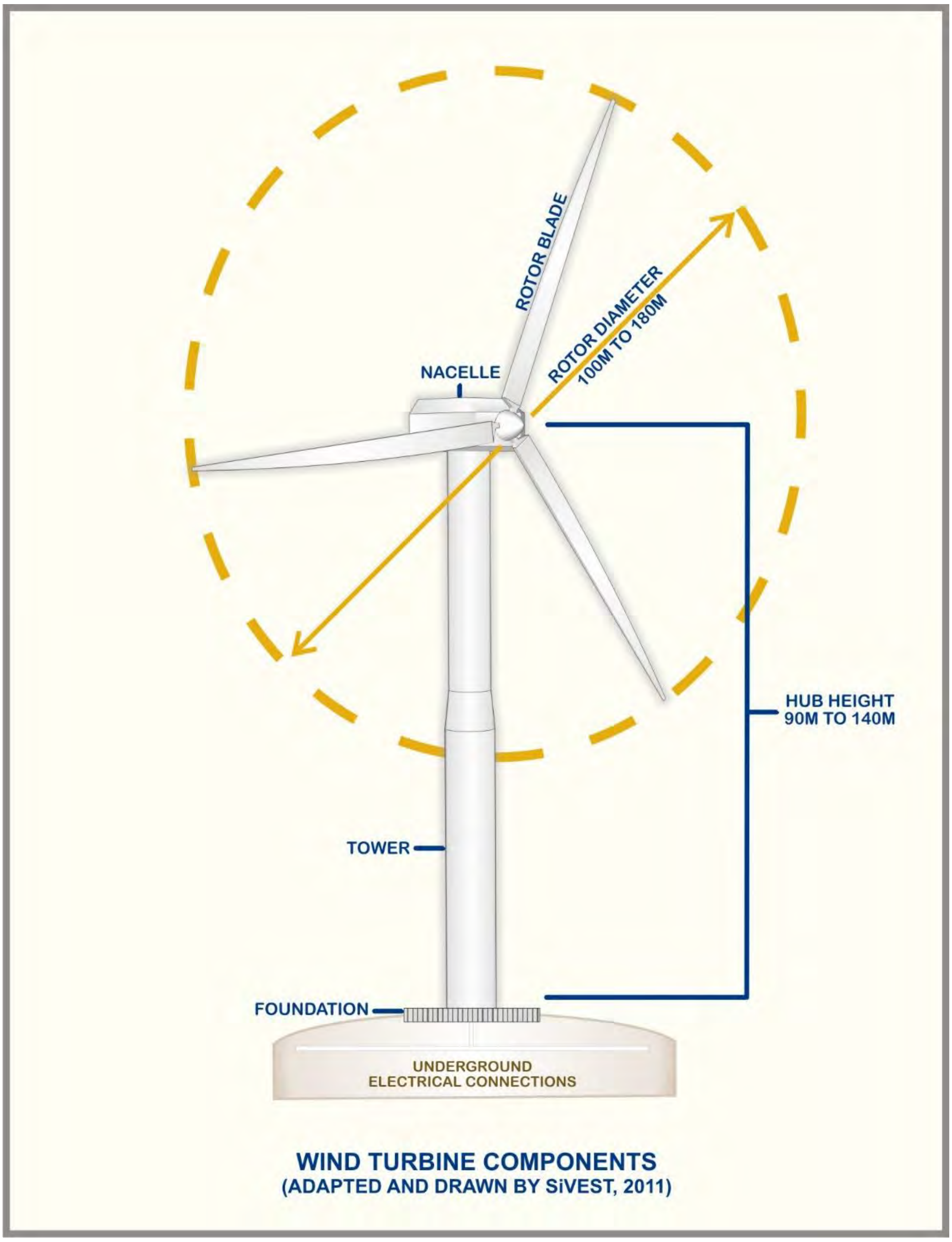


Figure 4: Typical Components of a Wind Turbine with specifications as proposed by Rondekop Wind Farm (Pty) Ltd.

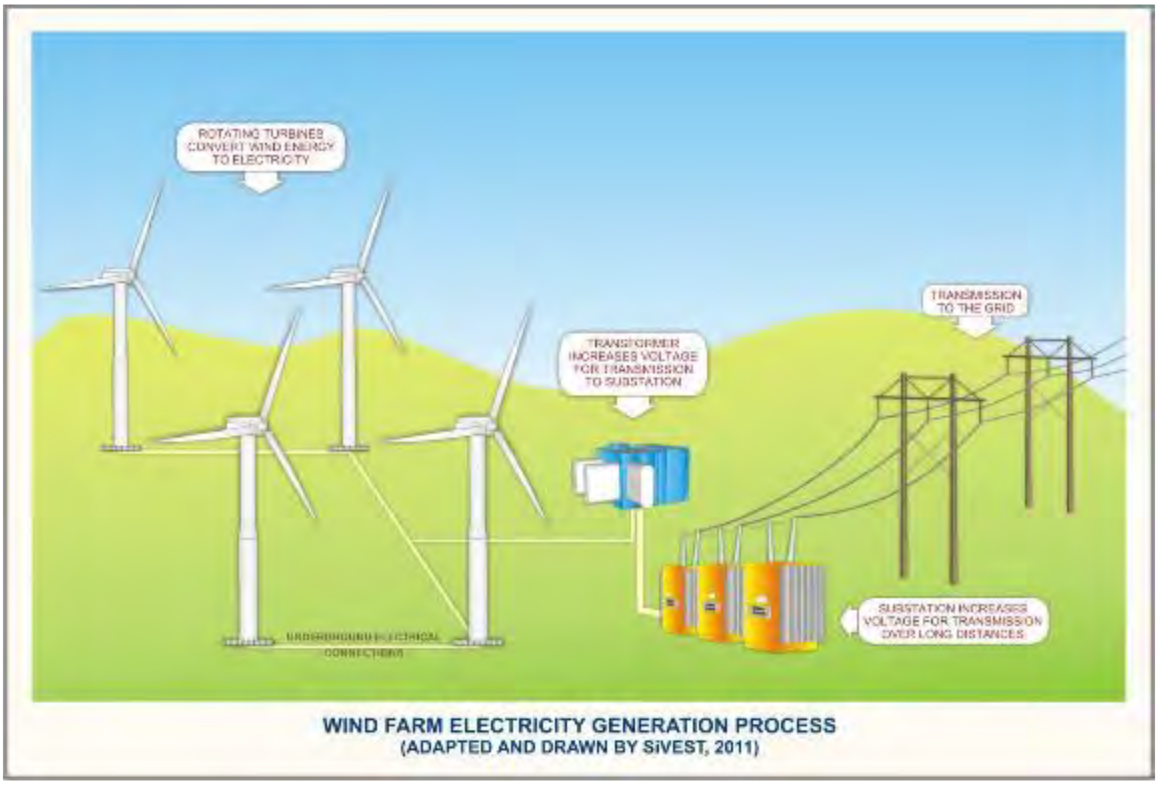
2.2.2 *Electrical Transformers*

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.

2.2.3 *Underground Cabling / Overhead Power Lines*

The wind turbines will be connected (**Figure 5**) 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.



WIND FARM ELECTRICITY GENERATION PROCESS
(ADAPTED AND DRAWN BY SiVEST, 2011)

Figure 5: Conceptual WEF electricity generation process showing electrical connections

2.2.4 *Roads*

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.

2.2.5 *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.

2.2.6 *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.

2.3 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.

2.3.1 *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.

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 5** 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.

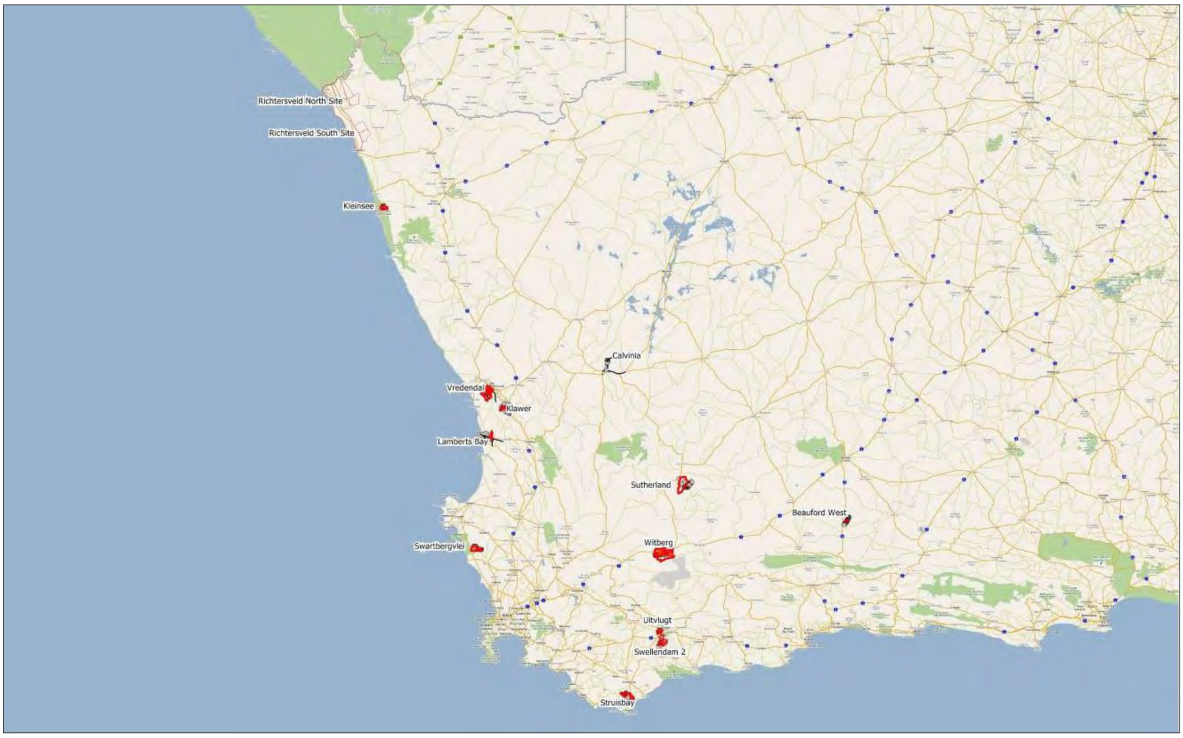


Figure 6: Overview map of the areas investigated in the pre-feasibility assessment and site selection process

Table 5: 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.

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.

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 landonwers 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 ~13 x 147MW projects. 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 4** is the only and preferred location alternative.

2.3.2 *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.

2.3.3 *The design or layout of the activity;*

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 1.**

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

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.

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.

2.3.4 *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.

2.3.5 *The operational aspects of the activity;*

No operational alternatives were assessed in the EIA.

2.3.6 *No-go alternative*

The 'do-nothing' alternative is the option of not implementing 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 therefore been placed on securing South Africa's future power supply through the diversification of power generation sources. Furthermore, South Africa would have to invest in a power generation mix, and not solely rely on coal-fired power generation, to honour its commitments made under the Copenhagen Accord and subsequent Paris Agreement (ratified during November 2016) to mitigate climate change challenges. Under the Paris Agreement, the country committed to work towards the goal of holding the increase in global average temperature to well below 2 degrees Celsius and pursuing efforts to limit global temperature increase to 1.5 degrees Celsius.

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).

The current South African plan to achieve the goal set under the Paris Agreement, is rated as Highly Insufficient due to an unresolved strategy to secure a 'just transition' from coal to renewables, successfully and timeously implement a carbon tax and update the Integrated Resource Plan (Refer to Section 2.3.2 for more information). In December 2011 Climate Action Tracker rated South Africa's plan as Medium as at the time we committed to increasing renewable energy to enable our emissions to peak between 2020 and 2025. Based on the dismal performance to date downgrading our climate action plan from medium to highly insufficient, it is clear that the trajectory South Africa is on is insufficient to reach the goals set to avoid catastrophic climate change.

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 strategically 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 significant environmental, social and economic benefits associated with the development of the renewables sector. Accordingly, all specialists have assessed the no-go option, albeit not the preferred option.

3 LEGAL REQUIREMENTS AND GUIDELINES

3.1 Key Legal and Administrative Requirements Relating to the Proposed Development

3.1.1 *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.

3.1.2 *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 lists 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.

3.1.3 *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 6: 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 may be 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 likely 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, may need to traverse the identified surface water features and during construction of these roads, soil may 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 agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;*	**The proposed project site is currently used and zoned for agricultural purposes and the proposed WEF will result in an special 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—*	**The proposed WEF may entail the expansion (upgrading) of roads and other infrastructure by 100 m^2 or more within a**

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.
	(a) within a watercourse; or *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;*	**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 and during construction of these roads, soil may 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.*	**It is likely that 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-* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*	**The proposed development will transform more than 20 hectares of indigenous vegetation. Clearance will also be required for the proposed on-site substation, internal access roads and other associated infrastructure.**
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) (bb) (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:* *(bb) National Protected Area Expansion Strategy Focus areas;*	**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,**

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.
	(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;*	**outside an urban area. Sections of the site are locationed within a CBA and NPAES.** **An ecology impact assessment is being undertaken to assesses the impacts of this infrastructure on the indigenous vegetation and will be 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, 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;*	**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 likely occur within a CBA and NPAES.** **An ecology impact assessment is being undertaken to assesses the impacts of this infrastructure on the indigenous vegetation and will be included in the DEIAr.**
Activity 14 (ii) (a), (c); g (ii) (bb) (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:*** *(bb) National Protected Area Expansion Strategy Focus 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 may 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, may need to traverse the identified surface water features.** **The development of the infrastructure will likely occur within a CBA and NPAES and outside an urban area.** **An ecology impact assessment is being undertaken to assesses the impacts of this infrastructure on the indigenous vegetation and will be included in the DEIAr.**

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.
<u>Activity 18 (g) (ii) (bb) (cc) (ee) (ii)</u> .	**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:* *(bb) National Protected Area Expansion Strategy Focus 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;* *(ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland;*	**It is likely that 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 likely occur within a CBA and / or NPAES as well as within and / or 100 m from the edge of a water course.** **An ecology impact assessment is being undertaken to assesses the impacts of this infrastructure on the indigenous vegetation and will be included in the DEIAr.**
<u>Activity 23 (ii) (a) (b) (c) (g) (ii) (bb) (cc) (ee)</u> .	**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;* *(b) 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:* *(bb) National Protected Area Expansion Strategy Focus 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 may entail development and expansion of roads and other infrastructure by 10 m² 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 likely occur within a CBA and NPAES and outside an urban area.**

3.1.4 *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.

3.1.5 *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).

3.1.6 *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.

3.1.7 *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.

3.1.8 *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.

A surface water assessment has been conducted to explore how the proposed development may impact on water resources as protected by the Act.

3.1.9 *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 proponent 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 Terrestrial Ecology Impact Assessment will be undertaken during the EIA.

3.1.10 *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.

3.1.11 *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.

3.1.12 *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.

3.1.13 *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.

3.1.14 *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.

3.1.15 *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, the Air Traffic and Navigation Services Company Limited (ATNS) and the Civil Aviation Authority (CAA) will be consulted and the required approvals/ no objection letters will be requested.

3.1.16 *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.

3.1.17 *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
- —Northern Cape AAA – GN115 of 2010 - Rondekop falls inside of this AAA

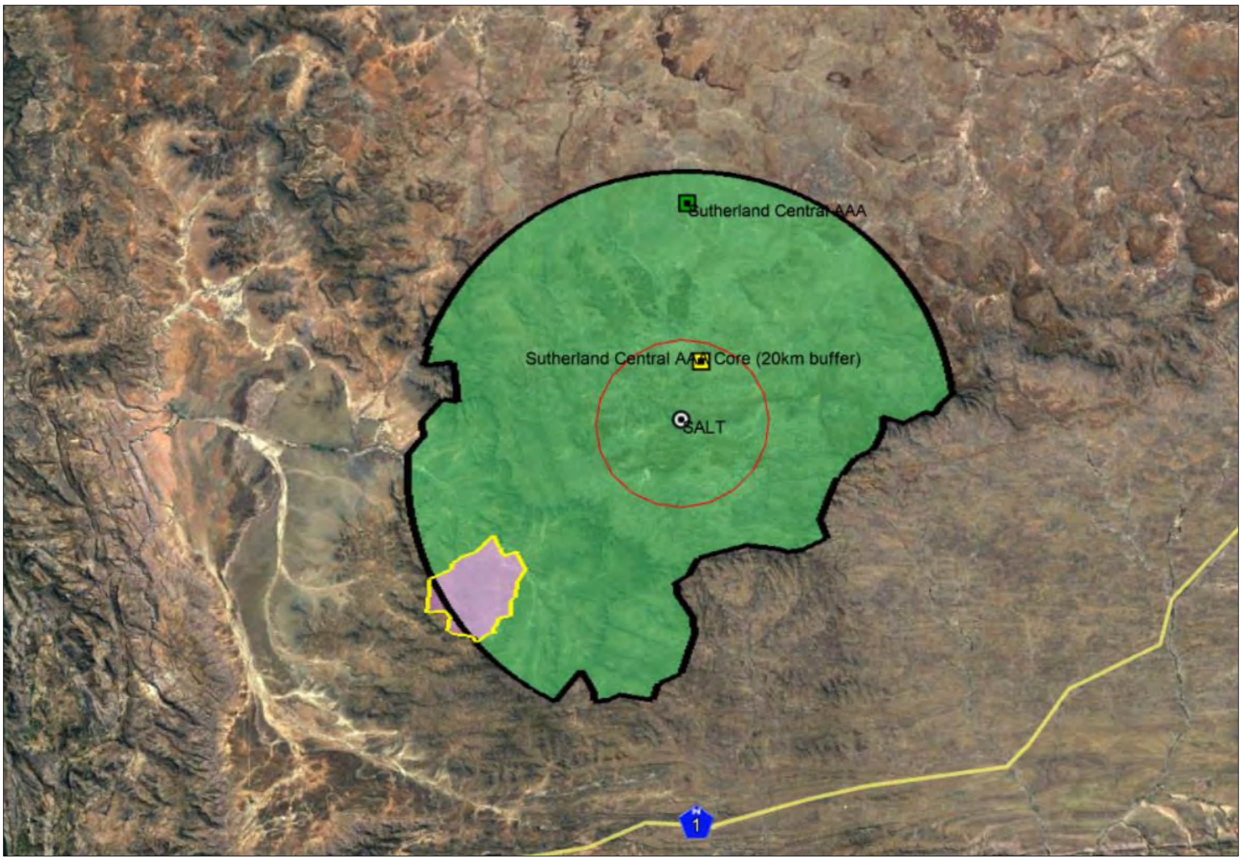


Figure 7: Sutherland Central AAA core area and AAA.

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

3.1.18 *Renewable Energy Development Zones*

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 (**Figure 8**). 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 in 2017). The location of

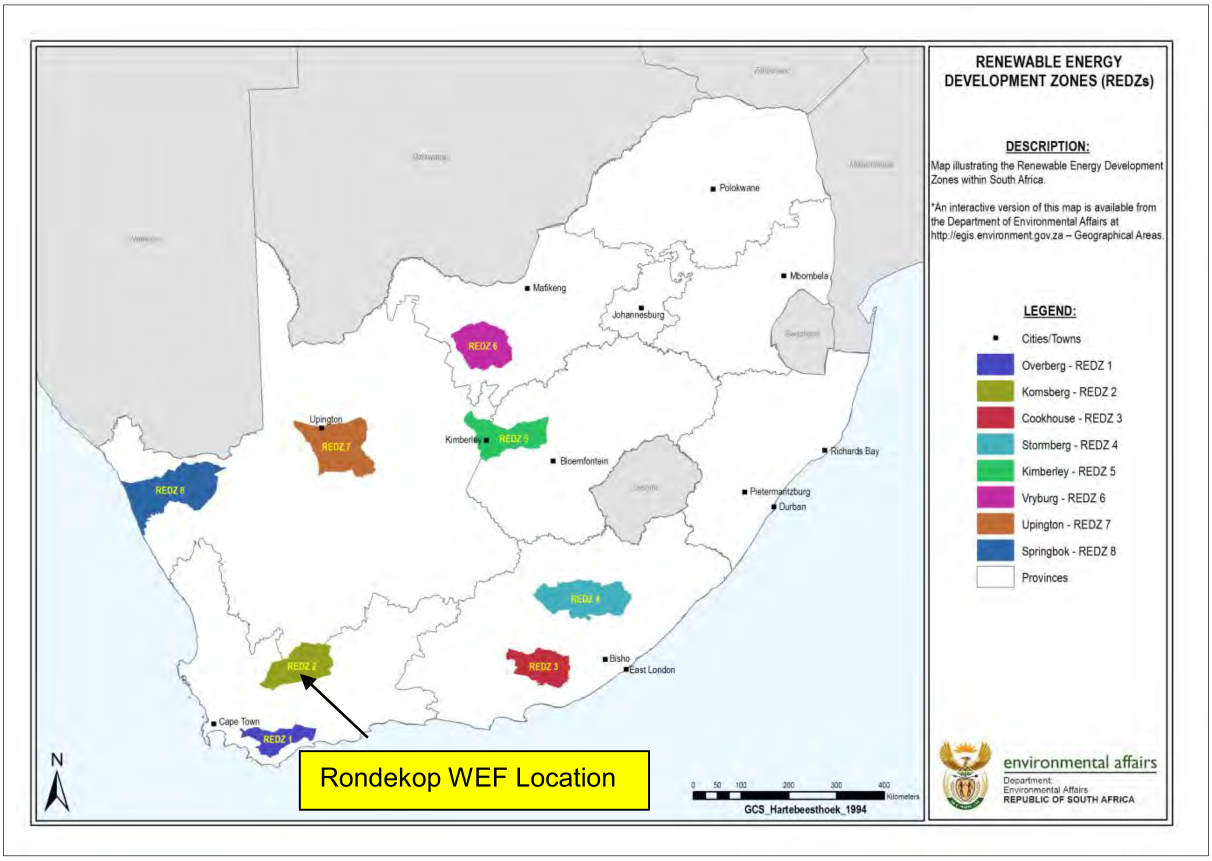


Figure 8: Formally gazette REDZ in South Africa and the proposed ROndekop WEP location in relation to the REDZ 2 (Komsberg REDZ)

3.1.19 *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

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

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 7: 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 8: 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

3.1.20 *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)

3.2 Key Development Strategies and Guidelines

3.2.1 *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 iis 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.

3.2.2 *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.

3.2.3 *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 take into account 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 9** 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 9: Proposed updated generation plan for the period ending 2030 (draft IRP 2018)

3.2.4 *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 Proposals
iii. Negotiation with the preferred bidder(s).

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

3.2.5 *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.

3.2.6 *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.

4 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 9** 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.

Table 9: 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 Assessment undertaken as part of this EIA Process. However it must be noted that The terrestrial ecology assessment will be undertaken in a phased approached namely desktop assessment coupled with a reconnaissance assessment (scoping assessment) to be followed by a detailed site walkthrough of the entire project footprint to inform the impact assessment.** **The mitigation hierarchy of avoidance, reduction and improved management will be applied to inform the findings of the Terrestrial Ecology Impact Assessment. The preliminary view is that it should be authorised (inclusive of all project alternatives).** **A sensitivity map produced based on the input obtained from the various specialist studies will be included in the EIA phase.**
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 Assessment undertaken as part of this EIA Process. However it must be noted that The terrestrial ecology assessment will be undertaken in a phased approached namely desktop assessment coupled with a reconnaissance assessment (scoping assessment) to be followed by a**

NEED	
Question	**Response**
	detailed site walkthrough of the entire project footprint to inform the impact assessment. **The mitigation hierarchy of avoidance, reduction and improved management will be applied to inform the findings of the Terrestrial Ecology Impact Assessment. The preliminary view is that it should be authorised (inclusive of all project alternatives).** **A sensitivity map will be produced based on the input obtained from the various specialist studies and will be included in the EIA report. Measures to avoid, remedy, mitigate and manage impacts are included within the compiled EMPr, which will be included in the EIA report.**
1.3. How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	**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 impact to ecology is being assessed further during the EIA phase.** **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 but may be significant in terms of local patterns and diversity that could be affected**. **Preliminary assessment of the ecological impacts is incorporated in Appendix 6H of this report. Measures to avoid, remedy, mitigate and manage impacts will be included within the Ecology Impact Assessment and the EMPr, which will form 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?	**. It is not anticipated that a significant amount of waste will be generated.** **The EMPr will include measures to avoid, remedy, mitigate and manage impacts are included within the compiled EMPr which will be included in 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	**A Heritage Impact Assessment was undertaken as part of the assessment for this project. The overall findings of the HIA is that the impact to heritage resources will be of low (negative) significance following mitigation. The cultural landscape in this area is considered to be of low significance**

NEED	
Question	**Response**
measures were explored to enhance positive impacts?	**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.**
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	**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, <u>please refer to the Alternatives section included in Section 2.3 of this report (this section) for an outline of the suitability of this activity.</u>**

NEED	
Question	**Response**
considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources of the proposed development alternative?) 1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?	
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 the layout will be amended to avoid sensitive areas where possible. This will be assessed and discussed in more detail during the EIA phase** **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.** **The risk associated with the limits in knowledge is considered to be low.**
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	**This is considered and addressed as part of the Socio-Economic Impact Assessment undertaken for this project (included in**

NEED	
Question	**Response**
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.)?	**Appendix 6 and summarised in Section 5.14 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".** **Additionally "from a Socio-Economic perspective the impacts associated with the proposed WEFare 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 5.14 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	**Please refer to the Alternatives section included in Section 2.3of this report (this section) for an outline of the suitability of this activity.**

NEED	
Question	**Response**
environmental option" in terms of ecological considerations?	
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 5.7 of this Scoping report and the full scoping specialist study in Appendix 6 of this report.**
2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	
2.1.1. The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,	**The 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 of this report for a description of the receiving environment and impact assessment,**

NEED	
Question	**Response**
	respectively. The impact of the proposed project on cultural/heritage areas (archaeology and palaeontology) have been assessed in the form of a Heritage Impact Assessment attached as Appendix 6 and summarised in Section 5.13. **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 6 and summarised in Section 5.10) 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 5.14 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 5.14 and included in Appendix 6 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 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 5.14 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.**

NEED		
Question		**Response**
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 5.10 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, via the Bon Espirange 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 reconstruction priorities of the settlement),	**This project is a renewable energy project and not related to bulk infrastructure expansion.**
2.5.9.	discourage "urban sprawl" and contribute to compaction/densification,	**Please refer to the Socio-Economic Impact Assessment summarised in Section 5.14 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**

NEED	
Question	**Response**
	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 2.3 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 5.14 and included in Appendix 6. 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 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. 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 (refer to Table 60 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 5.14 and included in Appendix 6.**

NEED	
Question	**Response**
2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	
2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
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?	
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?	**Please refer to the Socio-Economic Impact Assessment summarised in Section 5.14 and included in Appendix 6.**
2.11. What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	
2.12. What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	

NEED	
Question	**Response**
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 will be undertaken is included in the Report (Appendix 7) and summarised in Section 229. This Scoping Report will be released for a 30-day commenting period to all the relevant authorities and stakeholders. 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 will be provided to all I&APs throughout the Scoping and EIA process 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 5.14 and included in Appendix 6.**
2.15. What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	**An EMPr will be developed to address health and safety concerns and will be included in the EIA report. 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 5.14 and included in Appendix 6.**
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),	

NEED	
Question	**Response**
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 3 of this scoping 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 will be undertaken is included in the BA Report (summarised in Section 2298) This scoping report will be released for a 30-day commenting period to all the relevant authorities and stakeholders and will be given an opportunity to comment during the 30-day public review period. Various methods will be employed to notify potential (I&APs) of the proposed project, namely, through an advert, site notices on site and in Matjiesfontein and 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 will 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 will be included in the EMPr which will be included in the EIA report.**
2.20. What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for	**The EMPr which will be included in the EIA report of this proposed project must form part of the contractual agreement and be adhered to by both the contractors/workers and the applicant.**

NEED	
Question	**Response**
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 2.3 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 Section6.3 of this report for a summary of the cumulative impacts.**

4.1 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 (SAWEA, 2010).

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 60c/kWh at present. Further projects will increase the competitive nature of the REIPPP program and further result in cost savings to South African consumers.

4.2 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).

4.3 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).

4.4 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 two (2) 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.

4.5 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.

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.

5.1 Regional Locality

The proposed development will be located approximately 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 (**Figure 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 10** below:

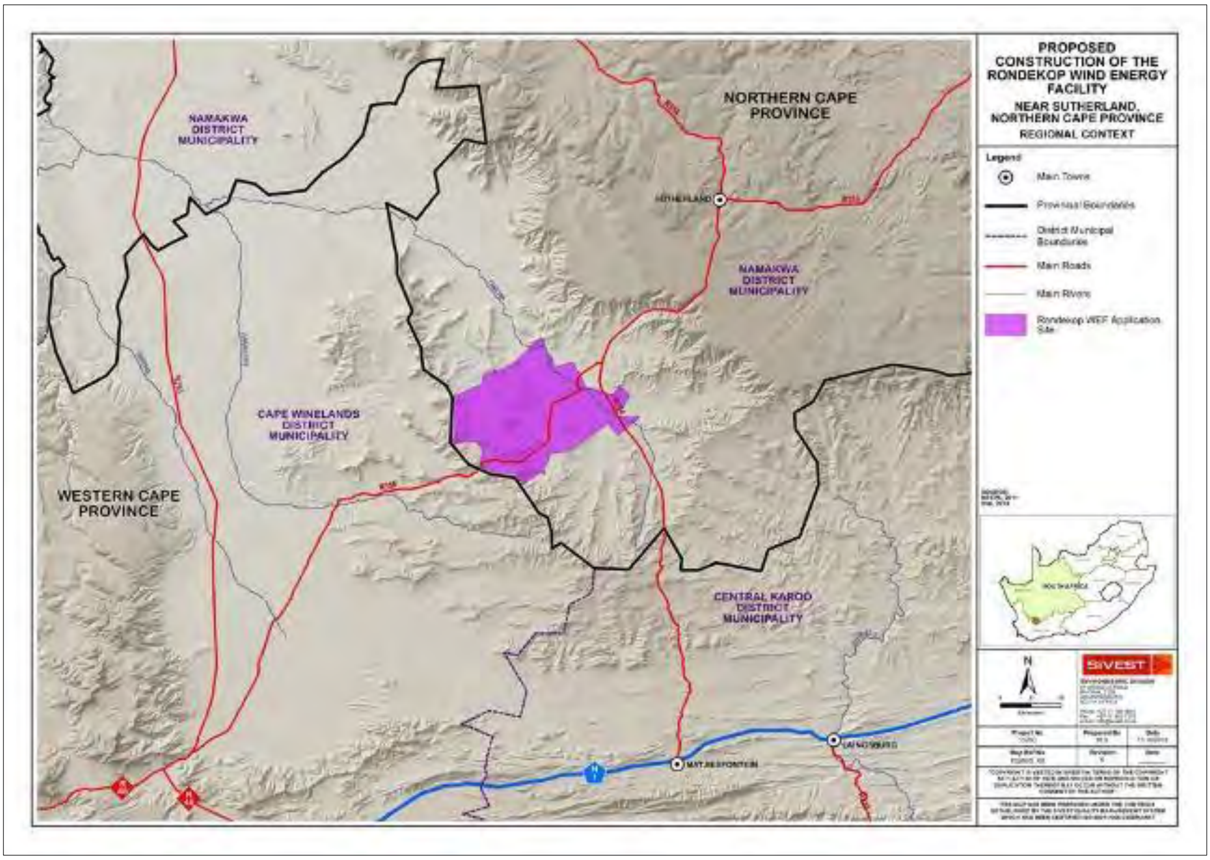


Figure 10: Regional context of the Rondekop WEF

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.

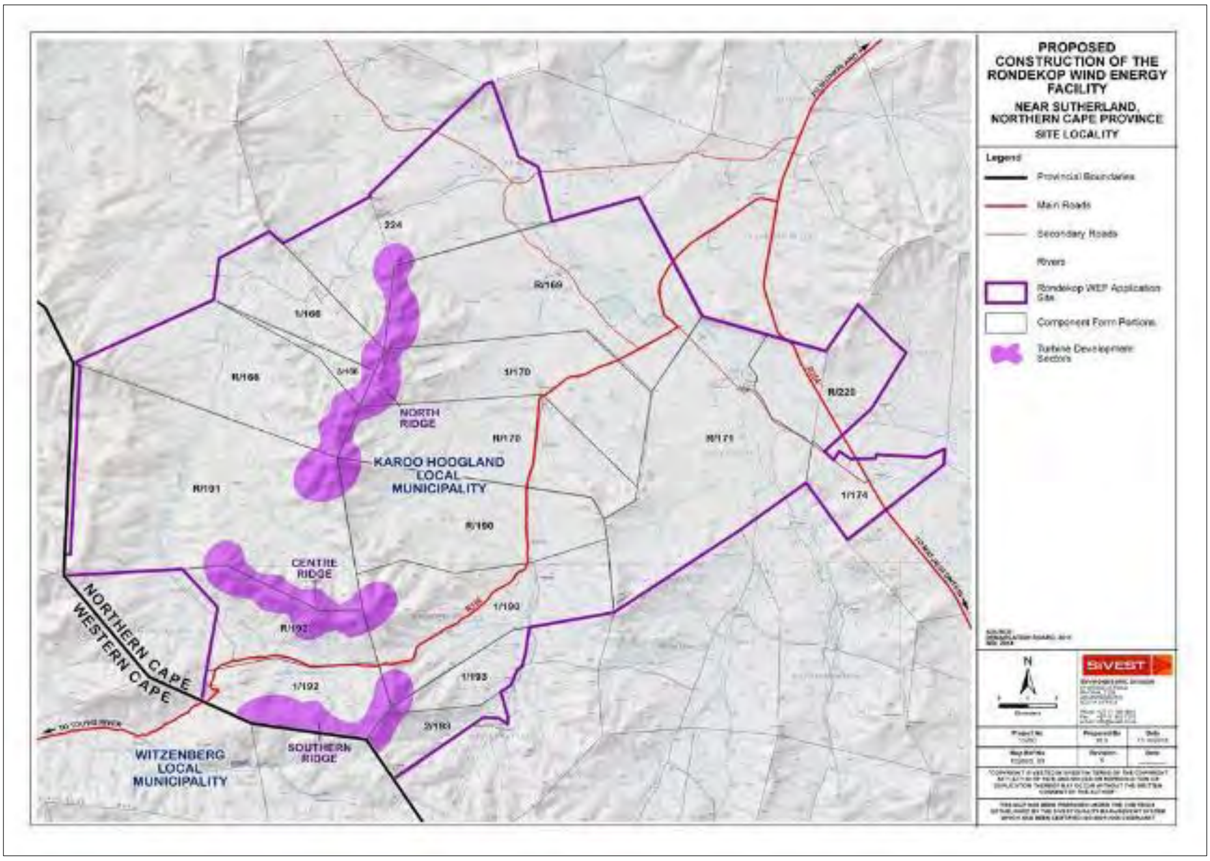


Figure 11: Site locality.

Table 10: 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° 42' 41.604"	E20° 19' 53.961"

5.3 Topography

The study area is situated in an area with moderately to steeply sloping topography (**Figure 12**). The elevation on site varies from 675 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 area are shown in **Figure 13**.

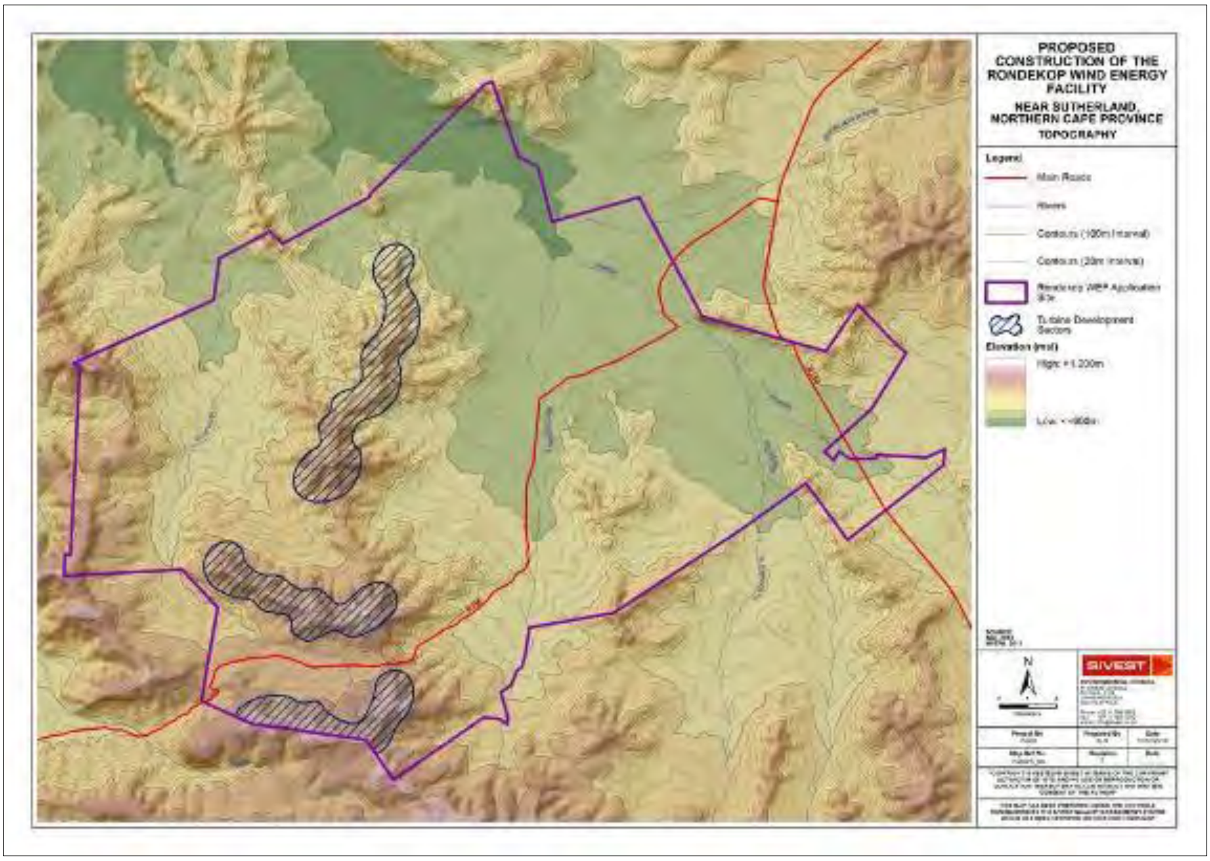


Figure 12: Topography of the study area.

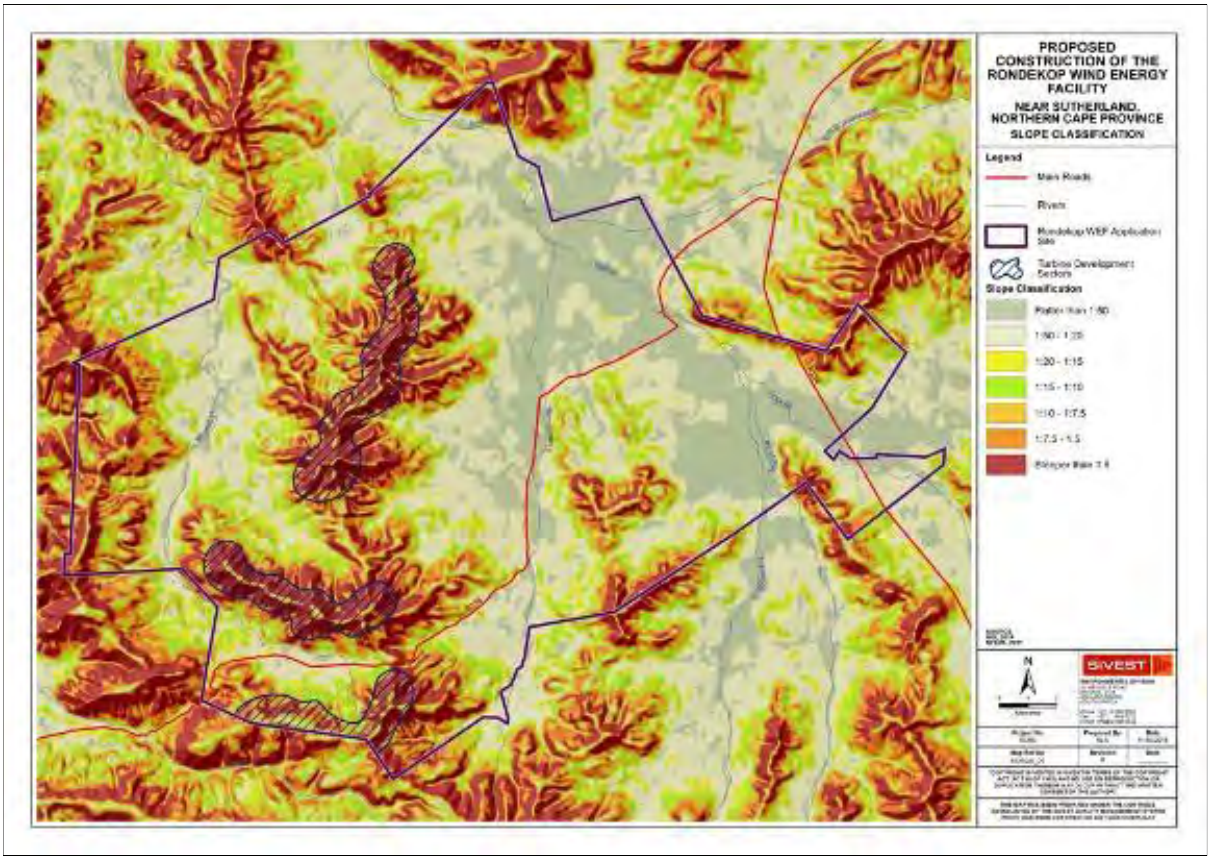


Figure 13: Degree of slope in region of the study area.

5.4 Geology

The underlying geology in the 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 14**). Sheep farming (**Figure 15**) is the dominant activity in the study area although the arid nature of the climate restricts stocking densities which has resulted in relatively large the 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.

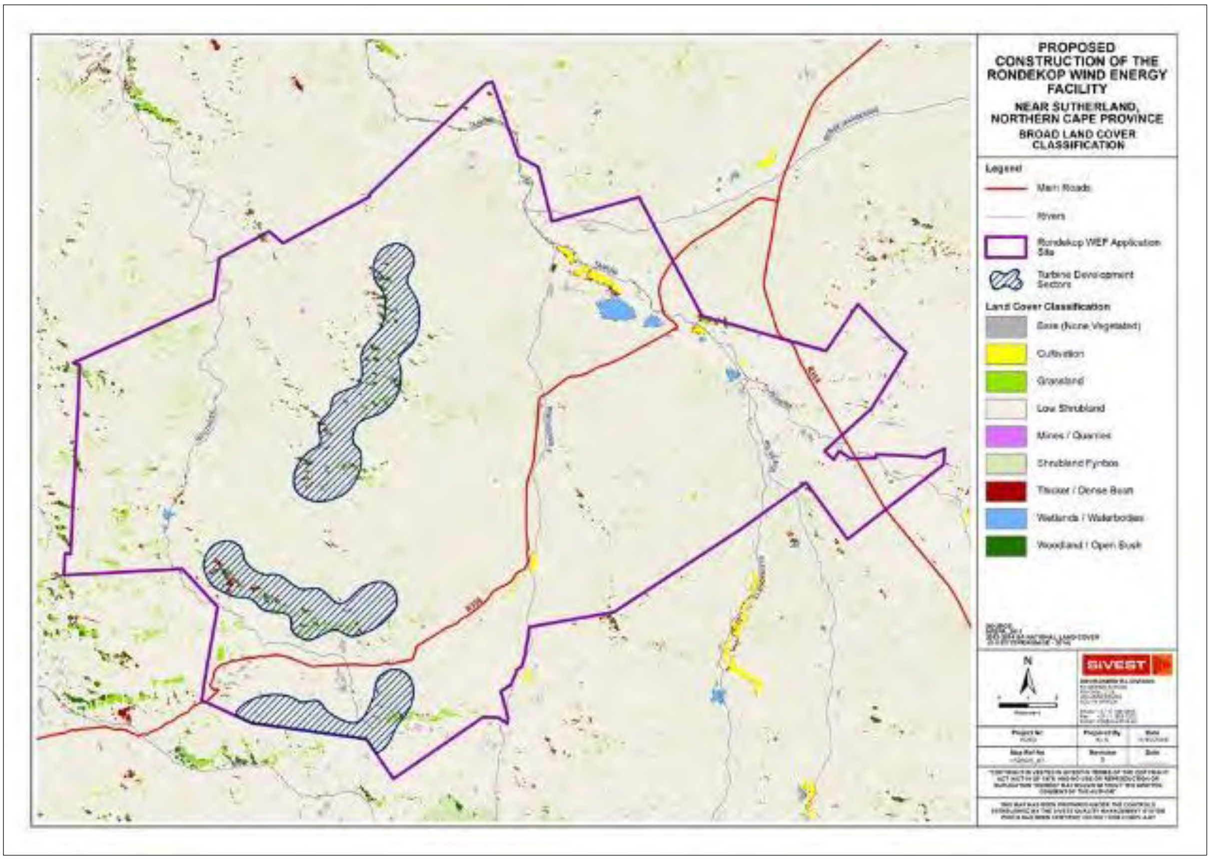


Figure 14: Land use in the region of the study area.

1


Figure 15: 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 16**). These elements can be found throughout the study area and are typically present in areas where sheep farming is taking place.

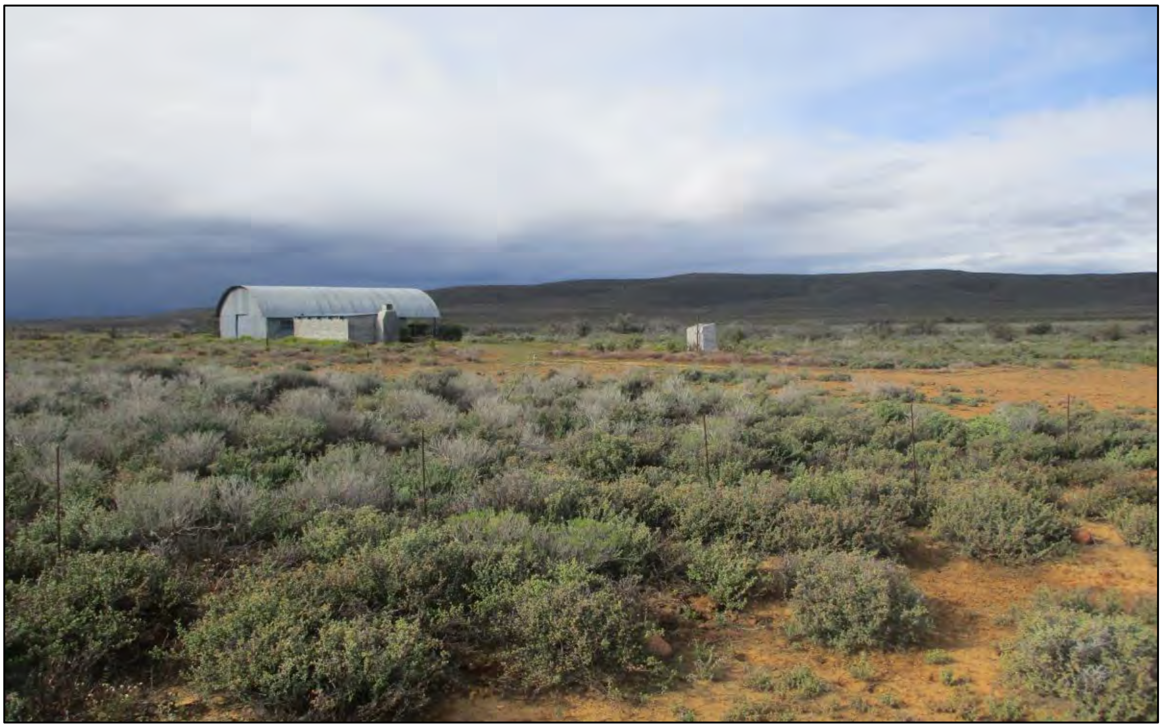


Figure 16: Example of typical pastoral elements which can be found within parts of the study area, especially in areas where sheep farming is taking place.

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 given as a very low 125 mm per annum (The World Bank Climate Change Knowledge Portal, undated). The average monthly distribution of rainfall is shown in **Figure 17**.

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

[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.

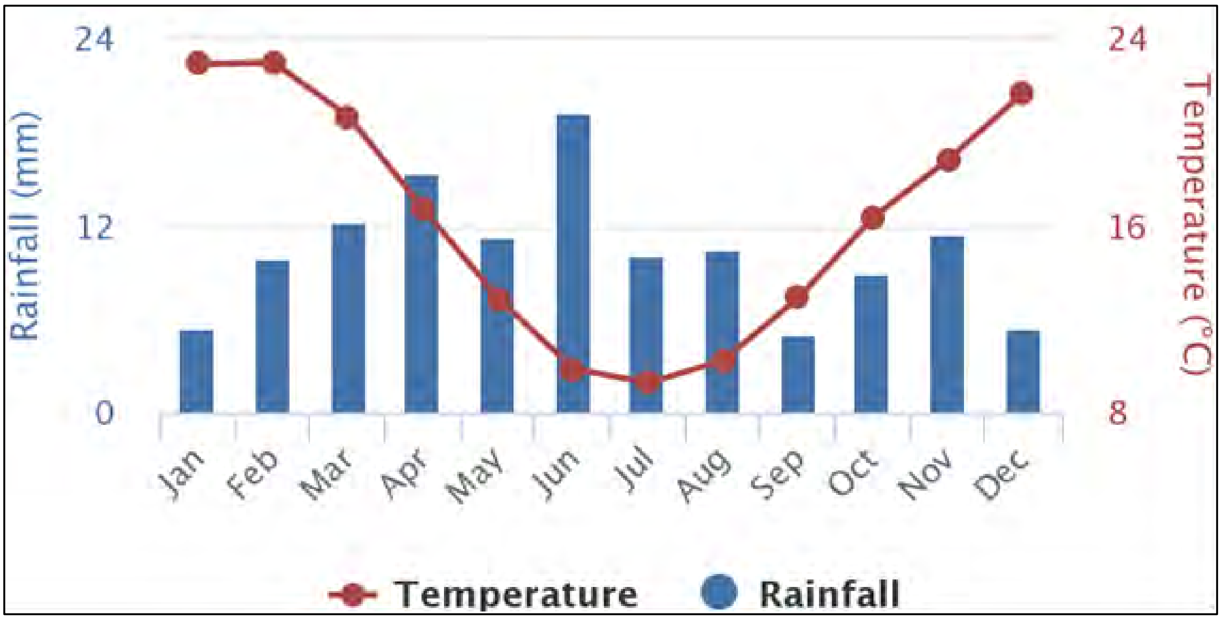


Figure 17: Average monthly temperature and rainfall for the site from 1990-2012 (The World Bank Climate Change Knowledge Portal, undated).

5.7 Terrestrial Ecology

The Ecology Assessment was conducted by Dr David Hoare and is included as Appendix 6H. The environmental baseline perspective is presented below. This has been informed by a site-specific resonance survey which was undertaken between the 5th and the7th October 2018.

5.7.1 *Broad-scale vegetation patterns*

The national vegetation map (Mucina & Rutherford 2006) for the study area is depicted below in **Figure 18**. The Rondekop site is mapped as falling within two dominant vegetation types, namely Koedoesberge-Moordenaars Karoo and Central Mountain Shale Renosterveld

The Koedoesberge-Moordenaars Karoo is 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 Central Mountain Shale Renosterveld is found in the Western Cape and Northern Cape Provinces along the 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.t

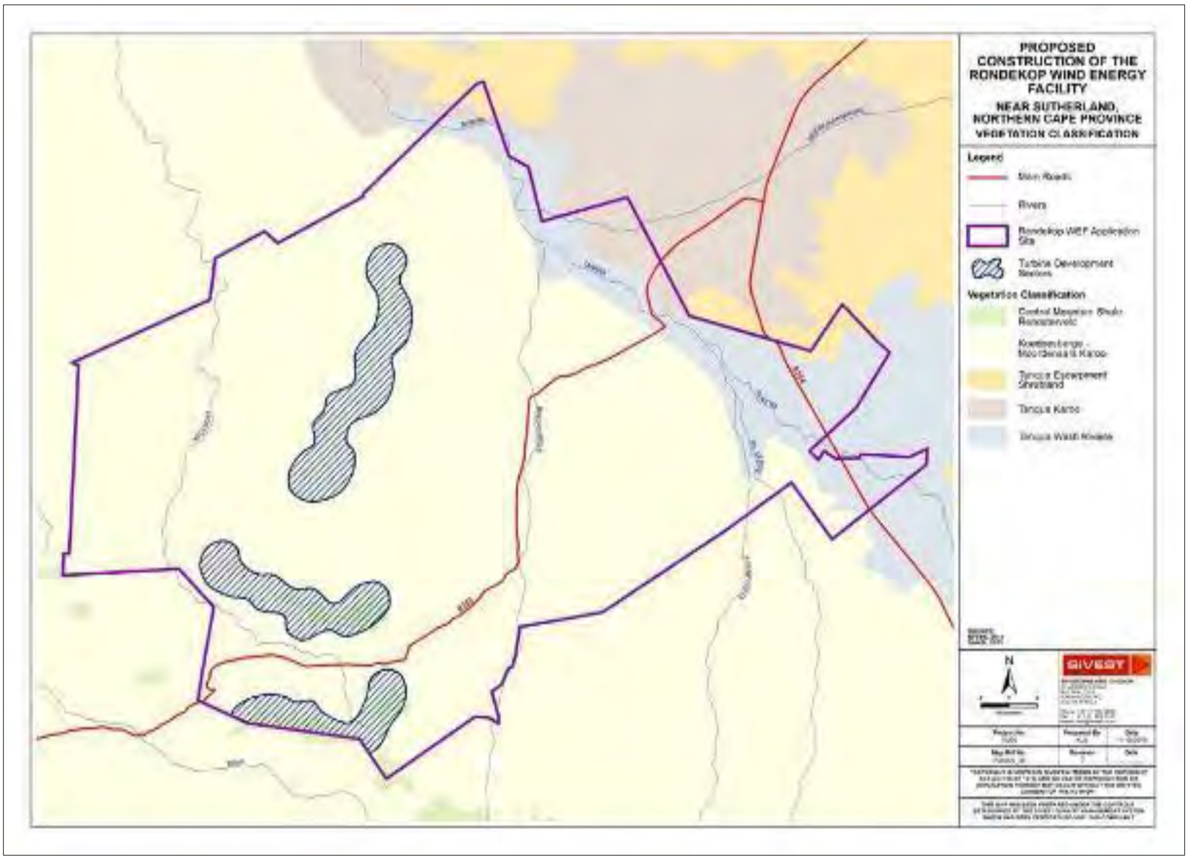


Figure 18: The national vegetation map (Mucina & Rutherford, 2006) for the study area. Rivers and wetlands (pans) delineated by the National Freshwater Ecosystem Priority Areas Assessment (Nel *et al.* 2011) are also depicted.

5.7.2 *Fine-scale vegetation patterns*

The natural habitat units on site are as follows:

1. Lowland plains vegetation (succulent karoo);
2. Mountain vegetation (more diverse succulent karoo); and
3. Dry stream beds and associated riparian vegetation.

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 19.**

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.

The site visit revealed that only the north western third of the site consists of vegetation that can be considered to be representative of Bushmanland Basin Shrubland. The southern two thirds of the site is dominated almost entirely by so called “white grasses” and is clearly representative of the Bushmanland Arid Grassland vegetation type. This discrepancy with the vegetation map can be ascribed to the coarse nature of the national vegetation map and associated uncertainty along the boundaries of the vegetation units. In addition, boundaries between units have been mapped largely from aerial or satellite imagery and these boundaries are not always clearly visible. The main driver of vegetation pattern in the area is substrate. On gravels and stony soils, the vegetation consists of open shrub-dominated vegetation typical of Bushmanland Basin Shrubland, while on sandy soils the vegetation is typically dominated by various Stipagrostis species and is typical of Bushmanland Arid Grassland. There are also many areas on shallow soils, which consist of grassy shrublands and are clearly transitional areas between the two typical forms.

Figure 19: View showing succulent karoo vegetation on plains with steeper topography in background.

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 20**). 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 20: Vegetation in steeper parts of the landscape.

Dry stream beds and associated riparian 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 21.** 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.

Figure 21: Typical habitat on the banks of a small stream bed.

5.7.3 *Critical biodiversity areas*

The site lies within the planning domain of the Namakwa Biodiversity Sector Plan (Desmet & Marsh 2007). This biodiversity assessment identifies Critical Biodiversity Areas (CBAs) which represent biodiversity priority areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to maintain ecosystem functioning and meet national biodiversity objectives. At a regional level, the CBA map for Northern Cape indicates various parts of the site as being important for conservation, but the reason behind the specific location of CBAs is not provided in relevant literature. A small patch of

CBA in the northern half of the study area is possibly the location of a species of concern, although this is not confirmed from any other information and the assumption is therefore speculative. The Northern Cape CBA map also shows the high-lying areas of the northern part of the study area as being Ecological Support Areas (ESAs). It should be assumed that, over and above the designation of CBAs in other parts of the site, all high-lying areas on site should be treated as ESAs. This coincides with the areas mapped here as Mountain Vegetation. (Figure 14).

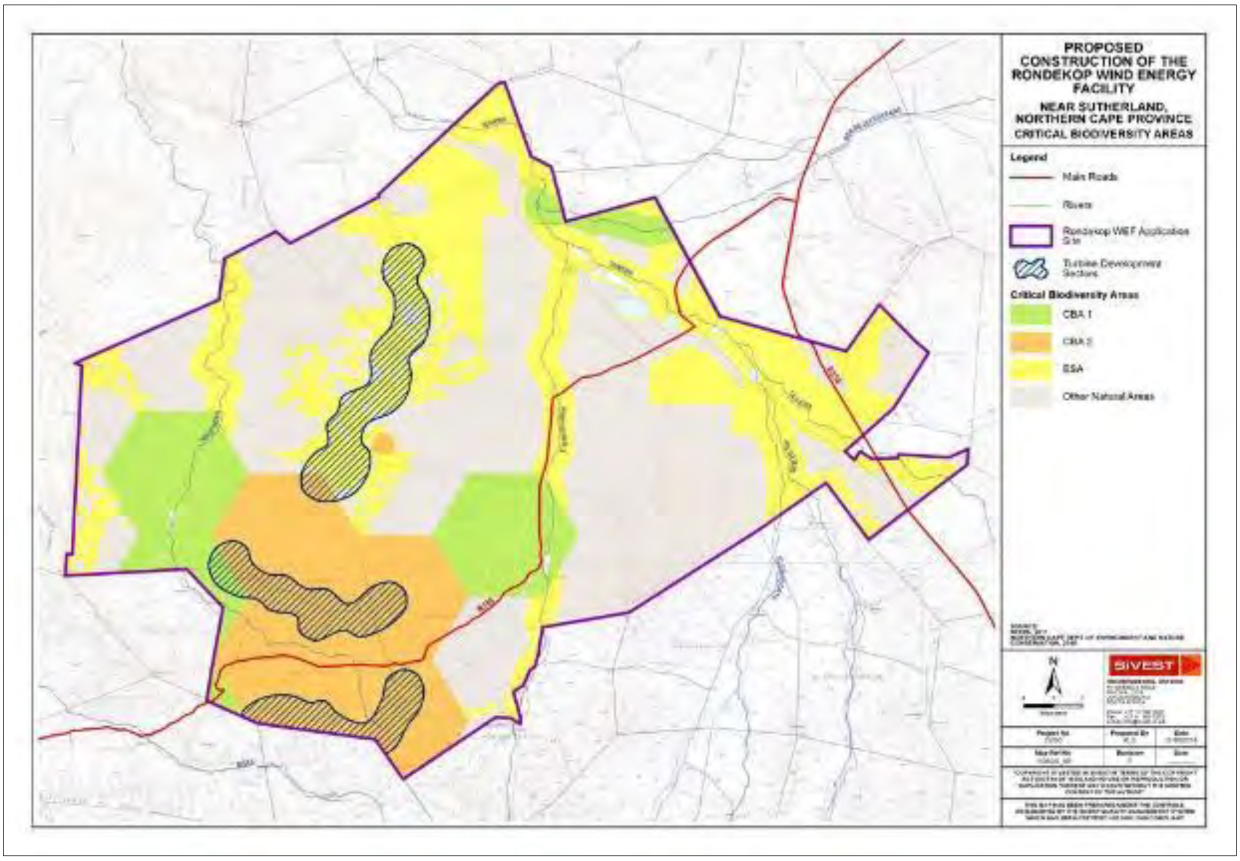


Figure 22: Extract of the Northern Cape Conservation Plan for the study area, showing that there are CBAs within the site

To address any uncertainty in the coarse scale delineation of CBA's, the ecologist will undertake a detailed site walkthrough of the entire project footprint to verify the relevance of the CBA.

5.7.4 *Overall species composition*

One plant species protected under the NEM:BA 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 under the NEM:BA that have a geographical distribution that includes the study area.

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.
There were no protected trees according to National Forest Act, found or are likely to occur in the geographical area that includes the site.

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.

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 below:

Table 11: 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 *Rondekop WEF ecology sensitivity assessment*

The majority of the site consists of arid grasslands or low open shrublands on open plains that are not considered highly sensitive. There are however some sensitive features present including some rocky outcrops, drainage lines and pans. These features should be avoided as much as possible and no infrastructure should be located within these features, although it may be necessary for the roads to traverse some of the drainage features. The gravel plains in the north of the site are considered medium low sensitivity due to the higher diversity and occasional presence of protected species such as *Hoodia gordonii*. These are very sparsely distributed and it is likely that significant impact on these species can be mitigation through avoidance.

The ecologist will undertake a detailed site walkthrough of the entire project footprint to verify the relevance of the CBA and define exact no-go areas to avoid.

5.8 Avifaunal and Bat

The Avifaunal and Bat Pre-Construction Assessment is currently underway and being conducted by Bioinsight (Pty) Ltd. The results of the pre-construction monitoring will provide the baseline data for the proposed development area contributing to the identification of impacts occurring in later phases of the project. At this stage, only partial information (three seasonal assessments) has been collected and therefore conclusions and recommendation provided must be taken cautiously, as they may be subjected to changes when considering the information from subsequent surveys. The main facts arising from the data collected to date are summarised as follows

- Bat species considered to have a high collision risk had low detection levels (7%) in the area of the proposed WEF during winter.
- The detection of bats was higher in the detectors at ground level (84%) than the detectors at rotor height (16%). However, the levels of activity indicate a potential high risk of fatality caused by the WEF, according to the most recent version of the Best Practice Guidelines (Sowler *et al*. 2016).
- Three of the four potential bat roosts inspected showed the presence of bats when monitored through night time by ultrasound detection.
- Bird activity recorded in the development area during the autumn surveys was very low. 43 species were detected in the study area. Of the total species list, five species have a conservation status of concern in South Africa: Black Harrier (*Circus maurus)* and Martial Eagle (*Polemaetus bellicosus)* (Endangered); Black Stork (*Ciconia nigra)* and Verreauxs' Eagle (*Aquila verreauxii*) (Vulnerable); Greater Flamingo (*Phoenicopterus roseus*) (Near Threatened).
- At the moment no active nests from bird species sensitive to wind farms were identified in the area of the proposed Rondekop WEF.

5.9 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.

5.9.1 *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 23**):

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

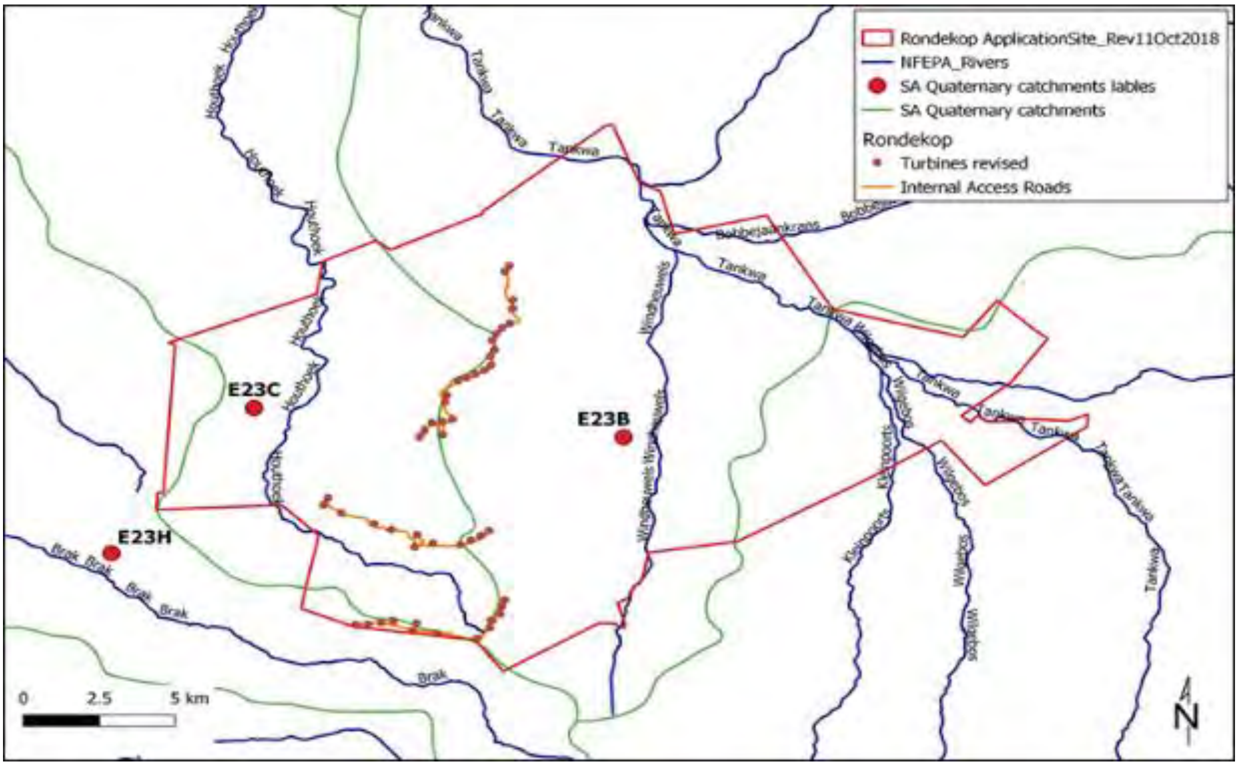


Figure 23: Project locality map indicating the various quaternary catchment boundaries (green line) in relation to the study area (Source DWS and NGI).

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 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 (**Figure 24**)

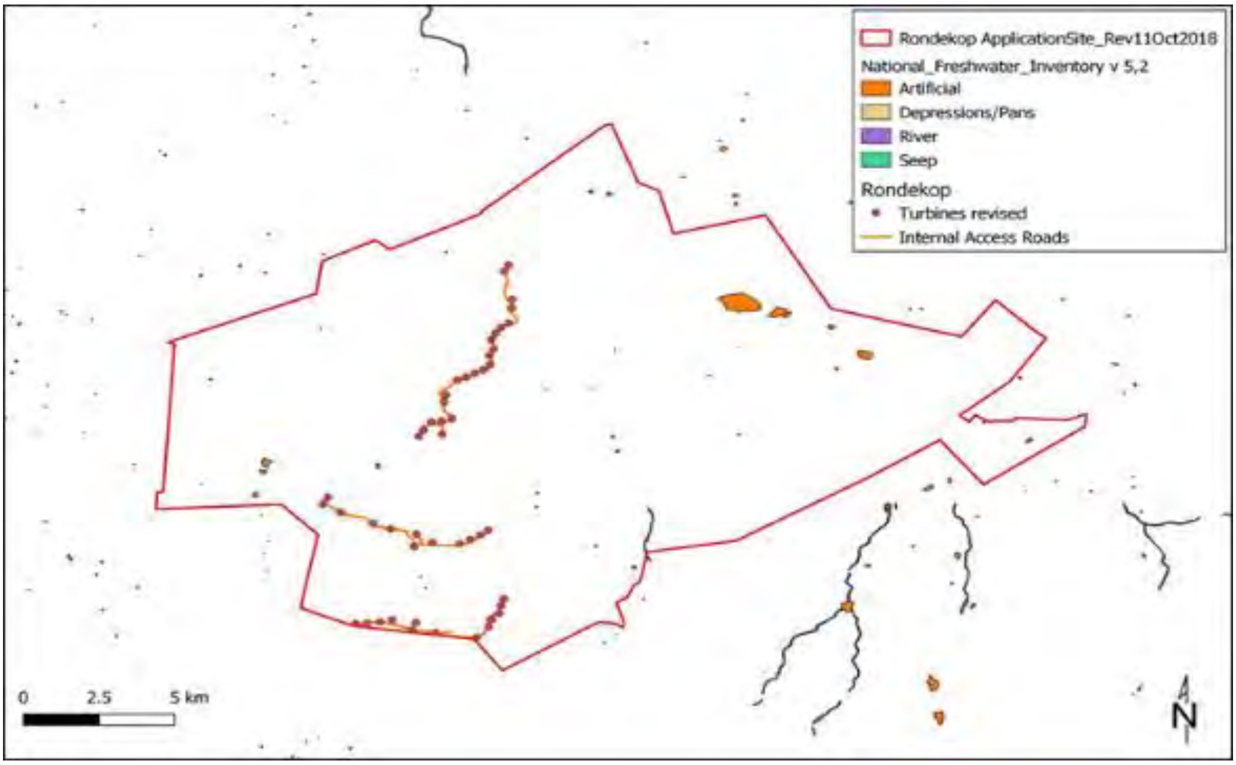


Figure 24: The various dams within or near the property identified in the National Wetland Inventory V5.2 (2018), with no natural wetlands being observed within the 500m of the boundary**.**

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 25** below) and are supported hydrologically by the study area systems.

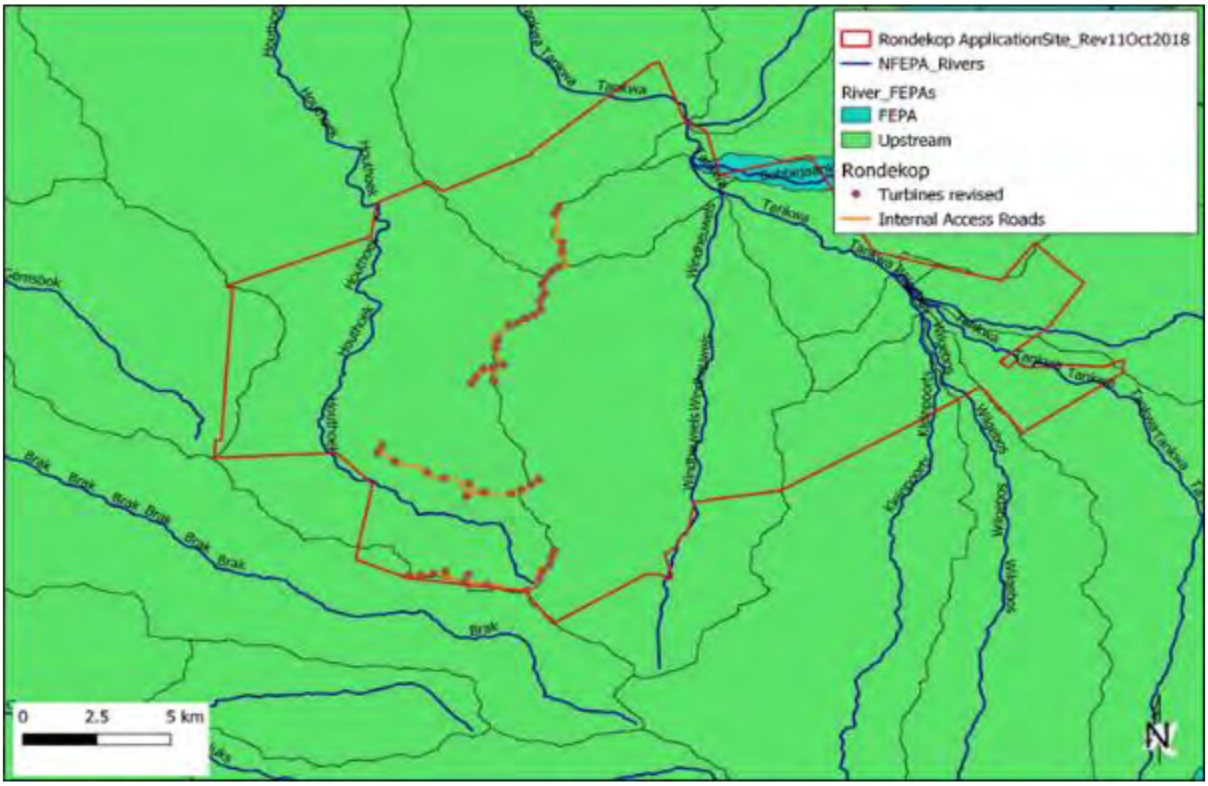


Figure 25: The respective subquaternary catchments rated in terms of Freshwater Ecosystem Priority Areas (FEPAs) in relation to the study area

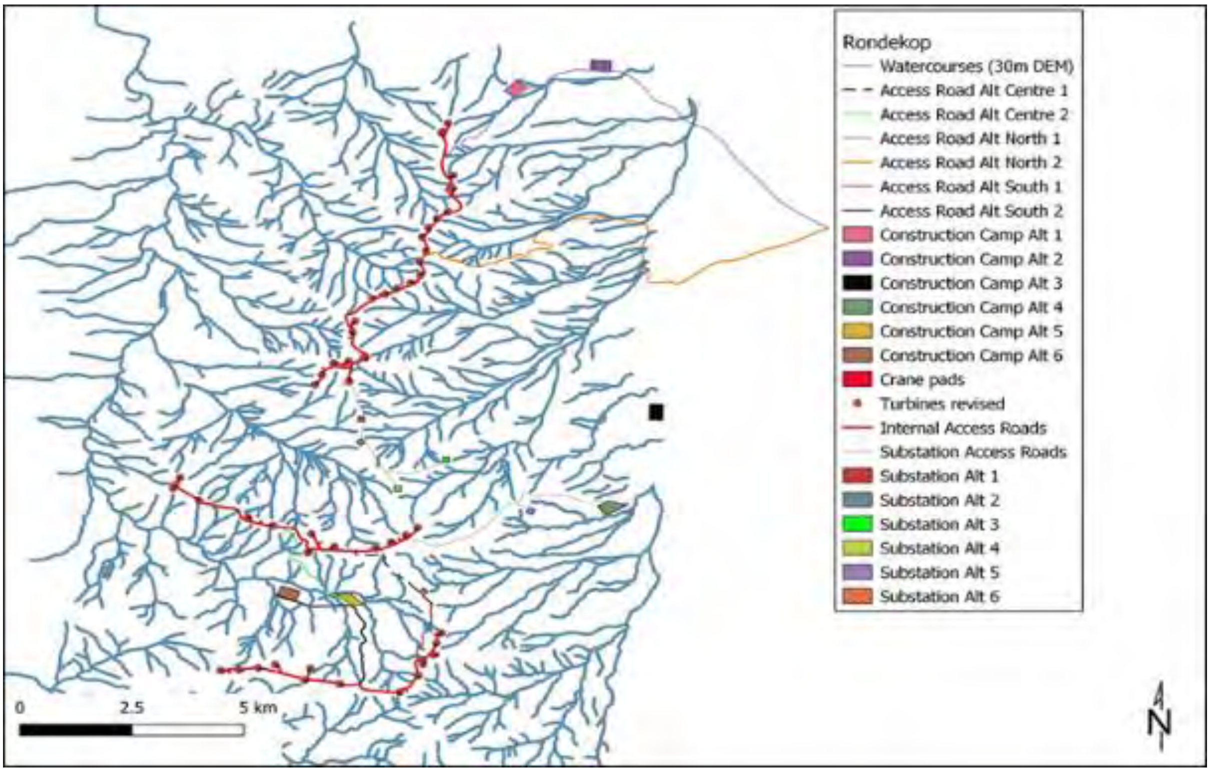


Figure 26: Watercourses within the study area created using 30m data supplied by the USGS and verified using NGI 1:50 000 topo data in relation to the activities, alternatives and the 32m watercourse buffer

Figure 26 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.

5.10 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.

5.10.1 *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).

5.10.2 *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 12**.

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 12: 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
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.

5.10.3 *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.

5.10.4 *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.

5.10.5 *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.

5.11 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.

5.11.1 *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.

5.11.2 *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 27** below.

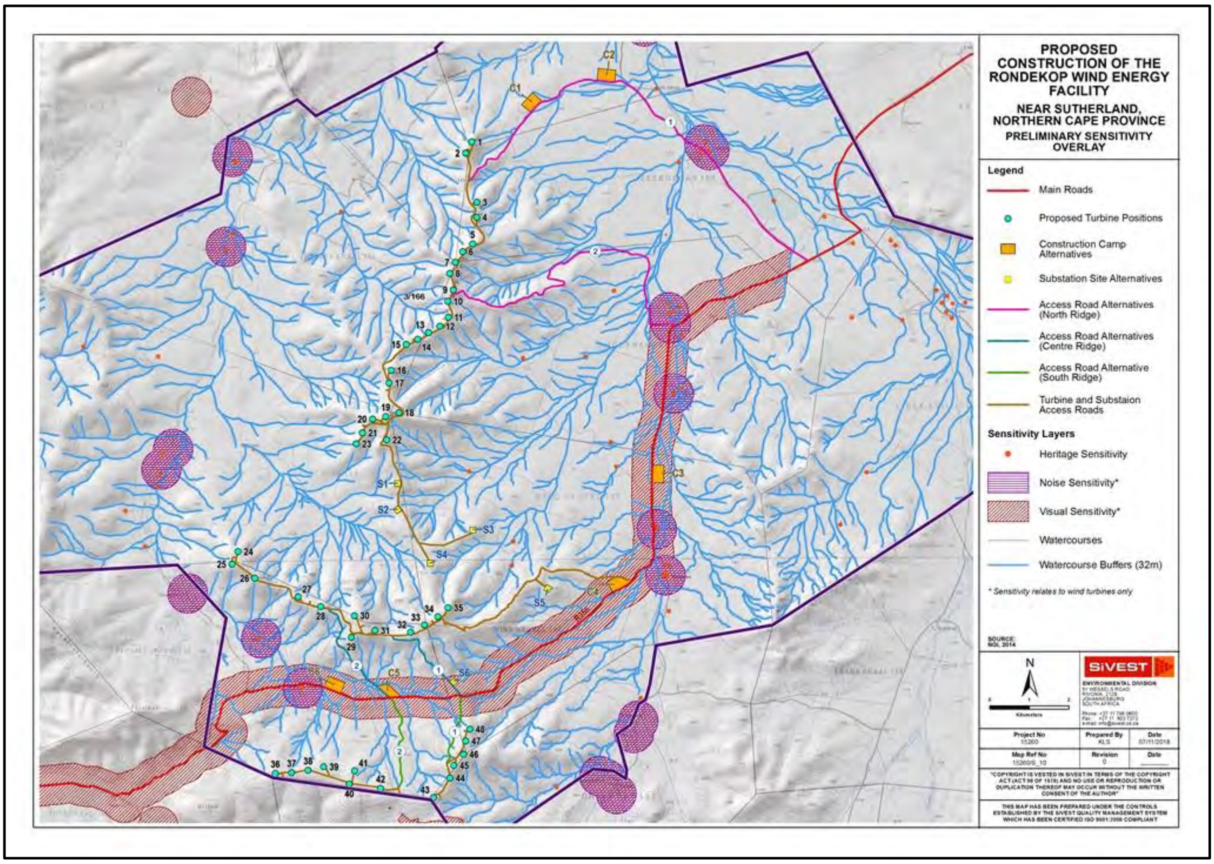


Figure 27: The proposed positions of the wind turbines and Noise Sensitive Areas
Wind turbines (red dots) and Noise Sensitive Areas (green dots).

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.

5.11.3 *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 13** below.

Table 13: 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

NSA No	Longitude	Latitude	Within the Project Area
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
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.

5.11.4 *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 14** below. The author is confident that this represents the ambient noise at the project site at the noise sensitive receptors.

Table 14: 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.

5.11.5 *Wind Turbine Generators*

The Wind Turbine Generator (WTG) that was modelled is described in **Table 15** 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 15: 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.

5.12 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.

5.12.1 *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 28** and **Figure 29**).

Maps showing the topography and slopes within and in the immediate vicinity of the proposed application site are provided in **Figure 12 and Figure 13 Section 5.3 on page 70.**

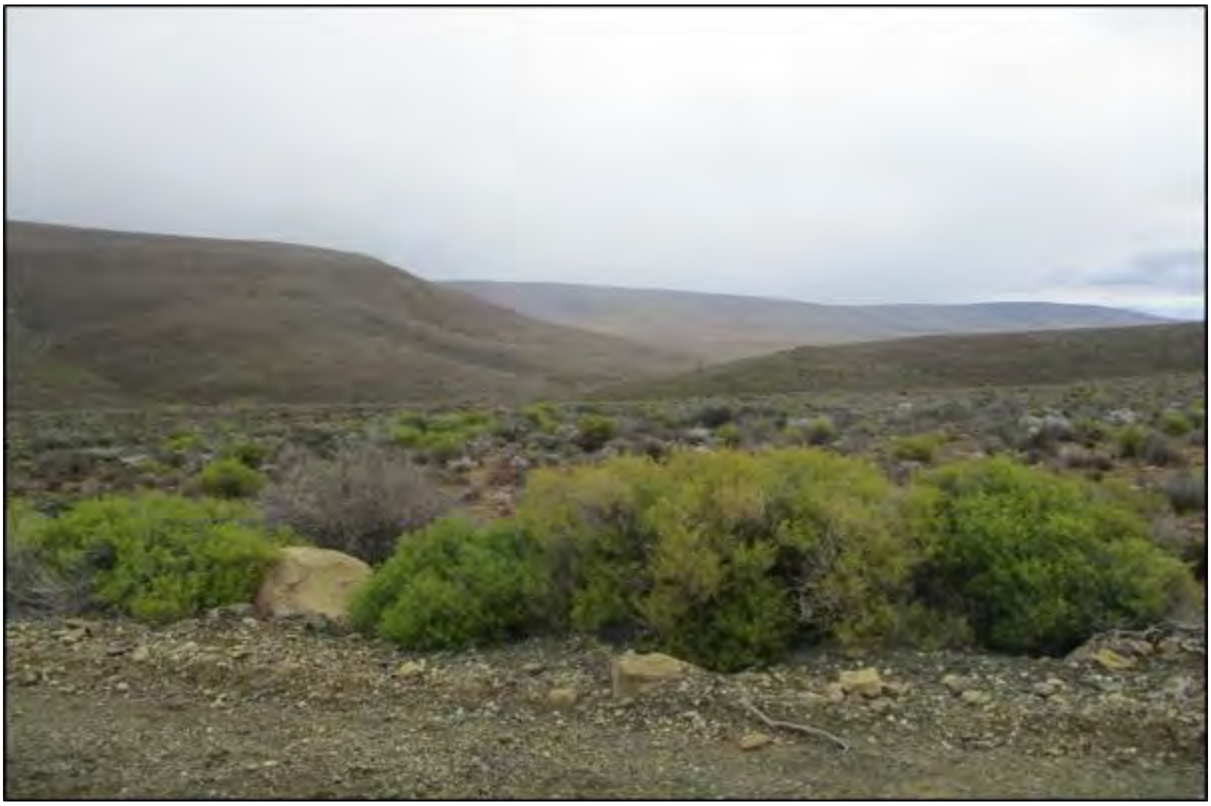


Figure 28: View (SE) across the study area from R356 **(-32.788244S; 20.242131E)** showing typical undulating topography.

Figure 29: View from a high point (**-32.704673; 20.290742E)** on the application area showing high mountains enclosing the visual envelope.

5.12.2 *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 30**).

Figure 30: Example of trees and garden vegetation established around farmhouses in the area

5.12.3 *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.

5.12.4 *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.

5.12.5 *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 16**), 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

ii) **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.

iii) **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 16: 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.

5.12.6 *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 31) 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 32** 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.

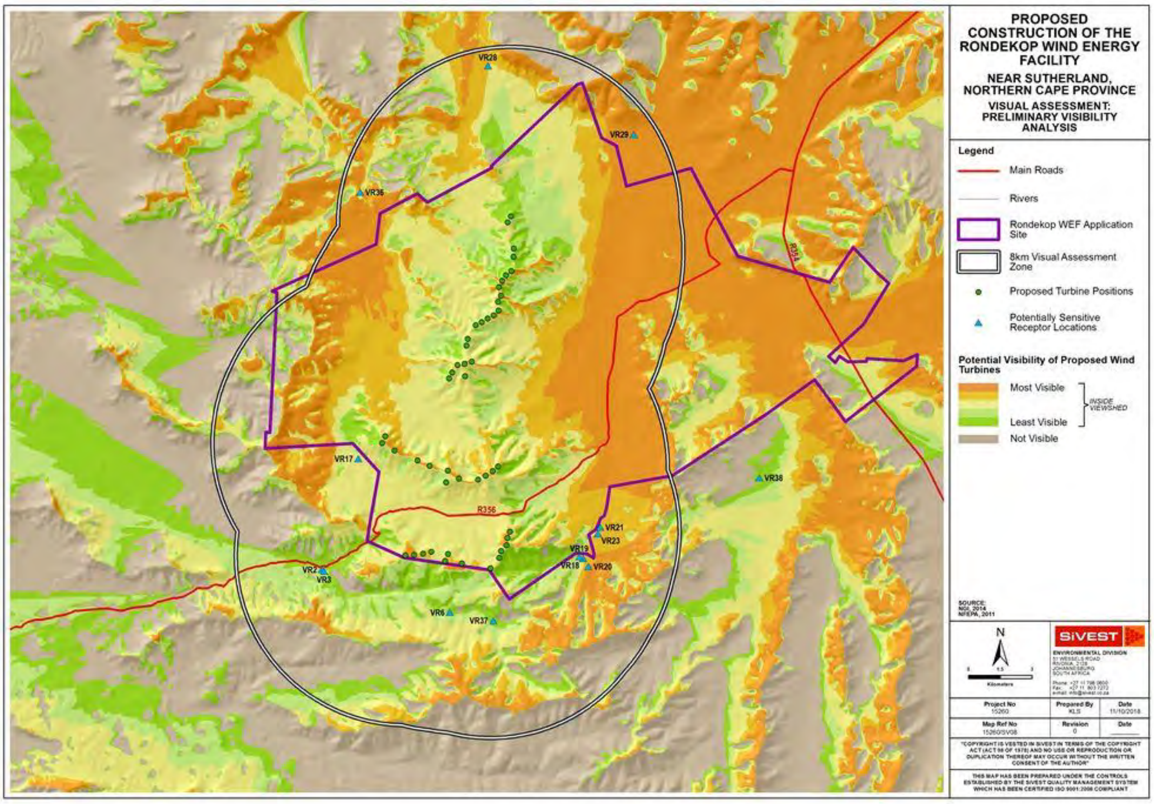

Figure 31: The turbine layout identified a relatively extensive viewshed, with high levels of visibility from a significant number of locations

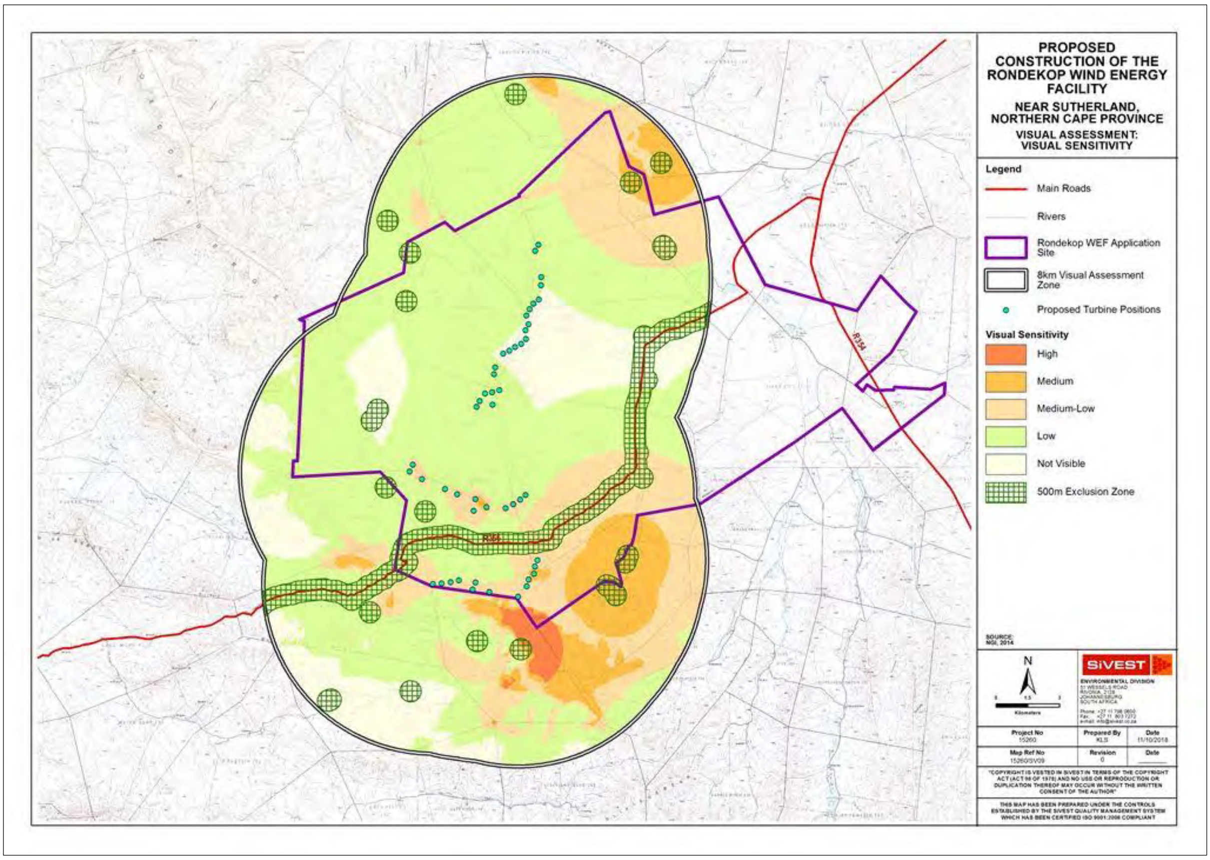

Figure 32: Visual sensitivity rating shows very few areas of high visual sensitivity on the site

5.12.7 *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 33** 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.

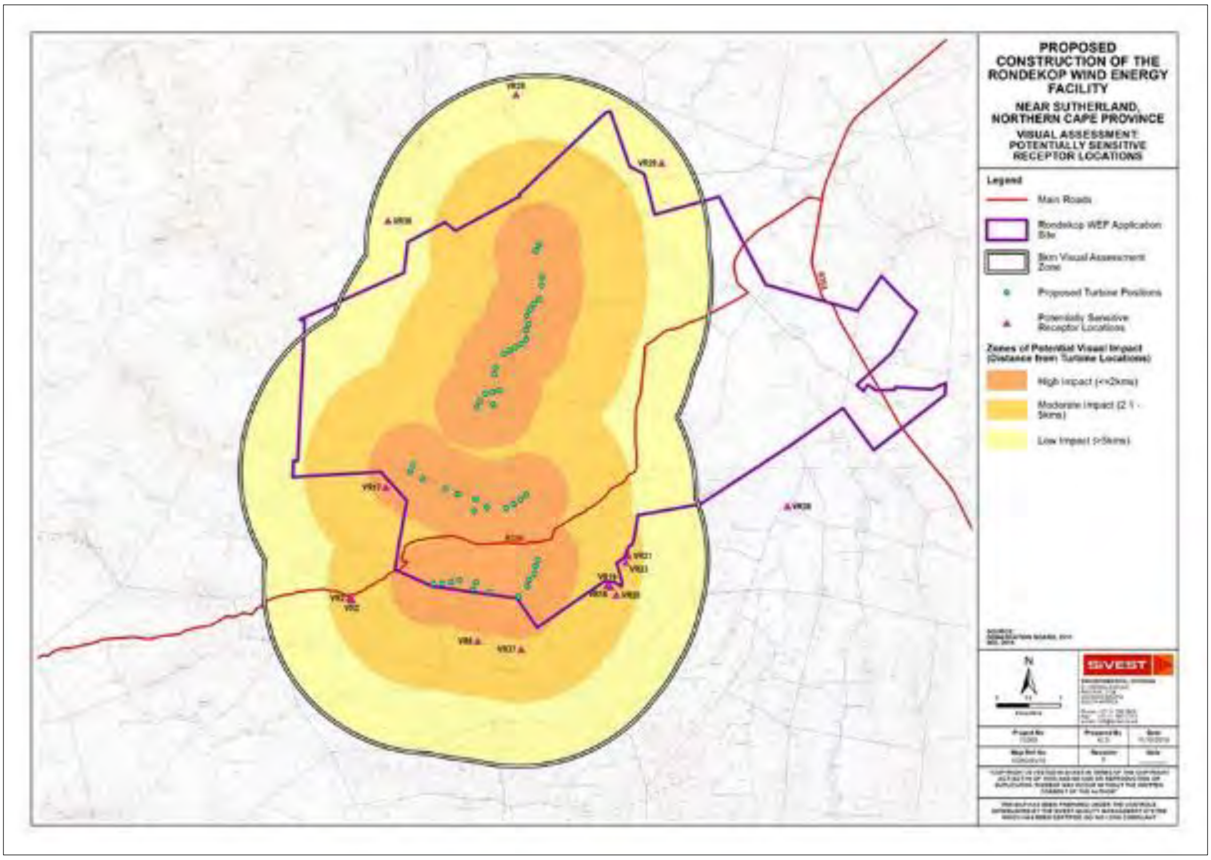

Figure 33: Potentially Sensitive Visual Receptors within the study area

5.13 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.

5.13.1 *Palaeontology*

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

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).

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.

5.13.2 *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.

5.14 Socio-Economic

The Socio-economic 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.

5.14.1 *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.

5.14.2 *Spatial Context, Regional Linkages and Demographic Profile*

<u>Provincial</u>

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 34**).

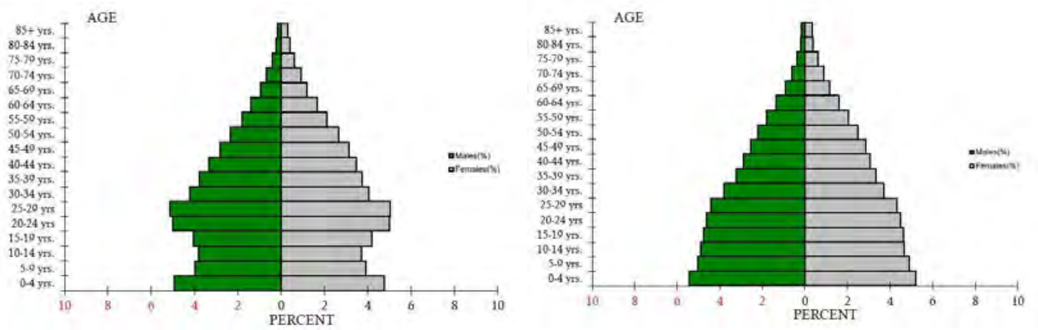

Figure 34: Population pyramids for the Western Cape Province and Northern Cape Province respectively

<u>Municipal</u>

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/km^2, 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/km^2. 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 17** 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 17: 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 18.**

Table 18: 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 Hooglands 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 Hooglands 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 Hooglands 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

5.14.3 *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.

5.15 Traffic Impact Assessment

The Traffic Impact Assessment was conducted by JG AFRIKA (PTY) LTD. The full report is included in **Appendix 6I**.

5.15.1 *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 35**). 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 35: 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 36** 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 36: 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.

5.15.2 *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 below).

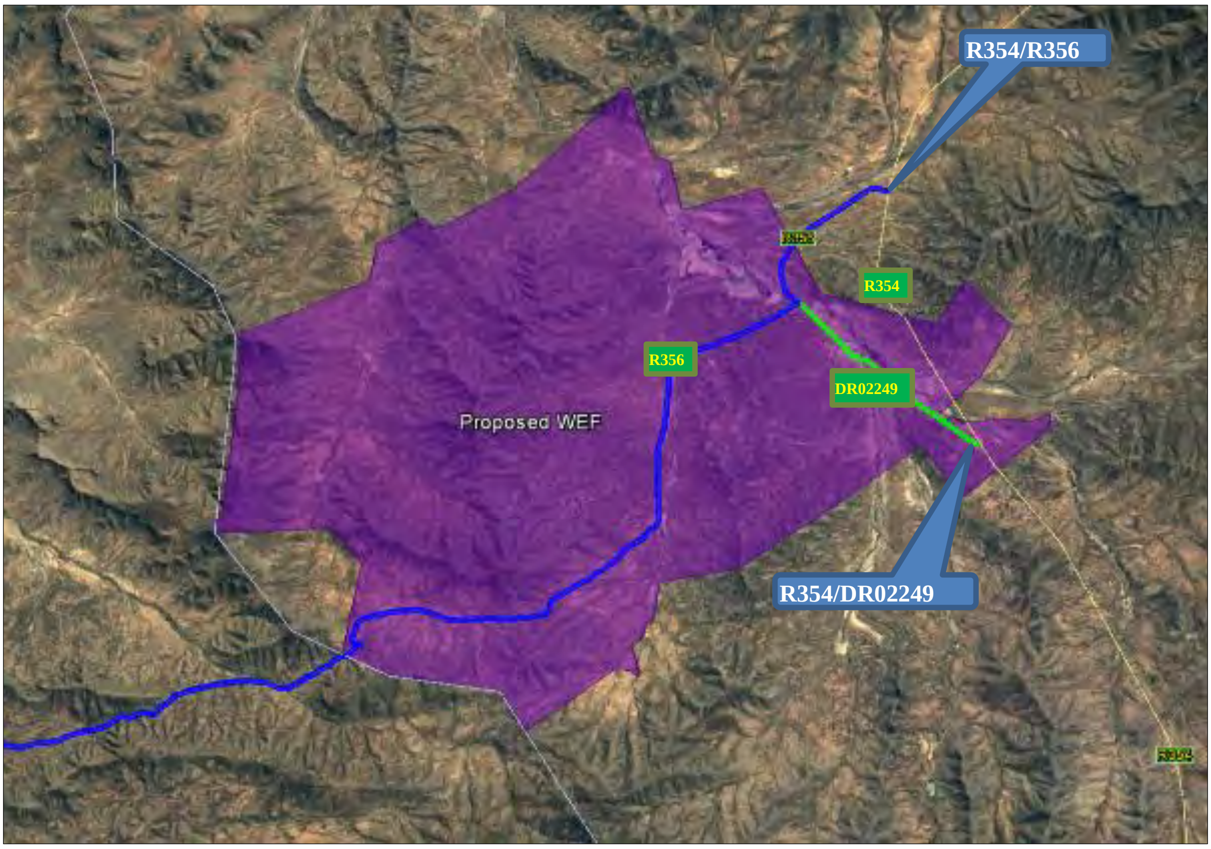

Figure 37: Proposed Main Route

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 38: Narrow bridge on DR02249

Figure 39: 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 37.** 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.

5.15.3 *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

5.15.4 *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 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.

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 20.**

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 19: 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	Negative Low 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 20: 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 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:

- Agriculture and Soils Assessment;
- Aquatic Ecology Assessment;
- Avifauna Assessment (Impact Assessment will be detailed in the EIA phase);
- Bat Assessment (monitoring is still underway and will be detailed in the EIA phase);
- Heritage Assessment (including Paleontology, Archaeology & Cultural Landscape);
- Noise Assessment
- Socio-Economic Impact Assessment;
- Terrestrial Ecology Assessment (detailed study to follow during the EIA phase);
- Traffic Impact Assessment; and
- Visual 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 will be 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.

6.2.2 *Terrestrial Ecological Impacts*

This terrestrial ecology scoping report provides details of the results of the ecology scoping-level desktop assessment of the study area, mapping from aerial imagery and one reconnaissance site visit undertaken during 8th -10th October 2018. The Ecology Scoping Assessment was conducted by Dr David Hoare and is included as Appendix 6H. For the scoping phase, the following impacts have been identified for the proposed WEF development and will be further investigated in the EIA phase of the ecological assessment and will be informed by a detailed site walk through assessment.

Potential sensitive receptors in the general study area

A summary of the potential ecological issues for the study area is as follows (issues assessed by other specialists, e.g. on birds and on wetland and hydrological function, are not included here):

- Presence of natural vegetation on site, some of which has high conservation value due to being within CBA. All-natural vegetation on site is vulnerable to disturbance, especially direct habitat loss and habitat fragmentation.
- Presence of dry stream beds and associated riparian vegetation on site, assessed as being sensitive to impacts associated with development as well as being important habitat for various plant and animal species.

- Presence of protected plant species, namely *Hoodia gordonii*, protected according to the NEM:BA.
- Potential presence of plant species of conservation concern. The identity of these species is difficult to determine due to the lack of scientific information of the vegetation and flora of the study area. There have been some general vegetation studies, but knowledge of which species of concern could potentially occur on site is poorly known.
- Presence of various plant species protected according to the Northern Cape Nature Conservation Act (Act 9 of 2009). The identity of such species requires detailed floristic surveys within the footprint of the proposed project.
- Potential presence of two reptile species of concern, namely the Karoo Dwarf Tortoise, listed as Near Threatened, and the Armadillo Girdled Lizard, protected according to the NEM:BA.
- Potential presence of various mammal species of concern, including Honey Badger, Black-footed Cat, Leopard and Cape Fox, protected according to the NEM:BA. In addition, the Honey Badger is listed as Near Threatened.
- Potential invasion of natural habitats by alien invasive plants, thus causing additional impacts on biodiversity features.

<u>Construction Phase Impacts</u>

Direct impacts

- 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;
- Effects on physiological functioning of vegetation due to dust deposition; and
- Increased poaching and/or illegal collecting due to increased access to the area.

Indirect impacts

- 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.

<u>Operational Phase Impacts</u>

Direct impacts

- 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

- 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;
- Changes to behavioural patterns of animals, including possible migration away or towards the project area; and
- Positive potential impact on climate change due to generation of electricity without the need for coal mining or burning of coal, currently the main form of power generation in South Africa.

<u>Decommissioning Phase Impacts</u>

Direct impacts

- 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

- 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.

At the site-specific scale, some sensitivities have been identified, primarily related to natural habitat, but also to some individual species. However, it is possible that these can be minimised or avoided with the application of appropriate mitigation or management measures. There will be residual impacts, primarily on natural habitat. 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 but may be significant in terms of local patterns and diversity that could be affected. It is therefore vitally important that the exact location of important biodiversity features be identified in the EIA phase so that a more informed decision can be made regarding potential impacts. From this perspective it is unlikely that the proposed project will have an unacceptable impact on the natural environment. The preliminary view is that it should be authorised (inclusive of all project alternatives).

To address any uncertainty in the coarse scale delineation of CBA’s, the ecologist will undertake a detailed site walkthrough of the entire project footprint to verify the relevance of the CBA

6.2.3 *Avifauna and Bat Impacts*

The Avifaunal and Bat Pre-Construction Assessment is currently underway. The detailed impact assessments will be incorporated into the EIA report.

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:

Planning / Pre-construction

No impacts are expected during planning.

- 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 21: 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
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

Environmental Parameter	Loss of riparian systems and disturbance to alluvial watercourses during construction, operations and decommissioning phases	
	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	• Where new water course crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (reduce footprint as much as possible). • During the construction and operational /decommissioning phase, monitor culverts to see if erosion issues arise and if any erosion control is required. • Where possible culvert bases must be placed as close as possible with natural levels in mind so that these don't from additional steps / barriers. • Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. • It is also advised that an Environmental Control Officer (ECO), with a good understanding of the local flora be appointed during the construction phase. The ECO should be able to make clear	

Environmental Parameter	Loss of riparian systems and disturbance to alluvial watercourses during construction, operations and decommissioning phases
	recommendations with regards to the re-vegetation of the newly completed / disturbed areas within aquatic environment, using selected species detailed in this report. • All alien plant re-growth must be monitored, and should it occur these plants should be eradicated. The scale of the operation does however not warrant the use of a Landscape Architect and / or Landscape Contractor.

Table 22: 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 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.

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	
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)
Mitigation measures	▪ 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. ▪ Any storm-water within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities. ▪ No stormwater runoff must be allowed to discharge directly into any water course along roads, and flows should thus be allowed to dissipate over a broad area covered by natural vegetation. ▪ Stormwater from hard stand areas, buildings and substation must be managed using appropriate channels and swales when located within steep areas or have steep embankments.	

Table 23: 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.	
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	▪ 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	

Environmental Parameter	Increase in sedimentation and erosion within the development footprint
	(SWMP) typically submitted post EA, forming part of any WULA.

Table 24: 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 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

Environmental Parameter	Impact on localised surface water quality	
Significance rating	-28 (Low negative)	-7 (Low negative)
Mitigation measures	▪ Strict use and management of all hazardous materials used on site in line with the specific material safety data sheets, e.g. fuels must be stored within a contained / bunded site with the necessary and spill kits available. ▪ Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.). ▪ Containment of all contaminated water by means of careful run-off management on the development site. ▪ Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. ▪ Strict control over the behaviour of construction workers, with regard littering, use and storage of chemicals. ▪ Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced. Additional details in this regard in contain in Section 9 of this report and have also been considered in the mitigation assessment process.	

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.

No-go

Table 25: 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

Environmental Parameter	No-go alternative	
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	
Intensity/magnitude	2	
Significance rating	-32 (MEDIUM negative)	
Mitigation measures	• 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:

Planning / Pre-construction

No impacts are expected during planning.

All Phases of the Development - Construction, Operation and Decommissioning

The following potential impact has been identified for the proposed wind power facility development.

Table 26: Soil Erosion and Degradation

Environmental Parameter	Soil Erosion and Degradation	
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:	▪ 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.	

Environmental Parameter	Soil Erosion and Degradation
	▪ 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.

Operational phase

The following impact occurs only during the operational phase:

Table 27: 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

Environmental Parameter	Farm economic sustainability
Mitigation measures:	▪ None possible

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

Table 28: 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

Environmental Parameter	agricultural land (grazing)	
Irreplaceable loss	2	n/a
Duration	3	n/a
Cumulative effect	3	n/a
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:

Construction Phase

Table 29: 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 – Negative low impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	1	1

Environmental Parameter	Noise emissions during the **Construction Phase**	
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	▪ All construction operations should only occur during daylight hours, if possible. ▪ Staff to receive noise sensitivity training; ▪ 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 ▪ Conduct noise sensitivity training for all construction staff. ▪ 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 ▪ 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.	

Operational Phase.

Table 30: 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

Environmental Parameter	*Noise emissions during the **Operational Phase***	
Significance Rating	-10 Negative low impact	
	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:	▪ 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	

6.2.7 *Visual Impacts*

The Visual Assessment was conducted by Kerry Schwartz of SiVEST and peer reviewed by Scott Masson from SRK. The full report is includeding the peer review report is included in Appendix 6J. The following visual impacts are discussed in detail below:

<u>Pre-Construction</u>

No visual impacts are expected during the pre-construction phase.

<u>Construction</u>

Rating of direct visual impacts of the proposed Rondekop WEF during construction:

Table 31: 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.

Environmental Parameter	Visual Impact	
	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:** Negative low impact **After mitigation measures:** Negative low 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)
Mitigation measures	▪ Carefully plan to mimimise the construction period and avoid construction delays. ▪ Inform the identified potentially sensitive visual receptors of the construction programme and schedules.	

Environmental Parameter	Visual Impact
	▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the proposed site, where possible. ▪ Ensure that dust suppression techniques are implemented: ○ on all access roads; ○ in all areas where vegetation clearing has taken place; ○ on all soil stockpiles.

** Please note in the context of the visual environment 'resources' are defined as scenic / natural views that are almost impossible to replace.*

Table 32: 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. 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.

Environmental Parameter	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:** Negative Low impact **After mitigation measures:** Negative Low 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	▪ Carefully plan to mimimise the construction period and avoid construction delays. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles travelling to and from the proposed site, where possible. ▪ 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.*

Operation

Table 33: 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)

Environmental Parameter	Visual Impact
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. ▪ 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 34: 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)

Environmental Parameter	Visual Impact	
Irreplaceable loss of resources	Marginal loss of resource (2)	
Duration	Long term (3)	
Cumulative effect	Low cumulative effect (2)	
Intensity/magnitude	Medium (2)	
Significance Rating	**Prior to mitigation measures:** Negative Low impact **After mitigation measures:** Negative Low 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	▪ 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, underground cabling should be utilised. ▪ Where overhead power lines are required, these should be aligned parallel to existing power lines and other linear features where possible. ▪ 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.*

Decommissioning

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

No Go

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:

Paleontology Impacts

Pre-Construction

No paleontology impacts are expected during the pre-construction phase.

Construction phase

The following impacts have been identified for the proposed WEF development.

Table 35: 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).

Environmental Parameter	Prevent the loss of Palaeontological Heritage	
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	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	

Environmental Parameter	Prevent the loss of Palaeontological Heritage
	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 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 36: 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*

Environmental Parameter	Prevent the loss of Palaeontological Heritage not identified during the site survey.	
	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 ▪ 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.	

Environmental Parameter	Prevent the loss of Palaeontological Heritage not identified during the site survey.
	▪ 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. .

Operational

No heritage impacts are expected during the operational phase.

Decommissioning

No impacts identified.

No go

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

Pre-Construction

No heritage impacts are expected during the pre-construction phase.

Construction phase

Table 37: 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

Environmental Parameter	Stone Age find spots and sites	
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*
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 38: 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

Environmental Parameter	Colonial buildings and stone walled kraals	
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 Colonial buildings and stone walled kraals. ▪ Provide ECO with locations and monitor excavations	

Table 39: 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

Environmental Parameter	Monuments (memorials)	
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 40 : 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

Environmental Parameter	Unidentified heritage structures, beyond the already surveyed portions of the property.	
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 finds and a final process of mitigation implementation.	

Operational

No heritage impacts are expected during the operational phase.

Decommissioning

No impacts identified.

No go

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 *Socio-economic 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:

Pre-Construction

No socio-economic impacts are expected during the pre-construction phase.

Construction

Table 41: 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	▪ Where necessary apply the appropriate dust suppression methods; ▪ Follow the mitigation measures suggested in the Noise Impact Assessment.	

Table 42: 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

Environmental Parameter	Health and social wellbeing	
Probability	3	3
Reversibility	3	3
Irreplaceable loss	2	2
Duration	2	2
Cumulative effect	3	3
Intensity/magnitude	2	2
Significance rating	-30 (Medium negative)	-30 (Medium negative)
Mitigation measures	▪ Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing; ▪ Fence off construction site and control access to these sites; ▪ Appoint an independent security company to monitor the site; ▪ Encourage local people to report any suspicious activity associated with the construction sites through the establishment of a community liaison forum; ▪ Prevent loitering within the vicinity of the construction camp as well as construction sites.	

Table 43: 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)

Environmental Parameter	Health and social wellbeing
Mitigation measures	▪ Ensure that an onsite HIV infections policy is in place and that construction workers have easy access to condoms; ▪ Expose workers to a health and HIV/AIDS awareness educational program; ▪ Extend the HIV/AIDS program into the community with specific focus on schools and youth clubs.

Table 44: 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	▪ Communicate the limitation of opportunities created by the project through Community leaders and Ward Councilors; ▪ Draw up a recruitment policy in conjunction with the Community Leaders and Ward Councilors of the area and ensure compliance with this policy.	

Table 45: 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	▪ Ensure all construction equipment and vehicles are properly maintained at all times; ▪ 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; ▪ 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; ▪ Make staff aware of the dangers of fire during regular tool box talks.	

Table 46: 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	▪ Ensure that, at all times, people have access to their properties as well as to social facilities.	

Table 47: 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; • Ensure that where communities' access is obstructed that this access is restored to an acceptable state.	

Table 48 : Job creation and skills development

Environmental Parameter	Economic	
Issue/Impact/Environmental Effect/Nature	Job creation and skills development	
Extent	District	
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	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	▪ Wherever feasible, local residents should be recruited to fill semi and unskilled jobs; ▪ Women should be given equal employment opportunities and encouraged to apply for positions; ▪ 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; ▪ A procurement policy promoting the use of local business should, where possible, be put in place to be applied throughout the construction phase.	

Table 49: Socio-economic development

Environmental Parameter	Economic
Issue/Impact/Environmental Effect/Nature	Positive economic impacts
Extent	Provincial
Probability	Definite
Reversibility	Partly reversible
Irreplaceable loss of resources	Significant gain of resource
Duration	Short term

Environmental Parameter	Economic	
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	▪ A procurement policy promoting the use of local business should, where possible, be put in place to be applied throughout the construction phase.	

Operational

Table 50: 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
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)

Environmental Parameter	Quality of the living environment
Mitigation measures	▪ Apply the mitigation measures suggested in the Visual Impact Assessment Report; ▪ Communicate the benefits associated with renewable energy to the broader community as is being done in this EIA process; ▪ Ensure that all affected land owners and tourist associations are regularly consulted; ▪ A Grievance Mechanism should be put in place and all grievances should be dealt with in a transparent manner; ▪ The mitigation measures recommended in the Heritage and Paleontology Impact Assessment should be followed.

Table 51: Job creation and skills development

IMPACT TABLE		
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)
Mitigation measures	▪ Implement a training and skills development programme for locals; ▪ Work closely with the appropriate municipal structures in regard to establishing a social responsibility programme;	

Table 52:Socio-economic stimulation

IMPACT TABLE	
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	▪ Ensure that the procurement policy supports local enterprises; ▪ Establish a social responsibility programme either in line with the REIPPPP BID guidelines or equivalent; ▪ 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.	

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

- Ensure that a retrenchment package is in place;
- Ensure that staff have been trained in a manner that would provide them with saleable skills within the job market;
- Ensure that the site is cleared responsibly and left in a safe condition.

No go

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 53: No project alterative

IMPACT TABLE	
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)

6.2.10 *Traffic Impacts*

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.

<u>Construction phase impact</u>

Table 54: Impact Rating - Construction Phase

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

Environmental Parameter	*Traffic Congestion*	
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	▪ 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. ▪ Regular maintenance of gravel roads by the Contractor during the construction and decommissioning phases.	

Table 55: Impact Rating - Construction Phase

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
Duration	1	1
Cumulative effect	2	1

Environmental Parameter	Air quality will be affected by dust pollution	
Intensity/magnitude	3	1
Significance rating	-35 (Medium negative)	-6 (Low negative)
Mitigation measures	▪ Dust Suppression of gravel roads during the construction and decommissioning phases, as required. ▪ Regular maintenance of gravel roads by the Contractor during the construction and decommissioning phases.	

Table 56: Impact Rating - Construction Phase

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	▪ 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	

Operational Phase

The traffic generated during this phase will be minimal and will have not have any impact on the surrounding road network.

Table 57: Impact Rating - Decommissioning Phase

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	▪ Stagger turbine component removal from site ▪ Reduce the construction period ▪ Staff and general trips should occur outside of peak traffic periods	

Table 58: Impact Rating - Decommissioning Phase

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	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	▪ Dust Suppression	

Table 59: Impact Rating - Decommissioning Phase

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

Environmental Parameter	Noise pollution due to increased traffic.	
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	2	2
Intensity/magnitude	3	3
Significance rating	-35 (Medium negative)	-6 (Low 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	

6.3 Assessment of Cumulative Impacts

The area has seen a notable interest from developers of various renewable energy projects, which could be associated with the energy resource potential found in the region, proximity to the grid access and its evacuation capacity, as well as other factors. Such developments, whether already approved or only proposed, need to be considered as they have the potential to create cumulative impacts, whether positive or negative, if implemented. The potential cumulative impact of the proposed wind facility in combination with other renewable energy facilities in the area have been identified and assessed per environmental aspect and mitigation measures will be identified to address the cumulative impact, where possible. Cumulative impacts will also be rated as part of the impact rating system and used to determine the significance of the impacts.

As requested by the DEA, a literature review of other specialist assessments / studies which were undertaken for the other nearby renewable energy developments (both wind and solar) proposed within a 50km radius of the proposed Rondekop Wind Farm application site (**Figure 40**) was also undertaken in order to ascertain any additional cumulative impacts that should be taken into consideration. A fair amount of information was available and provide to the specialists to incorporate into their respective assessment reports. **Table 60** below highlights the renewable wind energy developments that are within a 50 km radius of the proposed Rondekop Wind Farm application site as well as the various stages of the development.

Table 60: Renewable wind energy developments identified within a 50km radius of the proposed Rondekop Wind Farm application site.

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 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 bidders. Construction to commence 2019
Sutherland WEF	140	Approved
Sutherland SEF	10	Approved
Tooverberg WEF	140	In process
Witberg WEF	120	Approved

The above projects are in different stages of planning, ranging from projects that have been awarded Preferred Bidder status and are under construction, to projects where the EIAs / BAs are being conducted.

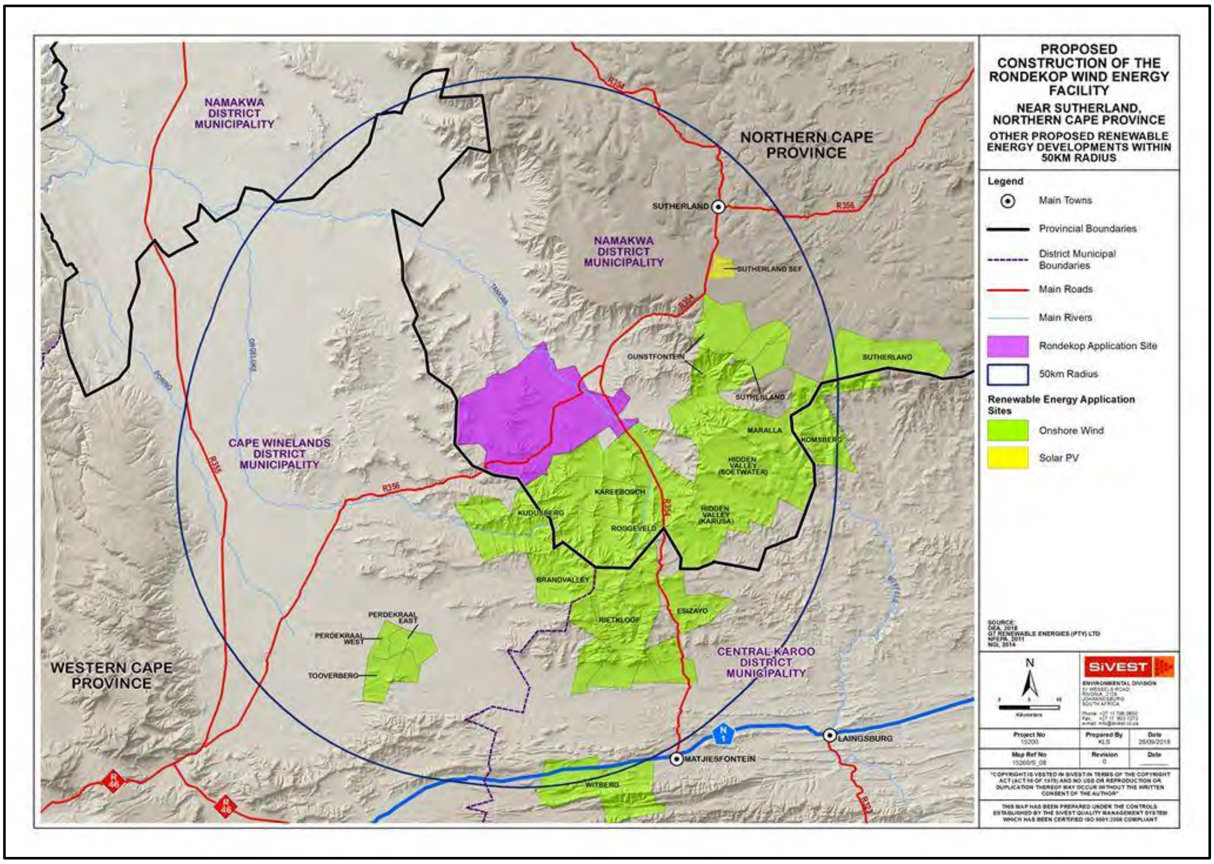

Figure 40: Map showing Cumulative Impact of other proposed renewable energy developments within 50km radius of the Rondekop WEF

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.

6.3.1 *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;
- Positive cumulative impact on climate change.

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. There are other vegetation types that will be affected, but these are not discussed here. 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 due to the combination of all projects, which will be much more significant than gross loss of habitat, measures 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 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.

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. Constructing the current project increases the likelihood of individuals being affected, but unless large numbers of individuals are directly affected, there will only be small cumulative effects.

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 heterogeneous 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.

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.

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.

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.

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.

Cumulative impacts on the wilderness character of the area

The site and surrounding areas is part of a large natural landscape in which little transformation has occurred. There are endless hills in all directions with the scenic backdrop of the escarpment. There is very little infrastructure in this area, including roads, and it is difficult to travel very far with ease. This inevitably creates the impression of a quiet wilderness area in which very few other people are found.

In a world of a rapidly growing population, this is a resource that increases in value over time. The wilderness, conservation and ecotourism potential of this area is very high, but this will all be affected by the construction and operation of multiple industrial energy projects adjacent to one another. The increased activity, obvious vertical infrastructure and network of roads will change the landscape in a fundamental way that will detract from this value.

Cumulative impact on climate change

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. The combined generation capacity of all the renewable energy projects considered here 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). A reduction in reliance on coal power would improve the air quality of the Mpumalanga Highveld (where many of these power stations are located), reduce the amount of coal-mining that would take place (which has a devastating effect on biodiversity resources and water quality) and would reduce the per capita carbon footprint of our country. 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 construction of renewable energy projects can, in fact, be seen as an offset for other carbon-generating technology.

Detailed assessment of these impacts will be incorporated in the ecology impact assessment and included in the EIA report.

6.3.2 *Avifauna and Bats*

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.

6.3.3 *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 61: 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 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

Environmental Parameter	Overall cumulative impact
	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 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)

Environmental Parameter	Overall cumulative impact
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.

6.3.4 *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, than 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 62: 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

Environmental Parameter	Agricultural land (grazing)	
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
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.	

6.3.5 *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:

- Karreebosch WEF
- Witberg WEF
- Tooverberg WEF
- Guntsfontein WEF
- Hidden Valley (Karusa & Soetwater) – both preferred bidders, to be constructed in 2019
- Hidden Valley (Greater Karoo)
- Kudusberg WEF
- Brandvalley WEF
- Esizayo WEF
- Komsberg (East and West)
- Roggeveld WEF – preferred bidder, to be constructed in 2019
- Maralla (East and West)

- Perdekraal (East & West) – Perdekraal East under construction
- Soetwater WEF
- Karusa WEF
- Rietkloof WEF
- 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 63: 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– Negative low 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

Environmental Parameter	*Noise emissions for the **Cumulative Impacts** during the Operational Phase*	
Intensity/magnitude	1	1
Significance rating	-7 (Low negative)	-7 (Low negative)
Mitigation measures	None	

6.3.6 *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 64: 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. 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

Environmental Parameter	Visual Impact	
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. ▪ 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.	

6.3.7 *Heritage and Palaeontology Impacts*

<u>Paleontology</u>

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 65: 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 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

Environmental Parameter	Prevent the loss of Palaeontological 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
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. ▪ 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 paleontologist. ▪ The ECO must appoint a relevant paleontologist to investigate and access the chance find and site. ▪ Both ECO and paleontologist must ensure that accurate records and documentation are kept. The documentation must start with the initial chance find	

Environmental Parameter	Prevent the loss of Palaeontological Heritage
	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.

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 67** 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 66: 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.

Study	Findings	Recommendation
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.
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.

Study	Findings	Recommendation
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.
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.

Study	Findings	Recommendation
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.
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.

Study	Findings	Recommendation
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.

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.

Study	Findings	Recommendation
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.
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.

Study	Findings	Recommendation
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 67 - 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 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 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.

Table 68: 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.	

6.3.8 *Socio-Economic*

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 Socio-Economic 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 69: Socio-economic 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
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.	

Environmental Parameter	Health
	▪ 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 70: 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	
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.	

Environmental Parameter	Quality of the living environment
	▪ 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 71: Socio-economic cumulative 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

Environmental Parameter	Quality of the living environment	
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 72: Socio-economic cumulative 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 REIPPP; ▪ 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.

6.3.9 *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 73: 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

Environmental Parameter	Traffic Congestion	
Reversibility	Partly reversible	
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 74: 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*

Environmental Parameter	*Air quality will be affected by dust pollution*	
Intensity/magnitude	*High*	
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 75: 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

Environmental Parameter	*Noise pollution due to increased traffic.*	
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	3	2
Intensity/magnitude	3	3
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*	

7 LAYOUT ALTERNATIVES

One of the aims of the Scoping Report is to identify alternatives to carry through to the EIA phase of the investigation for detailed assessment (as was discussed in **Chapter 2**). The selection of alternatives during the Scoping Phase of the project usually helps to focus future investigations, both in terms of the environmental investigations required and the scope of the public participation process. Various environmental specialists assessed 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 (**Chapter 7**). These layouts will be further investigated in the EIA phase of the project (see the plan of study for the EIA phase in **Chapter 11** of the DSR). At this stage, 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 will be based on both environmental constraints and design factors. The findings of the specialist studies and sensitivity mapping will be used to inform the layout of the proposed facility within the preferred site during the EIA phase.

As part of the EIA, the layout for the WEF and associated infrastructure will aim to avoid the sensitive features identified by the specialists. The area that excludes these sensitive features will be considered to be the Buildable Area for this project and no development may occur outside this area. Based on the boundaries of the Buildable Area, the site layout will be refined for this project (i.e. the placement of the wind turbines within the Buildable Area).

It is important to note that should the layout change subsequent to the issuing of an EA (should such authorisation be granted), any alternative layout or revisions to the layout occurring within the boundaries of the Buildable Area 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 the Buildable Area and identified sensitivities, which will be avoided in the siting of the proposed infrastructure within the Buildable Area. 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, various specialists identified site specific sensitive areas during the Scoping Phase of the EIA that may need to be precluded from the Buildable Area. These include the visual, heritage, surface water and noise specialists. The sensitive areas will be refined in the EIA phase following the completion of the Terrestrial Ecology, Avifauna and Bat Assessments. The sensitive areas as identified during the scoping phase by the various specialists overlaid on the layout alternatives are shown in the figure below.

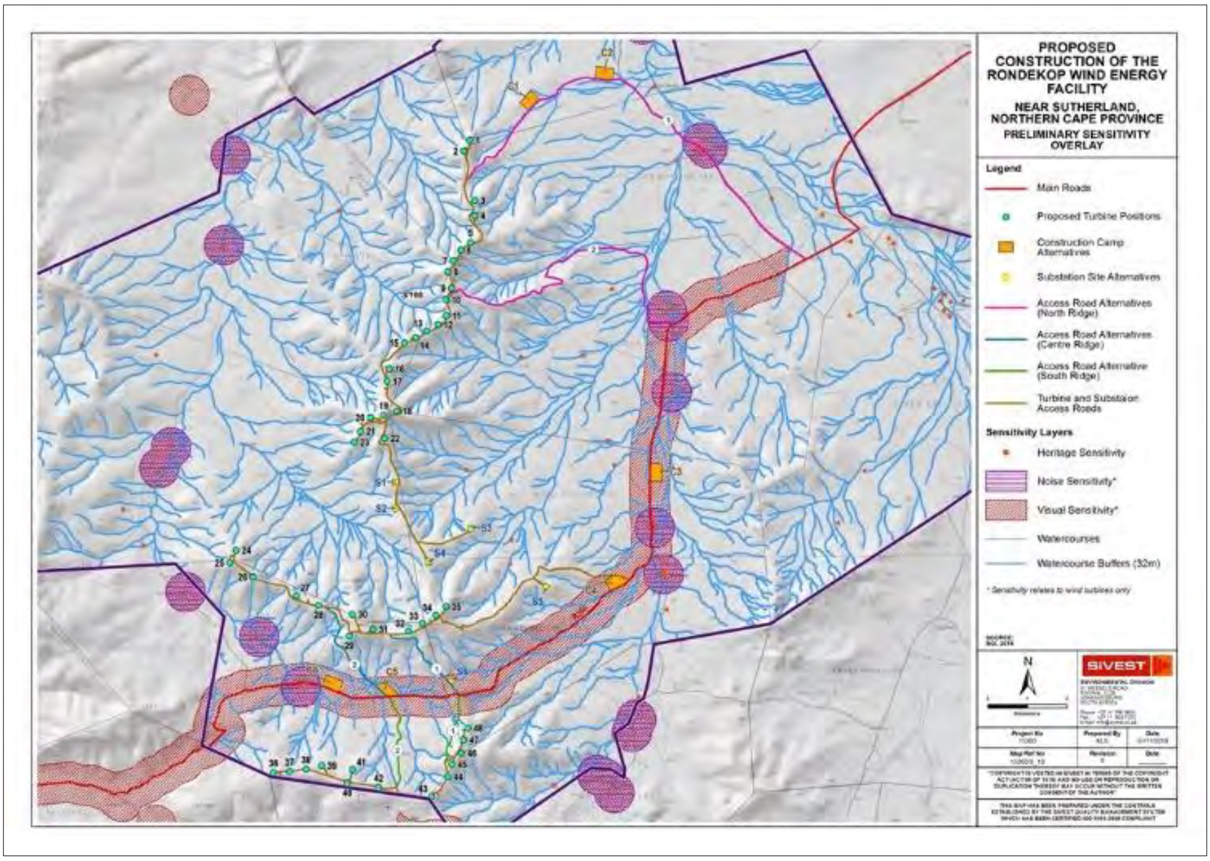

Figure 41: Sensitive areas as pertaining to visual, heritage, surface water and noise.

7.1 Preliminary Alternative Assessment

The layout has been assessed by the specialists in their respective specialist studies and will be further assessed in the EIA Report, once the EIA phase studies have been completed. A preliminary assessment of the alternatives is 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 76: A preliminary assessment of the alternatives

Alternative	Preference	Reasons (incl. potential issues)
ACCESS ROADS		
NORTH RIDGE - ACCESS ROAD ALTERNATIVE NORTH 1		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	Either makes use of existing roads and tracks or overall impact with mitigation would be low.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Preferred	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	Preferred	preferred as this is an existing farm road.
Visual	Preferred	This alternative is on relatively flat terrain, and although closer to the nearest potentially sensitive receptor, will only be moderately exposed.
NORTH RIDGE - ACCESS ROAD ALTERNATIVE NORTH 2		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	Either makes use of existing roads and tracks or overall

Alternative	Preference	Reasons (incl. potential issues)
		impact with mitigation would be low.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Least Preferred	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	Favourable	All alternatives are acceptable
Visual	Least Preferred	Although no fatal flaws were identified with this alternative, it was the least preferred because a significant portion of this route runs along a ridge line and thus will be highly exposed.
CENTRE RIDGE - ACCESS ROAD ALTERNATIVE CENTRE 1		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	Either makes use of existing roads and tracks or overall impact with mitigation would be low.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of

Alternative	Preference	Reasons (incl. potential issues)
		low significance before and after mitigation
Socio-Economic	Preferred	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	Preferred	This road is shorter and therefore less expensive to upgrade and maintain than Alternative 2.
Visual	Preferred	This route alternative is shorter in length and further from the nearest potentially sensitive receptor than Alternative 2.
CENTRE RIDGE - ACCESS ROAD ALTERNATIVE CENTRE 2		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	Either makes use of existing roads and tracks or overall impact with mitigation would be low.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	Favourable	All alternatives are acceptable
Visual	Favourable	Although this route is longer than Alternative 1 and closer to the nearest receptor, no fatal flaws were identified and thus, Alternative 2 is considered

Alternative	Preference	Reasons (incl. potential issues)
		favourable.
SOUTHERN RIDGE - ACCESS ROAD ALTERNATIVE SOUTH 1		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	Either makes use of existing roads and tracks or overall impact with mitigation would be low.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	Preferred	This road is shorter and therefore less expensive to upgrade and maintain than Alternative 2.
Visual	Favourable	Although Alternative 1 is within 5 kms of several potentially sensitive receptors, no fatal flaws were identified and this alternative is considered favourable.
SOUTHERN RIDGE - ACCESS ROAD ALTERNATIVE SOUTH 2		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	Either makes use of existing roads and tracks or overall impact with mitigation would be LOW.
Avifauna	To be confirmed in the EIA phase.	

Alternative	Preference	Reasons (incl. potential issues)
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Preferred	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	Favourable	All alternatives are acceptable
Visual	Preferred	Alternative 2 is further from the nearest receptors than Alternative 1 and as such is the preferred alternative.
CONSTRUCTION CAMPS		
CONSTRUCTION CAMP ALTERNATIVE 1		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Favourable	Requires minimal micro-siting to avoid watercourse buffer.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	No Preference.	There is no difference between the proposed alternatives from

Alternative	Preference	Reasons (incl. potential issues)
		a Traffic perspective. All alternatives are acceptable
Visual	Favourable	This alternative is located on relatively flat terrain and is approximately 5 kms from the nearest receptor. The area in the immediate vicinity of this alternative is largely natural and as such the camp would contrast significantly with the surrounding landscape. This is not however seen as a fatal flaw and Alternative 1 is considered favourable.
CONSTRUCTION CAMP ALTERNATIVE 2		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	All options avoid watercourses and their buffers.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	No Preference.	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable
Visual	Favourable	This alternative is located on relatively flat terrain and is approximately 3 kms from the

Alternative	Preference	Reasons (incl. potential issues)
		nearest receptor. The area in the immediate vicinity of this alternative is largely natural and as such the camp would contrast significantly with the surrounding landscape. This is not however seen as a fatal flaw and Alternative 1 is considered favourable.
CONSTRUCTION CAMP ALTERNATIVE 3		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	All options avoid watercourses and their buffers.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Preferred	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	No Preference.	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable
Visual	Preferred	This alternative is located adjacent to the R356, approximately 6 kms from the nearest receptor. Proximity to the R356 will reduce the visual contrast of the construction camp with the surrounding landscape. As a result of this factor, in conjunction with the

Alternative	Preference	Reasons (incl. potential issues)
		distance from the nearest receptor, Alternative 3 is the preferred alternative.
CONSTRUCTION CAMP ALTERNATIVE 4		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	All options avoid watercourses and their buffers.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	No Preference.	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable
Visual	Favourable	This alternative is located adjacent to the R356, approximately 3kms from the nearest receptor. Proximity to the R356 will reduce the visual contrast of the construction camp with the surrounding landscape. No fatal flaws were identified in relation to Alternative 4 and as such this alternative is considered favourable.
CONSTRUCTION CAMP ALTERNATIVE 5		
Agricultural and Soils	No Preference	Low agricultural impacts and

Alternative	Preference	Reasons (incl. potential issues)
		the agricultural uniformity of the site.
Aquatic Ecology	Favourable	Requires minimal micro-siting to avoid watercourse buffer.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	No Preference.	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable
Visual	Favourable	This alternative is located adjacent to the R356, approximately 5kms from the nearest receptor. Proximity to the R356 will reduce the visual contrast of the construction camp with the surrounding landscape. No fatal flaws were identified in relation to Alternative 5 and as such this alternative is considered favourable.
CONSTRUCTION CAMP ALTERNATIVE 6		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	All options avoid watercourses and their buffers.
Avifauna	To be confirmed in the EIA phase.	

Alternative	Preference	Reasons (incl. potential issues)
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	No Preference.	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable
Visual	Favourable	This alternative is located adjacent to the R356, approximately 4kms from the nearest receptor. Proximity to the R356 will reduce the visual contrast of the construction camp with the surrounding landscape. No fatal flaws were identified in relation to Alternative 5 and as such this alternative is considered favourable.
SUBSTATIONS		
SUBSTATION ALTERNATIVE 1		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	All options avoid watercourses and their buffers.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.

Alternative	Preference	Reasons (incl. potential issues)
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	No Preference.	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable
Visual	Favourable	Alternatives 1 to 4 are all located in close proximity to each other and as such the impacts will be similar. No fatal flaws were identified with any of these alternatives and as such, they are considered favourable
SUBSTATION ALTERNATIVE 2		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	All options avoid watercourses and their buffers.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	

Alternative	Preference	Reasons (incl. potential issues)
Traffic	No Preference.	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable
Visual	Favourable	Alternatives 1 to 4 are all located in close proximity to each other and as such the impacts will be similar. No fatal flaws were identified with any of these alternatives and as such, they are considered favourable
SUBSTATION ALTERNATIVE 3		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	All options avoid watercourses and their buffers.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	No Preference.	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable
Visual	Favourable	Alternatives 1 to 4 are all located in close proximity to each other and as such the impacts will be similar. No fatal flaws were identified with any of these alternatives and as such,

Alternative	Preference	Reasons (incl. potential issues)
		they are considered favourable
SUBSTATION ALTERNATIVE 4		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	All options avoid watercourses and their buffers.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	No Preference.	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable
Visual	Favourable	Alternatives 1 to 4 are all located in close proximity to each other and as such the impacts will be similar. No fatal flaws were identified with any of these alternatives and as such, they are considered favourable
SUBSTATION ALTERNATIVE 5		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	All options avoid watercourses and their buffers.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	

Alternative	Preference	Reasons (incl. potential issues)
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	No Preference.	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable
Visual	Favourable	This alternative is located on relatively high ground, some 4kms from the nearest receptor. The substation at this location will be highly exposed and will contrast significantly with the surrounding landscape. This is not however seen as a fatal flaw, although Alternative 5 is seen as the least preferred alternative.
SUBSTATION ALTERNATIVE 6		
Agricultural and Soils	No Preference	Low agricultural impacts and the agricultural uniformity of the site.
Aquatic Ecology	Preferred	All options avoid watercourses and their buffers.
Avifauna	To be confirmed in the EIA phase.	
Bat	To be confirmed in the EIA phase.	
Heritage	No Preference	There are no known heritage resources in the vicinity.
Paleontology	No Preference	No Fossil Heritage was recovered
Noise	No Preference	The overall noise impact with recommended mitigation is

Alternative	Preference	Reasons (incl. potential issues)
		expected to be negative and of low significance before and after mitigation
Socio-Economic	Favourable	In accordance with the Visual Impact
Terrestrial Ecology	To be confirmed in the EIA phase.	
Traffic	No Preference	No Fossil Heritage was recovered
Socio-Economic	Preferred	In accordance with the Visual Impact
Visual	Preferred	This alternative is located some 500m from the R356, almost 5kms from the nearest receptor. Proximity to the R356 will reduce the visual contrast of the substation with the surrounding landscape and as such Alternative 6 is the preferred alternative.

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 Scoping Phase were implemented according to NEMA EIA Regulations, 2014 as amended in April 2017. The comment periods during the Scoping Phase (as set out by EIA Regulations 2014) is as follows:

- Comment period for the Draft Scoping Report (DSR): 30 days.

As stipulated in the regulations this report is currently under the DSR comment period that will run from 14 November – 14 December 2018. Should any I&APs which to register as an I&AP or comment on this report they 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
Fax:(011) 803 7272
Websites:www.sivest.co.za

The EIA regulations emphasise the importance of public participation. In terms of the EIA 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.

No Comments to date have been received on the proposed development. However, the following actions will be taken upon receiving comments/queries/issues:

- Should a comment be obtained from an I&AP not yet included in the I&AP database, then the contact details provided will be included in the project database for use in future notifications.
- The EAP will confirm receipt of comments.
- Address comments in the Comments & Response Report.

- Circulate the Comments & Response Report to all I&APs that commented.
- Include the Comments & Response Report in the FSR.

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.

- What 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 (not relevant to possibly affected landowners identified).

The primary aims of the PPP are:

- 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 18^{th}-21^{th} of September 2018. Proof of the site notice is shown in Appendix 7A of this report.
- An I&AP database was compiled including all landowners, adjacent landowners, occupiers, other potentially interested parties, organs of state, no-go's and other project developers.
- Contacting all landowners and adjacent landowners to request contact details of occupiers.
- Public notification of the EIA process was advertised in a local/regional newspaper as required under the EIA Regulations in the Noordwester Oewernuus.
- A Background Information Document was issued in November 2018 (proof of this can be found in Appendix 7) along with written notification to all I&APs.
- The DSR was released for public review and comment on the 14^{th} November 2018 and will remain in the public domain until 14^{th} December 2018.
- The DSR is available from the Sutherland public library and from *http://data.g7energies.com/eia/rondekop*
- The stages that typically form part of the public participation process during the Scoping Phase are reflected in **Figure 42** below.

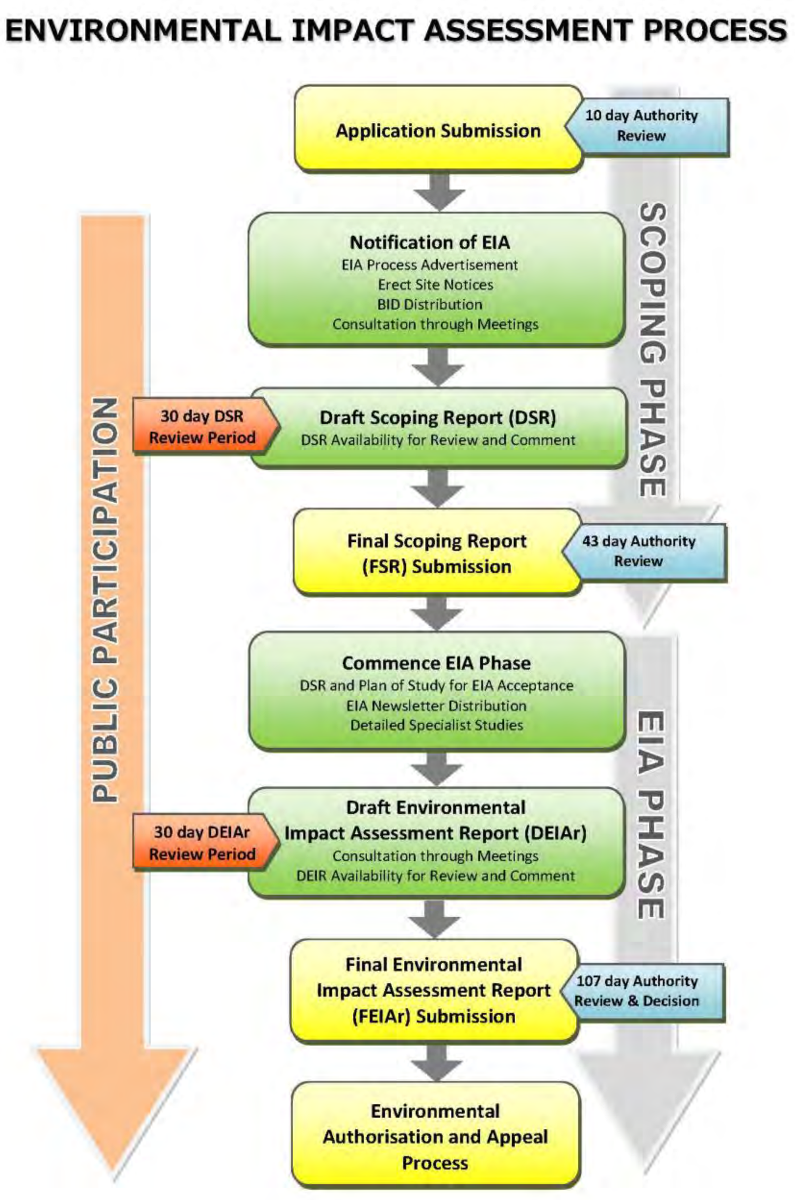

Figure 42: EIA and Public Participation Process

Members of the public who wish to be register on the database as an I&AP or comment on the report are able to do so via telephone, fax, email, mail by contacting the 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

Fax:(011) 803 7272

Websites:www.sivest.co.za

The DSR is also available for public review and download on the G7 Renewable Energy's website (*http://data.g7energies.com/eia/rondekop*).

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 will effectively continue throughout the Scoping Phase of the project until the Final Scoping Report and EIA Plan of Study are 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 Consultation and Public Involvement

Through the consultation process, issues for inclusion within the DSR will be identified and confirmed. Telephonic discussions and one-on-one consultation will be undertaken where relevant.

8.4 Landowner consent

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 77: 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
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 the Application for EA (included as Appendix 7), which will be submitted to the DEA for consideration, together with the DSR for comment.

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. Appendix XXX of this scoping report contains a detailed copy of the I&AP database which indicates interaction with I&APs, 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 (Proof of this has been included in Appendix 7H);
- The municipal councillors 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 EDEA.

The above stakeholders, Organs of State and I&APs will accordingly receive written notification of the commencement of the EIA process and release of the DSR for comment.

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

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

8.6 Announcing the Opportunity to Participate

The opportunity for stakeholders to participate in the EIA will be as follows:

- EIA process advert (November 2018).
- I&APs with e-mail addresses and fax numbers were sent copy of the BID (9^{th} of November 2018).

The letter of invitation to participate accompanied the BID.

8.7 Notification of the Potential Interested and Affected Parties

In order to identify and ensure that all possible I&APs were identified, use will be made of:

- print media – EIA process advertisements
    - Noordwester / Oewernuus (English and Afrikaans)
- site notice throughout the study area (proof included in **Appendix 7A**)
    - on the site; and in
    - Sutherland;

- referrals; and

- requesting databases and/or contact information from NGOs / CBOs and other organisations.

A full database list of registered I&APs was compiled and is included in **Appendix 7F**.
As stakeholders respond to the advertisements, site notices and notifications, they will be registered on the project database and sent letters of invitation to participate as well as the BID. This process will continue throughout the life-cycle of the EIA process.

8.7.1 *Summary of comments received*

I&AP	**Date received**	**Summary of comments**
No comments received to date.		

A detailed Comments and Response Report will be included in the **Appendix 7E** of the FSR.

8.8 Proof of Notification

Appendix 7 includes all proof of notification of I&APs. More specifically, the types of proofs are as follows:

- Site notice text (**Appendix 7A**);
- Photographs of site notices (**Appendix 7A**);
- Background Information Document (**Appendix 7B**);
- Proof of advertisements in the newspapers (**Appendix 7C**) – to be provided in the FSR; and
- Correspondence to potential and registered I&APs and key stakeholders (**Appendix 7D**).

8.9 Meetings

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.

8.10 Comments and Response Report

Issues, comments and concerns raised during the public participation process will be captured in the Comments and Response Report (C&RR) which will be included in **Appendix 7E** of the FSR. This C&RR will provide 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.

8.11 Comments on Draft Scoping Report

The DSR will be made available for public review after submission to DEA on the 14th of November, the competent authority.
Hard copies of the DSRs can be reviewed at the following public place:

VENUE	STREET ADDRESS	HOURS	CONTACT NO
Sutherland Library	Sarel Cillier Street, Sutherland	Mondays- Fridays 08h00 – 13h00 14h00 – 17h00	023 571 1429

The report can also be downloaded from http://data.g7energies.com/eia/rondekop during the review period.

The report will be out for public review and comment for a period of thirty (30) calendar days. Written notice will be given to all registered I&APs as well as all key stakeholders on the database that the DSR will be available for public review.

Electronic copies (CD) of the report will also be made available and will be distributed on written request.

8.12 Authority Review of the Draft Scoping Report

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 78 below includes all the organs of state who will be e-mailed the DSR and sent electronic copies (on CD) of the full report including all appendices. Telephonic follow-up with stakeholders will be done through the review period in order to provide them with ample opportunity to comment during the DSR comment period.

Table 78: Authorities communication

TITLE	SURNAME	NAME	POSITION	POSTAL ADDRESS	EMAIL ADDRESS
KAROO HOOGLAND LOCAL MUNICIPALITY					
Mr.	Gibbons	Allistar	Community Service Manager	Karoo Hoogland Local ,North Thumberland Street, Sutherland, 6920, PO BOX 24, 6920	a.gibbons@karoohoogland.gov.za
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TITLE	SURNAME	NAME	POSITION	POSTAL ADDRESS	EMAIL ADDRESS
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DEAPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES					
Northern Cape Department					

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NORTHERN CAPE DEPT OF SPORT, ARTS & CULTURE: Heritage Resources Unit					
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NORTHERN CAPE DEPARTMENT OF ROADS AND PUBLIC WORKS					

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WESSA					
Mr.	Griffiths	Morgan	Environmental Governance Programme Manager	PO Box 12444, Centrahil, Port Elizabeth, 6006, South Africa	morgan.griffiths@wessa.co.za
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9 ASSESSMENT IN TERMS OF 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:

Principle 1: Review and Categorisation

When a project is proposed for financing, the Equator Principles Funding Institution ("EPFI") will categorise the project based on the magnitude of its potential environmental and social impacts and risks.

Principle 2: Environmental and Social Assessment
For each project assessed as being either Category A or Category B, the client / borrower must conduct a Social and Environmental Assessment ("Assessment") process to address the relevant impacts and risks of the proposed project. The Assessment should also propose mitigation and management measures relevant and appropriate to the nature and scale of the proposed project.

Principle 3: Applicable Environmental and Social Standards
The Assessment will refer to the applicable IFC Performance Standards and applicable Industry Specific Environmental, Health, and Safety (EHS) Guidelines.

Principle 4: Environmental and Social Management System and Equator Principles Action Plan
The client / borrower must prepare an Environmental and Social Management System (ESMS). Further, an Environmental and Social Management Plan (ESMP) must be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree to an Equator Principles Action Plan to outline gaps and commitments.

Principle 5: Stakeholder Engagement
For all Category A and Category B Projects, the EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities and, where relevant, Other Stakeholders. For projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. The client will tailor its consultation process to: the risks and impacts of the Project; the Project's phase of development; the language preferences of the Affected Communities; their decision-making processes; and the needs of disadvantaged and vulnerable groups.

Principle 6: Grievance Mechanism
The EPFI will require the client, as part of the ESMS, to establish a grievance mechanism designed to receive and facilitate resolution of concerns and grievances about the project's environmental and social performance. The grievance mechanism is required to be scaled to the risks and impacts of the Project and have Affected Communities as its primary user. It will seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate, readily accessible, at no cost, and without retribution to the party that originated the issue or concern. The mechanism should not impede access to judicial or administrative remedies.

Principle 7: Independent Review
For all Category A projects and, as appropriate, for Category B projects, an independent social or environmental expert not directly associated with the borrower must review the Assessment, AP and consultation process documentations in order to assist the EPFIs due diligence, and assess EPs compliance.

Principle 8: Covenants

An important strength of the EPs is the incorporation of covenants linked to compliance. For all projects, the client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits in all material respects. For Category A and B projects, the client / borrower will covenant in financing documentation:

- To comply with the ESMPs and EPs AP (where applicable) during the construction and operation of the Project in all material respects;
- To provide periodic reports in a format agreed with the EPFI (with the frequency of these reports proportionate to the severity of impacts, or as required by law, but not less than annually), prepared by in-house staff or third party experts, that i) document compliance with the ESMPs and EPs AP (where applicable), and ii) provide representation of compliance with relevant local, state and host country environmental and social laws, regulations and permits; and
- To decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan.

Principle 9: Independent Monitoring and Reporting

To ensure ongoing monitoring and reporting over the life of the loan, EPFIs will, for all Category A projects, and as appropriate, for Category B projects, require appointment of an independent environmental and/or social expert, or require that the borrower to retain qualified and experienced external experts to verify its monitoring information, which would be shared with EPFIs.

Principle 10: Reporting and Transparency

For all Category A and, as appropriate, Category B Projects:

- The client will ensure that, at a minimum, a summary of the ESIA is accessible and available online.
- The client will publicly report GHG emission levels (combined Scope 1 and Scope 2 Emissions) during the operational phase for Projects emitting over 100,000 tonnes of CO_2 equivalent annually.

Although this report is not written in terms of the EPs, it fully acknowledges that EPs will need to be complied with should funding for the project be required from a development financial institution. In general, the following documentation will need to be considered in that regard:

- The "Equator Principles" 2013
- International Finance Corporations Performance Standards on Social and Environment, IFC, January 2012, namely:
  - Performance Standard 1: Social and Environmental Assessment and Management Systems
  - Performance Standard 2: Labour and Working Conditions
  - Performance Standard 3: Pollution Prevention and Abatement
  - Performance Standard 4: Community Health, Safety and Security
  - Performance Standard 5: Land Acquisition and Involuntary Resettlement
  - Performance Standard 6: Biodiversity Conservation and Sustainable Natural Resource Management
  - Performance Standard 7: Indigenous Peoples

- Performance Standard 8: Cultural Heritage

- International Finance Corporation – World Bank Guidelines, General EHS Guidelines 2007.

EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice. These EHS Guidelines are applied as required by the World Bank's respective policies and standards. These General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines which provide guidance to users on EHS issues in specific industry sectors.

- The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs.

9.1 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 79: 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 **Chapter 2** – Technical Details and **Chapter 5** – Description of the receiving environment
2. Alternatives (Assessment of alternatives)		Refer to **Chapter 7**
3. Impacts and risks		Refer to **Chapter 6**
4. Global impacts	N/A	N/A
5. Legal requirements		Refer to **Chapter 3** for legal requirements and guidelines
6. Transboundary	N/A	N/A
7. Disadvantaged / vulnerable groups		Partly addressed in **Appendix 6G** as part of the Socio-economic scoping assessment. This

Principles	Compliance Level	Reference
		will be addressed as part of the EMPr during the EIA phase
8. Third party		Refer to **section 1.1.**
9. Mitigation measures		Partly addressed as part of scoping assessments. These will be addressed as part of the EMPr during the EIA phase
10. Documentation process		Refer to **Chapter 1**, **Chapter 3** and **Chapter 8**
11. Action Plans		Partially, addresses in **Chapter 11**, To be addressed during in the FSR with the EIA Plan of Study and then will be addressed further in the EIA phase
12. Organisational capacity		To be addressed as part of the EMPr during the EIA phase
13. Training		To be addressed as part of the EMPr during the EIA phase
14. Grievance mechanism		To be addressed during the EIA phase
15. Report content		To be addressed as part of the EMPr during the EIA phase
Performance Standard 2, Labour & Working Conditions		
1. Human Resource Policy		To be addressed as part of the EMPr during the EIA phase or prior to the commencement of the construction phase
2. Working relationship		To be addressed as part of the EMPr during the EIA phase or prior to the commencement of the construction phase
3. Working conditions with and terms of employment		To be addressed as part of the EMPr during the EIA phase or prior to the commencement of the construction phase
4. Workers organisation		To be addressed prior to construction
5. Non-discrimination and equal opportunities		Partly addressed as part of the Socio-economic scoping assessment. This issue will also be addressed as part of the EMPr during the EIA phase
6. Grievance mechanism		To be addressed as part of the EMPr during the EIA phase
7. Occupational Health and Safety		To be addressed as part of the EMPr during the EIA phase and prior to commencement of construction

Principles	Compliance Level	Reference
8. Non-employee workers		To be addressed as part of the EMPr during the EIA phase and prior to commencement of construction
9. Supply Chain		To be addressed as part of the EMPr during the EIA phase and prior to and during construction
10. Labour Assessment Component of a Social and Environmental Assessment		To be addressed as part of the EMPr during the EIA phase and prior to the commencement of construction
Performance Standard 3, Pollution		
1. Pollution Prevention, Resource Conservation and Energy Efficiency		To be addressed as part of the EMPr during the EIA phase
2. Wastes		To be addressed as part of the EMPr during the EIA phase
3. Hazardous material		To be addressed as part of the EMPr during the EIA phase
4. Dangerous substances		To be addressed as part of the EMPr during the EIA phase
5. Emergence preparedness and response		To be addressed as part of the EMPr during the EIA phase
6. Technical guidance – ambient considerations		To be addressed as part of the EMPr during the EIA phase
7. Greenhouse gas emissions		N/A
Performance Standard 4, Health & Safety		
1. Hazardous materials safety		To be addressed as part of the EMPr during the EIA phase
2. Environmental and natural resource issues		Refer to **Chapter 6**
3. Emergency preparedness and response		To be addressed in the EMPr during the EIA phase
Performance Standard 5, Land Acquisition		Refer to **Chapter 4** Project needs and desirability is discussed.
Performance Standard 6, Biodiversity		Refer to **Chapter 5**, **section 5.7** and **Chapter 6**, **section 6.2.1** which summarises the Biodiversity Scoping Assessment
Performance Standard 7, Indigenous People		Refer to **Chapter 8** describing public participation.
Performance Standard 8, Cultural Heritage		Refer to **Chapter 5**, **section 5.12** and **Chapter 6**, **section 6.2.6**

It is important to note that, most of the issues listed per performance standard in the table above will only be addressed during the EIA phase and some during the pre-construction and construction phase of the project. Therefore, at this stage (scoping phase), most of the issues are categorised as "not assessed/ to be determined". Full compliance with the EPs will only be realised following EIA assessment.

10 CONCLUSIONS AND RECOMMENDATIONS

The above report provides a broad introduction to the impacts and benefits that are pertinent to the proposed Rondekop WEF, and highlights important issues to be investigated during the EIA Phase of the project. The EIA Phase will draw on the above information and make use of the recommended specialist studies to reach an objective decision on the overall impact of the proposed development.

The EIA Phase will culminate in the compilation of detailed mitigation measures to reduce impacts, the identification of least impactful locations for the wind turbines, the identification of least impactful locations for associated infrastructure and the identification of sensitive areas within the site which may require more specific management measures. The EIA Phase will also aim to optimise and improve potential positive impacts that may result from the proposed development.

None of the specialist studies conducted during the Scoping Phase for the proposed development has identified any fatal flaws for the proposed Rondekop WEF. However, a few of potentially significant environmental impacts have been identified and will need to be evaluated and assessed further during the detailed EIA phase of the project. These include the ecology, bird and bat assessments. In addition, the EIA Phase will provide a more detailed comparative analysis of these potential impacts against the "no-go" alternative.

Detailed mitigation and management measures will be developed in the EIA phase and will be 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 possible mitigation measures that could be applied are provided in **Section 10.2** below.

10.1 Summary of Findings

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 80: Summary of environmental issues identified in Specialist Studies

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. 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.
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. All the 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**. 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.

	No wetlands were found within the site and no aquatic protected or species of special concern (flora) were observed during the site visit.
Avifauna	Information on the micro habitat level was obtained through a pre-construction monitoring programme which was conducted over four seasons between November 2015 and November 2016 in compliance with the best practice pre-construction monitoring guideline. Bird activity recorded in the development area during these surveys was very low. The highest number of species recorded was 43, in the autumn of 2016. Of the total species list, five species have a conservation status of concern in South Africa: Black Harrier *Circus maurus* and Martial Eagle, *Polemaetus bellicosus* (Endangered); Black Stork *Ciconia nigra* and Verreauxs' Eagle *Aquila verreauxii* (Vulnerable); Greater Flamingo *Phoenicopterus roseus* (Near Threatened). The findings of this monitoring programme are presently being verified and updated and the potential impacts of the proposed WEF will only be assessed once the new information is available. However, the final impact assessment will be included in the EIA phase.
Bats	Information on the micro habitat level was obtained through a pre-construction monitoring programme which was conducted over four seasons between November 2015 and November 2016 in compliance with the best practice pre-construction monitoring guideline. There were low detections (7%) of bat species considered to have a high collision risk in the area of the proposed WEF during winter. Widespread detections were however recorded in summer (78 in the area of the proposed WEF). The remaining detections in summer were of medium and medium-high collision risk groups of bats, in similar proportions. To date, the low collision risk group presents very low detections in the area. Bat activity at ground level was generally higher than activity detected in the microphones installed at rotor height. However, the levels of activity indicate a potential high risk of fatality caused by the WEF, according to the most recent version of the Best Practice Guidelines (Sowler *et al.*2016). The findings of this monitoring programme are presently being verified and updated and the potential impacts of the proposed WEF will only be assessed once the new information is available. However, the final impact assessment will be included in the EIA phase.
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 <u>not</u> 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.

	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.
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. 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.
Socio-economic	A socio-economic impacts assessment was undertaken to consider the positive and negative impacts associated with the proposed development. The socio-economic 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 ▪ 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 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**. 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.
Terrestrial Ecology	The terrestrial ecology assessment will be undertaken in a phased approached namely desktop assessment coupled with a reconnaissance assessment (scoping assessment) to be followed by a detailed site walkthrough of the entire project footprint to inform the impact assessment. The findings of the scoping assessment are summarised as follows: ▪ The study area is situated in an area with moderately to steeply sloping topography. Habitat on site is in a largely natural state and is in a remote and rural environment. There is very little transformation or degradation on site. ▪ There are two regional vegetation types occurring in the project study area, Koedoesberge-Moordenaars Karoo (most of the area), and Central Mountain Shale Renosterveld (small patches in the southerns side). Both vegetation types are listed in the scientific literature as Least Threatened and neither is listed in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011). ▪ All habitat in the southern half of the study area is mapped as “Critical Biodiversity Area” (CBA) in the Provincial Conservation Plan and most of the northern half is mapped as “Ecological Support Area” (ESA). The remaining natural vegetation on site therefore has high value for conservation of vegetation in the Province according to the broadscale CBA maps. ▪ Habitats on site were divided into three units, namely “Mountain Vegetation”, “Plains Vegetation” and “Riparian Vegetation”, the latter associated with dry stream beds. The vegetation on site was found to be a succulent dwarf

	shrubland that resembles the description for Koedoesberg-Moordenaars Karoo, but with a trend of increasing diversity and structural variation with increased elevation and increased surface rockiness. This means that mountain vegetation, especially the highest peaks, have the highest local diversity and greatest variation in species composition. ▪ There is one plant species protected according to the National Environmental Management: Biodiversity Act (Act No 10. Of 2004) (NEM:BA) that was found on site. This is *Hoodia gordonii*, which could potentially occur in other localities on site. ▪ There are a number of plant species occurring on site that are protected according to the Northern Cape Nature Conservation Act (Act 9 of 2009). It is likely that additional protected species occur there that were not observed during the field survey. None of these are of conservation concern, but a permit is required from the Provincial authorities to destroy them. ▪ There are no protected tree species that are likely to occur in the study area. ▪ A total of 56 mammal species have a geographical distribution that includes the general study area in which the site is found. Of the species currently listed as threatened or protected, the following are considered to have a medium probability of occurring on site, based on habitat suitability: Honey Badger (Near Threatened), Black-footed Cat, Leopard, Cape Fox and Riverine Rabbit (Critically Endangered). Given the nature of the proposed project and the fact that many of the species of concern are relatively mobile, few threatened, near threatened or protected mammal species are likely to be significantly negatively impacted by activities on the site. The species that could potentially be affected by habitat disturbance or degradation, due to its specific habitat requirements, is the Riverine Rabbit, however when considering that Riverine Rabbits require vast extents of plains to thrive and the wind farm infrastructure are focussed on the mountainous areas, the concern is very low. ▪ The site contains habitat that is suitable for a small number of frog species, although none are listed or protected species. ▪ A total of 74 reptile species have a geographical distribution that includes the general study area in which the site is found. Two reptile species of conservation concern could potentially occur in the study area, as follows: the Karoo Dwarf Tortoise (NT), and the Armadillo Girdled Lizard (protected). ▪ A preliminary sensitivity map of the site was produced that identifies areas of high sensitivity that should be taken into account during activities on site. This includes watercourses and their associated riparian vegetation, and areas mapped as Critical Biodiversity Areas. Other areas that were not mapped but considered to be sensitive are any steep slopes and any rock outcrops or ridges The following potential impacts were identified, and potential mitigation measures were recommended. These impacts will be further assessed during the EIA phase with a full assessment of the impacts and mitigation measures included.

	Construction Phase 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; ▪ Effects on physiological functioning of vegetation due to dust deposition; ▪ Increased poaching and/or illegal collecting due to increased access to the area. *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; ▪ 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** *Ongoing direct impacts will include the following:* ▪ Continued disturbance to natural habitats due to general operational activities and maintenance; ▪ Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with infrastructure; *Indirect impacts 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; ▪ Changes to behavioural patterns of animals, including possible migration away or towards the project area; ▪ Positive potential impact on climate change due to generation of electricity without the need for coal mining or burning of coal, currently the main form of power generation in South Africa. **Decommissioning Phase Impacts** Decommissioning direct impacts 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; ▪ Effects on physiological functioning of vegetation due to dust deposition;

	Indirect decommissioning impacts 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; ▪ Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape; ▪ Changes to behavioural patterns of animals, including possible migration away or towards the project area; **Cumulative Impacts** 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; ▪ Positive cumulative impact on climate change. The report concludes that there are some sensitivities on site related to natural habitat and to individual species, but that these can be minimised or avoided with the application of appropriate mitigation or management measures. There will be residual impacts, primarily on natural habitat, but 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 therefore the residual impacts are considered acceptable, on condition local sensitivities of biodiversity importance are avoided. On this basis it is recommended that the project be authorised.
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. All access road alternatives are considered suitable. Access road alternative **North Ridge 1** is deemed the **preferred** access road to the North Ridge as it is an existing farm road. Access alternatives **Centre Ridge 1** and **South Ridge 1** are the **preferred** access road for the Centre ridge and South Ridge respectively as these roads are shorter and therefore less expensive to upgrade and maintain. 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.
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 negative low 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 negative low 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.

10.2 Recommendations

Table 81: Outcomes and Recommendations of Specialist Studies

Aspect	Fatal flaws	Recommendations	Further Investigations required during EIA phase
Terrestrial Ecology	None	There are no specific long-term impacts likely to be associated with the WEF that cannot be reduced to an acceptable level through mitigation and avoidance. Implement mitigation measures as include in Section 6.2 of the DSR.	**Yes**
Avifauna and Bats	None	The Avifaunal and Bat Pre-Construction Assessment is currently underway and being conducted by Bioinsight (Pty) Ltd. The results of the pre-construction monitoring will provided in the EIA phase once the monitoring is complete.	**Yes**
Aquatic Ecology	None	Based on the findings of this study no objection to the authorisation of any of the proposed activities inclusive of the alternatives is made. Mitigation measures as per 6.2 of the DSR will need to be incorporated into the EMPr and implemented. .	No
Agriculture and Soils	None	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. 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	No

Aspect	Fatal flaws	Recommendations	Further Investigations required during EIA phase
		that grazing can continue in tandem with the WEF. No parts of the site need to be excluded from the proposed development and no buffers are required. Mitigation measures as per 6.2 of the DSR will need to be incorporated into the EMPr and implemented. Mitigation measures as per 6.2 of the DSR will need to be incorporated into the EMPr and implemented.	
Noise	None	▪ **Operational Activities** o Ambient noise monitoring is recommended at NSA 15 and 16 once the turbines are erected. This is to determine whether or not the noise rating limits are being exceeded and to confirm the modelling results. Mitigation measures as per 6.2 of the DSR will need to be incorporated into the EMPr and implemented.	No – unless turbine layout adjustments are made
Visual	None	Mitigation measures as per 6.2 of the DSR will need to be incorporated into the EMPr and implemented.	No
Heritage	None	▪ A 50m buffer should be applied to all Colonial buildings and stone walled kraals. ▪ Mitigation measures as per 6.2 of the DSR will need to be incorporated into the EMPr and implemented.	No
Palaeontology	None	The study area of of low palaeontological significance. It is consequently recommended that no further paleontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. Mitigation measures as per 6.2 of the DSR will need to be incorporated into the EMPr and implemented.	No
Socio-economic	None	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	No

Aspect	Fatal flaws	Recommendations	Further Investigations required during EIA phase
		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. The mitigation measures as include in Section 6.2 of the DSR should be incorporated to the EMP and implemented.	
Traffic	None	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. Mitigation measures as per 6.2 of the DSR will need to be incorporated into the EMPr and implemented.	No

It is therefore recommended that the following studies be taken through to the EIA Phase:

- Terrestrial Ecology (flora and fauna) Assessment (David Hoare Consulting)
- Avifauna and Bat Assessment (BioInsight)

The proposed scope of work and methodology to assess each of the above impacts has been detailed in the plan of study for EIA, as per the EIA Regulations. The Plan of Study is included below.

11 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

Issues identified during the Scoping Phase will be investigated further during the EIA phase of the project. Various specialist studies will be conducted during the EIA phase to assess these issues. Mitigation measures will be formulated, and these will be included in the Environmental Management Programme (EMPr).

This information will assist DEA in making an informed decision with regards to the proposed development.

11.1 Aim of the EIA Phase

The aim of the impact assessment phase is to:

- Conduct a detailed impact assessment of the issues identified that were not fully assessed in the scoping phase;
- Identify further mitigation measures to reduce impacts;
- Ensure information is disseminated to I&APs and there is a constant flow of communication; and
- Adhere to the requirements of Appendix 3 of the EIA Regulations.

The following tasks will form part of the EIA Phase:

- Undertake a comprehensive Public Participation Process (in compliance of section 41 of the EIA Regulations);
- Further assess and complete the assessment of layout alternatives identified in this DSR;
- Compilation of an EIA Report (EIAr);
- Compilation of an Environmental Management Programme (EMPr);
- Submit Final EIAr to DEA; and
- Await record of decision (ROD).

The following specialist studies will form part of the EIAr:

- Terrestrial Ecology (flora and fauna) Assessment (David Hoare)
- Avifauna and Bat Monitoring (BioInsight)

The terms of reference (ToR) for these studies involves assessing and determining mitigation measures to address the potential impacts that have been identified in the Scoping Report in addition to any new issues that are identified during the detailed assessments – see section 11.3. The qualifications of these specialists are included in their CV's which are included in **Appendix 2**.

11.2 Decision-Making Authority Consultation

The stages at which the competent authority will be consulted are as follows:

- Submission of the DSR for comment;
- Submission of the FSR for comment and acceptance/ rejection;
- Submission of DEIAr for comment;
- Submission of final Environmental Impact Assessment Report (FEIAr) for decision making; and
- Response from competent authority regarding the application.

Additional consultation may occur with the DEA during the EIA process should the need arise.

11.3 Assessing Environmental Issues and Specialist Studies

The EIA Methodology assists in consistent 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 EIA. The impact evaluation of predicted impacts will be undertaken through an assessment of the significance of the impacts for the three specialists that have not done so yet, in accordance with the impact rating methodology provided in **Section 11.5**.
The other specialists provided impact assessment reports that are sufficient to inform the EIA Phase.
A brief Terms of Reference for each specialist study required in the EIA phase is included below:

11.3.1 *Terrestrial Ecology Assessment*

The study area is mostly in a natural state, with farm infrastructure not falling within the footprint of the proposed project. Most of the proposed project is therefore to be located within a natural landscape. This natural landscape contains a number of potential sensitivities, including that part of the site is within a CBA, there could potentially be various plant species of concern occurring on site and there are specific habitats on site that may be sensitive, for example, rocky ridges, cliffs, outcrops and mountain summits. It also appears if general diversity increases with elevation and that some of the more interesting biodiversity may only occur at higher levels in the mountain. It is unknown whether biodiversity patterns on site change from one point to another or whether there is a pattern that repeats itself from one ridge to the next in a predictable way. For all areas within proximity to the proposed activities, a general floristic survey should be undertaken to characterise habitats in terms of condition and species composition. This assessment should include the footprint of the proposed infrastructure as well as an area up to 5 m away in all directions. The small distance is justified by the limited opportunity to site infrastructure due to the topography of the site.

The potential presence of protected plant species must be evaluated within the footprint of proposed activities. There is little information known on what protected plant species could potentially occur on site, but this information is required for determining possible permit requirements. Compiling a list of species for the site will partly alleviate this concern, but will also provide habitat-specific information that will help to evaluate the possibility of a specific species occurring there. A species list of species occurring within the proposed footprint will be compiled to provide the basis for understanding biodiversity patterns on site and helping to understand which species of concern could potentially occur there.

The presence of fauna and flora species of concern or habitats that are important for particular species of concern must be evaluated during the EIA phase. Particular attention should be paid to those species classified as threatened (VU, EN or CR), Near Threatened or Critically Rare and which have a high probability of occurring on site or being affected by the proposed activities. There are various animal species currently listed as threatened or protected that are considered to have a medium to high probability of occurring on site, based on habitat suitability. The potential presence of suitable habitat should be evaluated during field surveys.

- ***Proposed methodology***

The following methodology is proposed in order to obtain the information required for assessing impacts on specific features of concern:

  - General floristic survey

Habitat condition and status can be determined on the basis of a combination of visual surveys, vegetation structure and species composition. The relative composition of the vegetation is a powerful source of information for providing information on the status of vegetation. A general survey will be undertaken in areas within proximity to proposed activities, ensuring that all affected areas are covered. Plant species composition, relative cover and vegetation structure data should be collected at selected sites in order to characterise habitats properly. Photographs will also be taken as a visual reference. A floristic list will be compiled. Any unknown species will be identified using published field guides, expert knowledge or via collection of appropriate plant material.

  - Flora survey for plant species of concern and protected plants

A flora survey for plant species of concern must be undertaken within the footprint and nearby areas of all proposed activities. Habitat requirements and flowering times of all species are poorly-known, but could be obtained partially from published information. There is also the possibility that other species of concern could occur on site that were not on any database, but that occur on site. A general flora survey should therefore be included to ensure that no additional species of concern occur on site. For any species that are encountered, the exact locality and number of individuals will be recorded. Photographs will be taken to confirm the identity of the species. The survey will be a visual survey on foot, with the purpose of identifying the flora of the site.

  - Faunal survey

A habitat survey will be undertaken to be able to assess habitat suitability for the various species of concern that could potentially occur on site. Attention will be paid to the suitability of habitat for foraging, roosting and breeding. The intention is to make a more informed decision on the importance of the site for the various faunal species of concern that could potentially occur on site. If any species of concern are seen on site then GPS co-ordinates of individuals will be obtained, as well as observations on numbers and behaviour.

- Alien plant survey

A list will be compiled of any alien plant species that occur in the general area. This includes any species listed according to the Conservation of Agricultural Resources Act and the NEM:BA.

The information will be analysed, and site-specific no-go areas will be delineated. The proposed WEF layout will be amended if needs be. The potential impacts will be assessed using the methodology as described in section 6. Suitable mitigation measures will be recommended for inclusion in the EMP. The proposed alternatives will be assessed, and recommendations made to this regard. The findings of the assessment will be detailed in an EIA terrestrial ecology assessment in accordance with Appendix 6 of the EIA Regulations.

11.3.2 *Avifauna and Bat Assessment*

The overall objective of the pre-construction phase bat and bird monitoring programme is to characterise the bird and bat community present in the study area in order to present a baseline scenario for establishment of impacts caused by the WEF in latter stages. The monitoring protocol was designed in order to comply with the main requirements of the "South African Good Practice Guidelines for Surveying Bats in Wind Farm Developments" (Sowler & Stoffberg 2014) and the "Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa" (Jenkins et al. 2015).

The preconstruction avifauna and bat monitoring are currently underway and will continue in accordance with the methodology provided below. A full impact assessment will also be compiled based on the bird and bat monitoring and added into DEIR.

- **Avifauna Monitoring**

The bird monitoring programme will be implemented throughout the pre-construction phase of the WEF, for the establishment of a baseline scenario (covering at least four annual seasons before construction). The implementation of similar monitoring protocols and sampling locations during subsequent phases of the project (e.g. construction phase and operational phase) is very important. After referring to the established baseline scenario and implementing a Before-After-Control-Impact analysis, previously identified potential impacts can be validated and other unidentified impacts determined. If additional impacts are found, current proposed mitigation measures can be adequately adjusted, and if necessary, new and more appropriate ones may be proposed. This methodological approach will allow for the baseline results to be comparable throughout the entire monitoring programme of the WEF.

The following methodology is being implemented for the Avifaunal Monitoring:

- **Vantage points for detection of large bird species (with special attention to collision sensitive species) present in the study area**

- The raptors and large bird monitoring were implemented in order to evaluate the activity patterns of these birds in the WEF site and surrounding areas. By collecting this information, it will allow for the:
    - Identification of potential changes in the bird community present within the wind farm and the eventual exclusion/displacement effect (avoidance of the wind facility area post-construction);
    - Evaluation of potential changes that may arise in relation to how the target species and potentially sensitive overall bird community utilizes the site;
    - Documentation of bird activity patterns and movements within the wind farm and its immediate surroundings, as well as the establishment of a pre-impact baseline scenario of bird utilization within the study area;
    - Estimation of predicted collision risks for target and impact sensitive species;
    - Identification of sensitive areas and the proposal of additional mitigation / compensation measures, if need;
    - Establishment of a baseline scenario for the monitoring of subsequent project phases.

Observations from each vantage point was conducted for at least 12 hours per each season covering a 360º area. Each vantage point was surveyed 3 times per day (at least once at each period of the day) during each season. All the impact sensitive species observed during this period was recorded and their flight paths registered. For each observation the number of individuals and, whenever possible, the gender and age were also recorded. Behavioural patterns observed was recorded, including (i) type of flight - passage flight, soaring, display, territorial; (ii) flight height - below rotor height, rotor height, above the rotor height; and (iii) environmental variables (air temperature, wind speed and direction, occurrence of precipitation, cloud cover and visibility).

Seven suitable vantage points were established at strategic locations in the WEF and in such a way as to allow for efficient visualization of the proposed area for the wind farm and its immediate surroundings. The following parameters, derived from data collected at vantage points, was evaluated:

- Species detected - raptors and large birds;
- Mapping of the intensity of usage of the study area by bird species (Activity Index);
- Mapping of the intensity of usage of the study area by flight type for the target species;
- Mapping of the Collision Hazard Index of the study area.

- **Walked linear transects to survey passerines and other small sized birds**

The main objectives of this methodology are to identify potential changes in the bird community (sensitive small terrestrial birds/passerines) within the study site and the eventual exclusion/displacement effect (avoidance of the wind facility area post-construction), to identify sensitive areas and propose additional mitigation / compensation measures, if needed and to establish a baseline scenario for the monitoring of subsequent phases of the project. Linear walking transects, of 1000 m each, were conducted. They will cover the different habitats, microhabitats or biotopes relevant for the local bird community present on site and on a Control area. Each linear transect was conducted by an expert bird observer who walked slowly recording all bird contacts, both seen and heard. These contacts were recorded on both the left and right side of the progression line, with no distance limit between the observer and the birds

▪

- **Vehicle based transects to detect large terrestrial species that are less prone to flight (e.g. bustards and cranes) over greater areas**

The implementation of vehicle-based transects will complement the aforementioned methodologies, providing further insight so as to better evaluate the activity patterns of raptors and large birds in the Wind Energy Facility and surrounding areas. Therefore, the purpose of this survey was to provide a measure of abundance and richness of the observed species (large birds and raptors) and aid in the detection of species less prone to flying, such as bustards or to a lesser extent, cranes.

- **Water bodies inspection and monitoring to characterize the use of these features by water Birds**

▪ The main objectives of this monitoring methodology are:

- To identify potential changes in the bird community occurring within the study site, as well as the eventual exclusion/displacement effect (avoidance of the wind facility area after construction);
- Evaluate potential changes in the way target-species and the overall bird community utilises the study site;
- To document bird activity patterns and movements within the study area, as well as the
- establishment of a pre-impact baseline scenario of bird utilization within the study area;
- To identify sensitive areas and to propose additional mitigation / compensation measures if need be.
- Incidental observations to record all important observations located in the vicinity of the site.

The main water bodies occurring within the study area and its immediate surroundings was identified, mapped and surveyed in order to determine their level of utilization by water birds.
The following parameters was assessed, based on the information collected from the monitoring of water bodies:

- Estimation of the number and densities of water bird species that use these types of areas in the Wind Energy Facility and surrounding areas;
- Bird activity patterns and movements in sensitive areas.

Breeding/roosting evidences and monitoring

This methodology is relevant for the evaluation of the area undergoing change, as a suitable area for species to exist without disturbance. Therefore, by monitoring the reproduction of target or sensitive species, a measure of impact can be obtained to see whether or not reproduction is possible. If not, this measure of impact could be used to see if the decline in reproduction could be as a result of the WEF, or other species-based intrinsic factors.

The main objectives of this methodology are:

- To identify the potential changes in the bird community present within the wind farm and the eventual exclusion/displacement effect (avoidance of the wind facility area post-construction);
- To evaluate potential changes in the way target-species and the overall bird community utilizes

- the study site;
- To identify sensitive areas and to propose additional mitigation / compensation measures if
- need be.

The methodology implemented followed the general guidelines presented in the Best Practice Guidelines for Bird Monitoring (Jenkins *et al.* 2012). The area of the Wind Energy Facility and its immediate surroundings was investigated for nesting and/or roosting locations of priority species. All the nesting and/or roosting locations identified during inspection was accurately registered with a handheld GPS, after which the data was imported into an appropriate Geographical Information System. Once detected, each known nesting location was monitored at least twice during the year, and as many times as needed to certify whether the reproduction took place or not and, if possible, to determine if it was successful.

The data collected from nest investigations and monitoring in the Wind Energy Facility will allow for the evaluation of the following parameters:

- Nesting locations;
- Number and species of breeding pairs;
- Productivity of breeding pairs.

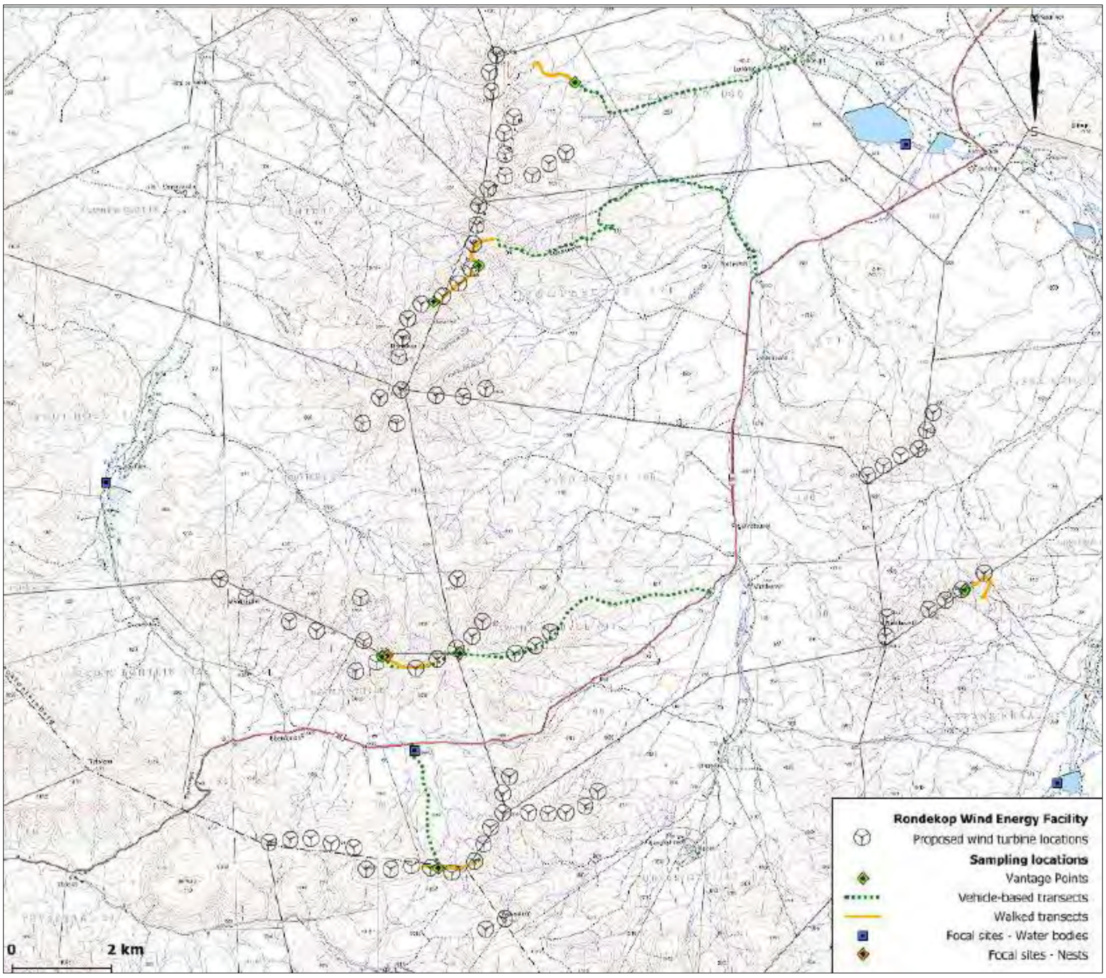

Figure 43: Key bird monitoring sampling locations

Reporting

The information will be analysed, and site-specific no-go areas will be delineated. The proposed WEF layout will be amended if needs be. The potential impacts will be assessed using the methodology as described in section 6. Suitable mitigation measures will be recommended for inclusion in the EMP. The proposed alternatives will be assessed, and recommendations made to this regard. The findings of the assessment will be detailed in an EIA terrestrial ecology assessment in accordance with Appendix 6 of the EIA Regulations.

- **Bat Monitoring**

Since these mammals are nocturnal and most species emit ultrasound calls for navigation, detection of prey and communication, ultrasound sampling plays an important role in the detection and identification of different bat species present in a certain area. Two complementary methods of survey were employed at the site in order to have a good representation of the bat community in the study area active detection surveys, give information mainly about spatial variations of the activity of the different bat species across different areas and habitats at ground level and at peak activity times (defined a priori), whereas passive detection surveys are more suitable for studying the activity patterns through long periods at different heights in certain locations. Details pertaining to these survey techniques are provided below:

  - Active ultrasound detection

The bat monitoring was implemented in order to evaluate the activity patterns in the Wind Energy Facility site and immediate surrounding area. By collecting this information, it will allow:

- Determination of the bat species that use the site;
- Determination of a bat activity index;
- Location and time of bat's activity;
- Number of bat passes per kilometre;

The Active detection of ultrasounds will continue to be conducted with a hand-held ultrasound detector (Wildlife Acoustics EM3+). Active surveys will be made through sampling vehicle transects located at the different habitats present on site. Transect points will be defined for characterisation of environmental variables such as cloudiness, temperature and wind (speed and direction). All bat passes heard and observed were recorded. Sampling started at evening civil twilight and lasted for a minimum of 1.5 hours and a maximum 4 hours after sunset - ensuring that bat species that emerge early in the evening can be included in the surveys (Sowler & Stoffberg, 2014).

  - Passive ultrasound detection

The information collected through passive detection will allow for evaluating activity patterns in the Wind Energy Facility and surrounding area during a continuous period. By collecting this information, it will allow for:

- Determination of the bat species that use the site;
- Calculating the Activity index (bat passes/unit time);
- Establishing a relation between bat activity and relevant environmental factors3 (e.g. air
- temperature and wind speed);

- Determination of bat activity and species present at blade swept area.

Passive detection was conducted through ultrasound detectors with automatic triggering (starting an ultrasound recording when a bat echolocation is detected). The equipment was scheduled to automatically record calls every night starting 30 min before evening civil twilight and ending 30 min after morning civil twilight.

Each monitoring sampling point was characterised according to: minimum distance to the future turbines, slope, dominant orientation, biotope, minimum distance to a water source and minimum distance to known roosts. The equipment automatically records environmental variables at each recording event (e.g. air temperature). This approach will allow registering bat activity in different weather conditions.

Passive automated data recorders (Wildlife Acoustics® SM2BAT+) were placed in 4 different locations: three detectors placed on the meteorological mast and other detector placed in one location representative of the WEF area. These locations cover the different combinations of vegetation types and topography and were determined following the latest recommendations included in the 3rd version of the guidelines (Sowler & Stoffberg, 2014). The three SM2BAT+ detectors installed on the meteorological mast have one microphone installed at 90 m (rotor height) and the other between 7 m and 10 m (ground level). Bat activity is being measured continuously, aiming to cover a minimum of 754% of the 365 nights over the 12-month period (aiming to cover 100% during the bat migration months – April, May and September). The placement of microphones at two different heights on the met mast will allow for comparisons of bat activity and diversity to be made, both at blade height and ground level. The electric power supply to the passive detectors installed will be supplied by using dedicated solar panel systems. The last SM2BAT+ detector was installed at ground level (between 7m and 10m) on telescopic poles. The detector will be monitored continuously throughout the 12-month period, also aiming to cover a minimum of 75% of the total of 365 nights of the year.

- <u>Bat calls analysis and identification</u>

Following the field data collection, bat recordings were analysed by a specialist in acoustic identification of bat species, considering the several parameters that allow the identification of bat species.

- <u>Roost search and monitoring</u>

The experimental design and systematic approach implemented aims to determine the overall utilization of the study area by the bat community. The survey of the study area and its immediate surroundings will allow verification of the occurrence of relevant roosting sites (both for building and cave-dwelling and tree roosting species, including fruit bats) and activity within the WEF, and the collection of information regarding:

- Number of individuals recorded in each roost;
- Species present (if possible);
- Presence/absence of bat roosting evidences (guano, bat corpses, ceiling marks);
- Location and description of the type of roost (house, cave, mine, bridge).

All structures that can potentially provide adequate roosts for bats (caves, mines, abandoned buildings, bridges, trees, etc.) will first be identified in the study area and its surroundings by a desktop study. The locations identified will be later inspected during the field work in order to record evidence of the presence of bats (such as guano accumulation, bat corpses or insect remains). Other structures identified during the field surveys will also be registered and inspected. At any inspected location, the following will be recorded: season, activity rate of individuals, presence of progeny, degree of human disturbance and type of roost. While conducting field work, the location of each roost to be inspected will be registered with GPS and subsequently photographed, for later reference. The occupation rate, species present and conservation status will be determined to each roost inspected.

Throughout all field surveys, an active daylight search for additional roost locations will be conducted in order to detect any structures that could have not been potentially identified while conducting the desktop study. When a location with high roosting potential for bats is identified, inspections will be directed to identify its occupancy and utilization. These roosts will then be subjected to roost monitoring which involve both regular visual inspections during daylight and conducting ultrasound recording sessions (starting 30min before dusk and ending 30 min after dusk), registering the time of exit/entrance, number of individuals and species present. Roost monitoring at dawn will also be considered, if relevant.

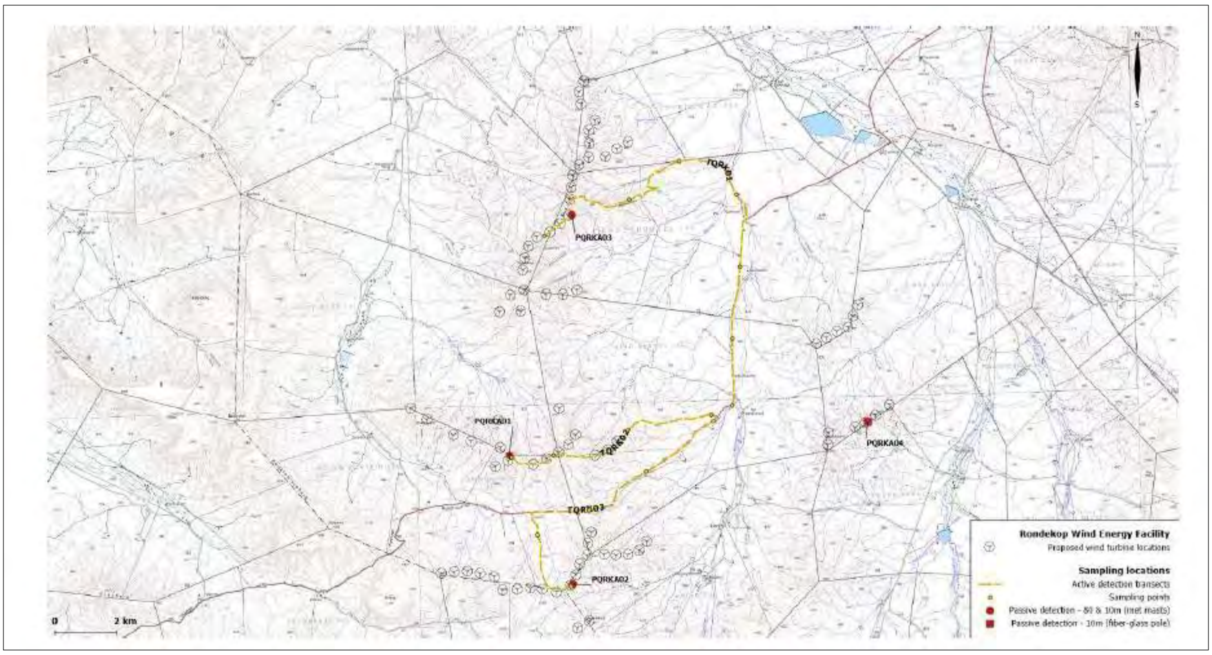

Figure 44: Bat active and passive sampling transects and points at Rondekop WEF

- Reporting

The information will be analysed, and site-specific no-go areas will be delineated. The proposed WEF layout will be amended if needs be. The potential impacts will be assessed using the methodology as described in section 6. Suitable mitigation measures will be recommended for inclusion in the EMP. The proposed alternatives will be assessed, and recommendations made to this regard. The findings of the assessment will be detailed in an EIA terrestrial ecology assessment in accordance with Appendix 6 of the EIA Regulations.

11.4 Cumulative Impact Assessment

The potential cumulative impact of the proposed WEF in combination with other renewable energy facilities in the area has been identified and assessed per environmental aspect in **section 6.3** of this DSR. In addition, mitigation measures were identified to address the cumulative impact, where possible. The Scoping Phase specialist reports included 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 will be reflected in the mitigation measures to be provided in the DEIAr and EMPr. Cumulative impacts were also rated as part of the impact rating system and used to determine the significance of the impacts. It should be noted that cumulative impacts will be further assessed during the EIA phase of the project. A cumulative assessment of impacts associated with ecology, bird and bats will be assessed and incorporated into the DEIAr.

11.5 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 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.

11.5.1 *Impact Rating System*

Impact assessment will 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 will also be assessed according to the project stages:

- Planning;
- Construction;
- Operation; and
- Decommissioning.

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

The significance of impacts will continue to be assessed based on the methodology as described in section 6.1.

11.6 Environmental Management Programme (EMPr)

In accordance with the EIA Regulations (Appendix 4) a draft Environmental Management Programme (EMPr) will be included within the EIA Report. The EMPr will include the mitigation measures formulated by the various specialists and will include all information as required in **Appendix 4** of the EIA Regulations.

11.7 Alternative Assessment

In accordance with the EIA Regulations and as discussed in **Chapter 7** of this report, the layout alternatives identified within this DSR will be further described and comparatively assessed in the EIA phase, once the EIA phase studies have been completed.

The layout of the proposed wind turbines and location of the substation, access road and construction camp alternatives will be adjusted (as required) based on the refinement of the sensitive areas determined during the more detailed EIA phase specialist studies. The preliminary layout and sensitive area overlay map is provided below. This map will be updated in the EIA phase to include the Terrestrial Ecology, Avifaunal and Bat sensitive areas and the layout will be assessed and adjusted accordingly. Recommendations and overall alternative preferences will be provided in the EIA phase once the more detailed EIA phase specialist studies have been completed.

The following alternatives are preferred based on the scoping assessment:

1. One location alternative namely the Rondekop WEF
2. One technology alternative namely wind energy generation facility

The following alternatives will be assessed in the EIA phase:

1. Access road layout alternatives
2. Substation layout alternatives
3. Construction camp layout alternatives
4. No-go alternative

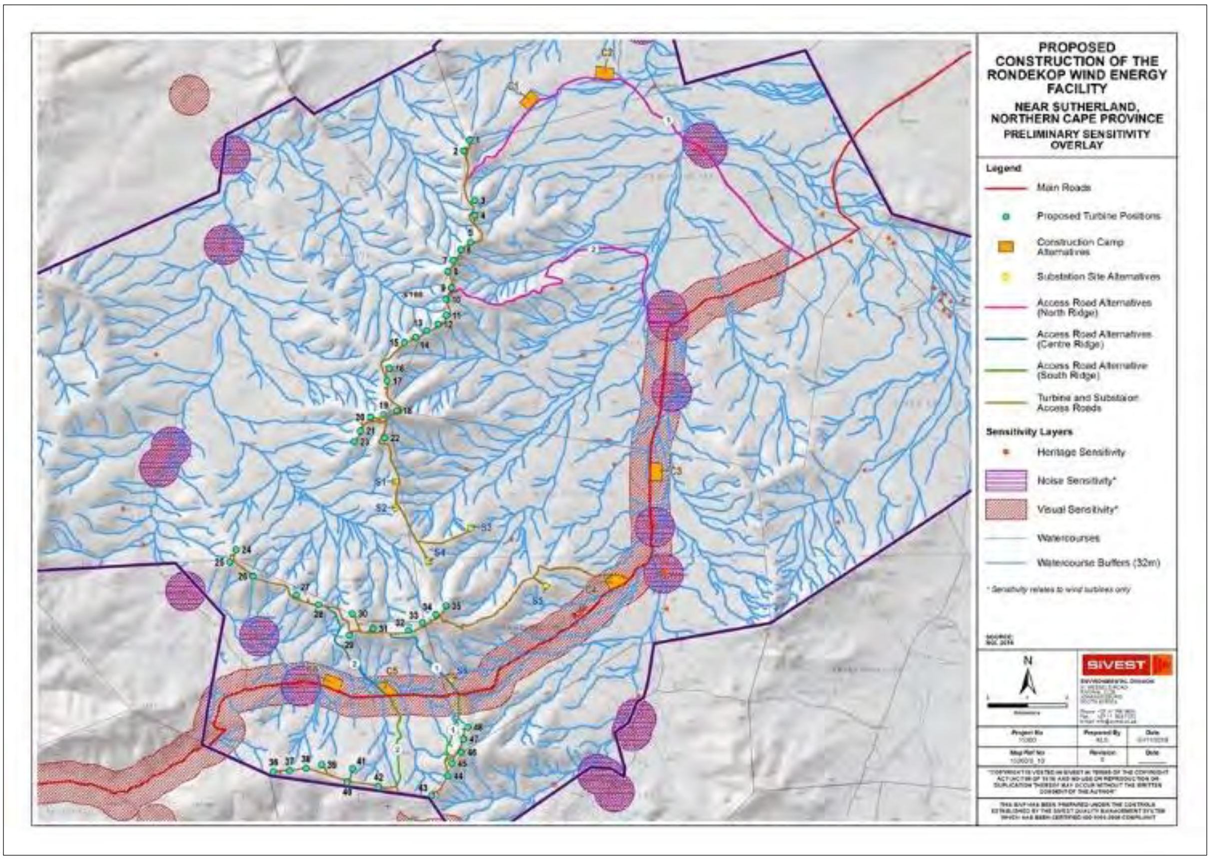

Figure 45: Proposed Layout Alternatives to be assessed in the EIA phase in relation to the Sensitive Areas

11.8 Recommendations

It is recommended that the specialist studies be carried forward into the EIA Phase, namely:

- Agriculture and Soils Assessment;
- Aquatic Ecology Assessment;
- Avifauna Assessment (Impact Assessment will be detailed in the EIA phase);
- Bat Assessment (monitoring is still underway and will be detailed in the EIA phase);
- Heritage Assessment (including Paleontology, Archaeology & Cultural Landscape);
- Noise Assessment
- Socio-Economic Impact Assessment;
- Terrestrial Ecology Assessment (detailed study to follow during the EIA phase);
- Traffic Impact Assessment; and
- Visual Impact Assessment.

Various issues and concerns have been identified which require detailed assessment and thus it is recommended that the EIA phase should be allowed to continue in order to assess these and the impacts associated.

11.9 Public Participation

The Public Participation during the EIA Phase will involve the following:

Table 82: Public Participation activities still to take place.

ACTIVITY	FUNCTION
Written notification to all I&APs	Notify registered I&APs of outcome of the Scoping Phase; and The availability of the DEIAR for comment (including timeframes and when their input is required).
Placement of DEAIR in public domain	the DEIAR will be available from the Sutherland public library and from *http://data.g7energies.com/eia/rondekop*
Meetings	Up to two meetings be held to provide feedback on the findings of the detailed specialist studies.
Public comment period	Notification of I&APs of the availability of the EIAr report for public comment for a 30-day period.
C&RR	Compilation of the C&RR
Notification of FEIAR	Notification of I&APs of the availability of the FEIAr submission to the DEA
I&AP database	Continual updating of the database as new I&APs register
Notification of granting or refusal of Environmental Authorisation	Informing all registered I&APs of the EA and their rights to appeal and the appeal process
Environmental Authorisation appeal period	Receive any appeals and forward to DEA (if required)

11.10 Proposed Project Schedule going forward

The table below represents the proposed schedule for the EIA phase.

Table 83: Proposed Project Schedule

	November 2018	December 2018	January 2019	February 2019	March 2019	April 2019	May 2019	June 2019	July 2019	August 2019
Start of DSR Comment period	14th November 2018 to 14th of December 2018									
Submission of FSR to DEA			January 2019							
DEA Decision on FSR					March 2019					
Distribution of EIA Notifications					March 2019					
DEIAr Comment period					March 2019 April 2019					
Hold Meetings (FGMs and PM)						March 2019				
Submission of FEIAr to DEA							May 2019			
DEA Decision										August 2019

12 WAY FORWARD

The DSR were circulated for public participation for a period of 30 days from 14 November 2018 until 14 December 2018. The comments received, will be collated into a C&RR that will include a response from the EAP. The Final Scoping Report, including the C&RR will be submitted to DEA early in 2019 for decision making. The DEA will have 43 days to either accept the report or refuse the project.

Should DEA accept the FSR, the project will proceed to EIA phase.

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:

Contact: Hlengiwe Ntuli

PO Box 2921, RIVONIA, 2128

☎ Phone:(011) 798 0600

E-mail:hlengiwen@sivest.co.za

Fax:(011) 803 7272

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13 REFERENCES

ABDALA F, RUBIDGE BS & VAN DEN HEEVER J 2008. The oldest therocephalians (Therapsida, Eutheriodontia) and the early diversification of the Therapsida. Palaeontology 51, 1011-1024.

ACKERMANN M & DE KLERK M 2012. Orlight SA (Pty) Ltd – Final EIA Report for the proposed development of the Loeriesfontein Solar PV Plant in the Northern Cape Province. Digby Wells Environmental, Pretoria.

AGENDA 21 – Action plan for sustainable development of the Department of Environmental Affairs and Tourism (DEAT) 1998.Agricultural Resources Act, 1983 (Act No. 43 of 1983).

ALEXANDER G & MARAIS J 2007. A guide to the reptiles of southern Africa. Struik, Cape Town.

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.

ALMOND J, PETHER J, & GROENEWALD G 2013. South African National Fossil Sensitivity Map. Fossil Heritage Layer Browser, SAHRA and Council for Geoscience.

ALMOND JE & PETHER, J. 2008. Palaeontological Heritage of the Western Cape. Internal Report Heritage Western Cape.

ALMOND JE 2005. Palaeontological scoping report: Proposed golf estate, Sutherland, Northern Cape, 10 pp. Natura Viva cc, Cape Town.

ALMOND JE 2010a. Eskom Gamma-Omega 765kV transmission line: Phase 2 palaeontological impact assessment. Sector 1, Tanqua Karoo to Omega Substation (Western and Northern Cape Provinces), 95 pp + Appendix. Natura Viva cc, Cape Town.

ALMOND JE 2010b. Palaeontological impact assessment: desktop study – Proposed Suurplaat wind energy facility near Sutherland, Western Cape, 33 pp. Natura Viva cc, Cape Town.

ALMOND JE 2010c. Proposed Mainstream wind farm to the southeast of Sutherland, Northern Cape and Western Cape Provinces. Palaeontological impact assessment: pre-scoping desktop study, 19 pp. Natura Viva cc, Cape Town.

ALMOND JE 2011. Proposed photovoltaic solar energy facility on the farm Jakhals Valley (RE/99) near Sutherland, Karoo Hoogland Municipality, Northern Cape Province. Palaeontological specialist study: combined desktop and field assessment, 34 pp. Natura Viva cc, Cape Town.

ALMOND JE 2014. Proposed Karreebosch Wind Farm (Roggeveld Phase 2) near Sutherland, Northern Cape Province. Palaeontological heritage assessment: combined desktop & field-based study, 63 pp. Natura Viva cc, Cape Town.

ALMOND JE 2015a. Proposed expansion of the existing Komsberg Substation on Farm Standvastigheid 210 near Sutherland, Northern Cape Province. Paleontological heritage assessment: combined desktop & field-based study (basic assessment), 39 pp. Natura Viva cc, Cape Town.

ALMOND JE 2015b. Authorised Karusa Wind Farm near Sutherland, Namaqua District Municipality, Northern Cape Province. Palaeontological heritage assessment: combined desktop & field-based study, 57 pp. Natura Viva cc, Cape Town.

ALMOND JE 2015c. Authorised Soetwater Wind Farm near Sutherland, Namaqua District Municipality, Northern Cape Province. Palaeontological heritage assessment: combined desktop & field-based study, 57 pp. Natura Viva cc, Cape Town.

ANDERSON AM & MCLACHLAN IR 1976. The plant record in the Dwyka and Ecca Series (Permian) of the south-western half of the Great Karoo Basin, South Africa. Palaeontologia africana 19: 31-42.

ANDERSON AM 1981. The Umfolozia arthropod trackways in the Permian Dwyka and Ecca Groups of South Africa. Journal of Paleontology 55: 84-108, pls. 1-4.

ARCHER W & BRAUN DR 2010. Variability in bifacial technology at Elandsfontein, Western Cape, South Africa: a geometric morphometric approach. Journal of Archaeological Science 37: 201-209.

AURECON 2016. Proposed Kokerboom 1 Wind Energy Facility and Associated Infrastructure on Farm RE/227 and Farm RE/1163, near Loeriesfontein in the Northern Cape: Final Scoping Report: Report No. 10990/112081.

AURECON 2016. Proposed Kokerboom 2 Wind Farm and Associated Infrastructure on farms RE/1164 and RE/215, near Loeriesfontein in the Northern Cape: Final Scoping Report: Report No. 10991/112081.

AURECON 2017. Proposed Kokerboom 3 Wind Energy Facility and Associated Infrastructure on Farm RE/213, 1/214 and 2/214, near Loeriesfontein in the Northern Cape: Final Scoping Report: Report No. 10992/112081.

AUSTRALIA ENVIRONMENTAL PROTECT AGENCY - Wind farms - environmental noise guidelines. July 2009.

BAMFORD MK 2004. Diversity of woody vegetation of Gondwanan southern Africa. Gondwana Research 7, 153-164

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.

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.

BANDAMA F 2017. Assessment for The Gamma (Victoria West, Northern Cape) - Kappa (Ceres, Western Cape) Second 765kV Eskom Power Transmission Line.

BARNES KN (ed.) 2000. The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. Birdlife South Africa, Johannesburg.

BARTHWAL R 2002. Environmental Impact Assessment. New Age International Publishes, New Delhi.

BATES MF, BRANCH WR, BAUER AM, BURGER M, MARAIS J, ALEXANDER GJ & DE VILLIERS MS 2014. Atlas and Red List of the Reptiles of South Africa. Suricata 1, South African National Biodiversity Institute. ISBN 978-1-919976-84-6.

BELL ACOUSTIC CONSULTING. Low frequency noise and infrasound from Wind turbine generators: A literature review. George Bellhouse. June 2004.

BERLINER D & DESMET P 2007. Eastern Cape Biodiversity Conservation Plan: Technical Report. Department of Water Affairs and Forestry Project No 2005-012, Pretoria. 1 August 2007.

BOOTH C 2011. An archaeological desktop study for the propsoed establishment of the Hidden Valley wind energy facility and associated infrastructure ona a site south of Sutherland, Northern Cape Province.
BOOTH C 2012. A Phase 1 AIA for the proposed HIdden Valley Wind Energy Facility, near Sutherland, Northern cape Province.
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.
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.
BOOTH C 2015. A Phase 1 Archaeological Impact Assessment for theProposed 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.
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 And The Remainder Of The Farm Rheebokke Fontein 209, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province.
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.
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.
BOOTH C 2016. A Phase 1 Archaeological Impact Assessment For The Proposed Brandvalley Wind Energy Facility Situated In The Karoo Hoogland Local Municipality (Namakwa District Municipality), The Witzenberg Local Municipality (Cape Winelands District Municipality) And Laingsburg Local Municipality (Central Karoo District Municipality).
BOOTH C 2017. An Archaeological Assessment for the Amendment to Turbine Specifications and the Revised Layout of the 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 and the remainder of the farm rheebokke fontein 209, near sutherland, karoo hoggland local municipality, namakwa district municipality, northern cape province.
BOOTH C 2017. An Archaeological Assessment for the Amendment to Turbine Specifications and the Revised Layout of the 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.

BORN J, LINDER HP & DESMET P 2007. The Greater Cape Floristic Region. Journal of Biogeography 34, 147-162.

BOTANICAL SOCIETY OF SOUTH AFRICA. Namakwa District Terrestrial CBAs [vector geospatial dataset] 2008. Available from the Biodiversity GIS website, downloaded on 30 May 2016.

BOWEN P GOVENDER G EDWARDS P & CATTELL K 2016. An explanatory model of attitudinal fear of HIV/AIDS testing in the construction industry. Engineering, Construction and Architectural Management, 23(1) , 92-112.

Bowen P, Dorrington R, Distiller G, Lake H, & Besesar S 2008. HIV/AIDS in the South African construction industry: an empirical study. Construction Management and Economics, 26(8) , 827-839.

BOWEN P, GOVENDER R, EDWARDS P, & LAKE A 2018. HIV infection in the South African construction industry. Psychology, Health & Medicine: 23(5), 612-618.

BRADDY SJ & BRIGGS DEG 2002. New Lower Permian nonmarine arthropod trace fossils from New Mexico and South Africa. Journal of Paleontology 76: 546-557.

BRANCH WR 1988. South African Red Data Book—Reptiles and Amphibians. South African National Scientific Programmes Report No. 151.

BRAUN DR, LEVIN NE, STYNDER D, HERRIES AIR, ARCHER W, FORREST F, ROBERTS DL, BISHOP LC, MATTHEWS T, LEHMANN SB, PICKERING R & FITZSIMMONS KE 2013. Mid-Pleistocene hominin occupation at Elandsfontein, Western Cape, South Africa. Quaternary Science Reviews 82: 145-166.

BREEDLOVE G 2002. A systematic for the South African Cultural Landscapes with a view to implementation. Thesis – University of Pretoria.

BUTLER Elize 2018. Palaeontological Impact Assessment for the proposed Rondekop Wind Energy facility south of Sutherland, Northern Cape Province. Banzai Environmental.

CAPE FARM MAPPER. Available at: https://gis.elsenburg.com/apps/cfm/

CAPE WINELANDS DISTRICT MUNICIPALITY 2009. Cape Winelands District Spatial Development Framework 2009/2010. Stellenbosch: Cape Winelands District Municipality.

CEDAR TOWER SERVICES 2016. Heritage Screener: Brandvalley Wind Energy Facility.

CENTRAL KAROO DISTRICT MUNICIPALITY 2016. Central Karoo District 3rd 2012-2017 IDP Review For Implementation 2016 – 2017. Beaufort West: Central Karoo District Municipality.

Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The 2016 Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

CILLIERS C, THERON H, RÖSCH H & LE ROUX A 2002. Succulent Karoo Ecosystem Plan, Sub-regional report, Hantam/Tanqua/Roggeveld. Succulent Karoo Ecosystem Plan report.

CLARK VR, BARKER NP & MUCINA L 2011. The Roggeveldberge – Notes on a botanically hot area on a cold corner of the southern Great Escarpment, South Africa. South African Journal of Botany 77: 112 – 126.

COETZEE F & FOURIE H 2015. HIA & Palaeo Assessment (Phase 1): Cultural Heritage Assessment for the Amendment to the Environmental Management Programme for the Proposed Tailings Storage Facility (TSF) and Associated Infrastructure at Royal Bafokeng Platinum Styldrift Mine Complex, Rustenburg Local Municipality, Bojanala District Municipality, North West Province.

COLE DI 2016. Lithostratigraphy of the Abrahamskraal Formation (Karoo Supergroup), South Africa. South African Journal of Geology. 119 (2), 415-424.

COOPER MR & KENSLEY B 1984. Endemic South American Permian bivalve molluscs from the Ecca of South Africa. Journal of Paleontology 58: 1360-1363.

CRITICAL ECOSYSTEM PARTNERSHIP FUND 2003. Ecosystem Profile: The Succulent Karoo hotspot, Namibia and South Africa. Critical Ecosystem Partnership Fund report.

DAY MO & RUBIDGE BS 2014. A brief lithostratigraphic review of the Abrahamskraal and Koonap formations of the Beaufort group, South Africa: towards a basin-wide stratigraphic scheme for the Middle Permian Karoo. Journal of African Earth Sciences 100, 227-242.

DAY MO, GÜVEN S, ABDALA F, JIRAH S, RUBIDGE B & ALMOND J 2015b. Youngest dinocephalian fossils extend the Tapinocephalus Zone, Karoo Basin, South Africa Research Letter, South African Journal of Science 111, 5 pp.

DAY MO, RAMEZANI J, BOWRING SA, SADLER PM, ERWIN DH, ABDALA F & RUBIDGE BS 2015a. When and how did the terrestrial mid-Permian mass extinction occur? Evidence from the tetrapod record of the Karoo Basin, South Africa. Proceedings of the Royal Society B282: 20150834. http://dx.doi.org/10.1098/rspb.2015.0834.

De Jager M 2017. "Environmental Noise Impact Assessment for the proposed Graskoppies Wind Farm North of Loeriesfontein, Western Cape". Enviro-Acoustic Research, Pretoria.

DEA 2015. Strategic Environmental Assessment for wind and solar photovoltaic development in South Africa. CSIR Report Number CSIR: CSIR/CAS/EMS/ER/2015/001/B. Stellenbosch.

DEACON HJ 1976. Where Hunters Gathered: a Study of Holocene Stone Age People in the Eastern Cape. South African Archaeological Society, Monograph Series 1.

DEACON HJ 1998. Elandsfontein and Klasies River revisited. In: Ashton NM, Healy F & Pettitt PB (eds) A Master of His Craft: Papers in Stone Age Archaeology Presented to John Wymer: 23-28. Oxford: OxBow Books.

DEACON HJ 2008. Archaeological Impact Assessment: Proposed Breede Valley De Doorns Housing Project.

DEFRA – United Kingdom A Review of Published Research on Low Frequency Noise and its Effects. Geoff Leventhal. 2003

DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES 2002. National land type inventories data set. Pretoria.

DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES 2017. National land capability evaluation raster data layer, 2017. Pretoria.

DEPARTMENT OF ENERGY REPUBLIC OF SOUTH AFRICA 2018. Draft Integrated Resource Plan, 2018 for public comments. Pretoria: Department of Energy Republic of South Africa.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM 2004. South African National Climate Change Response Strategy, September 2004. Pretoria: Department of Environmental Affairs and Tourism.

DEPARTMENT OF WATER AFFAIRS (DWA) 1998. The Groundwater Dictionary - Second Edition: A Comprehensive Reference of Groundwater Related Terminology. Available: http://www.dwa.gov.za/Groundwater/Groundwater_Dictionary/introduction_groundwater.htm. Last accessed 28th Oct 2018.

DEPARTMENT OF WATER AFFAIRS AND FORESTRY - DWAF 2005. A practical field procedure for identification and delineation of wetland and riparian areas Edition 1. Department of Water Affairs and Forestry, Pretoria. Updated with amendments in 2007.

DTI – United Kingdom The measurement of low frequency noise at 3 UK Wind Farms. Hayes Mackenzie. 2006

DU PREEZ L & CARRUTHERS V 2009. A complete guide to the frogs of southern Africa. Random House Struik, Cape Town.

DU TOIT A 1954. The geology of South Africa. xii + 611pp, 41 pls. Oliver & Boyd, Edinburg.

DUSSELDORP G, LOMBAR M & WURZ S 2013. Pleistocene Homo and the updated Stone Age sequence of South Africa. South African Journal of Science 109: 1-7.

ECONOMISTS UED 2009. Central Karoo District Local Economic Development. Department of Trade and Industry, Republic of South Africa .

EKOTRUST CC 2018. REPORT ON THE TERRESTRIAL ECOLOGY (FLORA AND FAUNA): Basic Assessment report for the proposed development of the 325 MW Kudusberg Wind Energy Facility located west of the R354 Between Matjiesfontein and Sutherland in the Northern and Western Cape.

ENVIRONMENTAL RESOURCES MANAGEMENT (ERM) 2012. Proposed Renewable Energy Facility at the Perdekraal Site 2, Western Cape DEA Ref: 12/12/20/1783. Environmental Resources Management (ERM).

Evans V & Gibb A 2015. Proposed Construction of the Dwarsrug Wind Farm, near Loeriesfontein, Northern Cape Province: Visual Impact Assessment Report – Impact Phase. SiVEST Environmental Division, Rivonia.

EVANS V, GIBB A, & RIMBAULTR 2015. Proposed Construction of the Dwarsrug Wind Farm near Loeriesfontein, Northern Cape Province: Final Environmental Impact Assessment Report. SiVEST Environmental Division, Rivonia.

FAIRBANKS DHK, THOMPSON MW, VINK DE, NEWBY TS, VAN DEN BERG HM & EVERARD DA 2000. The South African Land-Cover Characteristics Database: a synopsis of the landscape. S.Afr.J.Science 96: 69-82.

FEATHERS JK 2002. Luminescence dating in less than ideal conditions: case studies from Klasies River Main Site and Duinefontein, South Africa. Journal of Archaeological Science 29: 177-194.

FEY M 2010. Soils of South Africa. Cambridge University Press, Cape Town.

FEY M 2010. With contributions by Jeff Hughes, Jan Lambrechts, Theo Dohse, Anton Milewski and Anthony Mills. Soils of South Africa: their distribution, properties, classification, genesis, use and environmental significance. Cambridge University Press, Cape Town.

FIRESTONE J, BIDWELL D, GARDNER M, & KNAPP L 2018. Wind in the sails or choppy seas?: People-place relations, aesthetics and public support for the United States' first offshore wind project. Energy Research & Social Science. Volume 40, June 2018,, 232-234.

FOURIE D, KRITZINGER-VAN NIEKERK L & NEL M 2015. An overview of the renewable energy independent power producers procurement programme (REIPPPP) . Centurian: Department of Energy IPP Office.

FOURIE W 2010. Archaeological Walk Down Report: Gamma-Omega Transmission Section 1: Gamma-Kappa

FOURIE W 2010. Archaeological Walk Down Report: Gamma-Omega Transmission Section 1: Gamma-Kappa.

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.

FRIEDMANN Y & DALY B (eds.) 2004. The Red Data Book of the Mammals of South Africa: A Conservation Assessment: CBSG Southern Africa, Conservation Breeding Specialist Group (SSC/IUCN), Endangered Wildlife Trust, South Africa.

GERMISHUIZEN G & MEYER NL (eds) 2003. Plants of southern Africa: an annotated checklist. Strelitzia 14, South African National Biodiversity Institute, Pretoria.

GERMISHUIZEN G, MEYER NL, STEENKAMP Y & KEITH M (eds.) 2006. A checklist of South African plants. Southern African Botanical Diversity Network Report No. 41, SABONET, Pretoria.

Gibb A & Jacobs S 2017. Proposed Construction of the Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province: Visual Impact Assessment Report – Impact Phase. SiVEST Environmental Division, Rivonia.

GIBB A & JACOBS S 2017. Proposed Construction of the Ithemba Wind Farm near Loeriesfontein, Northern Cape Province: Visual Impact Assessment Report – Impact Phase. SiVEST Environmental Division, Rivonia.

Gibb A & Jacobs S 2017. Proposed Construction of the Xha! Boom Wind Farm near Loeriesfontein, Northern Cape Province: Visual Impact Assessment Report – Impact Phase. SiVEST Environmental Division, Rivonia.

Gibb A 2012. Construction of a Wind Farm and Photovoltaic (PV) Plant near Loeriesfontein – Visual Impact Assessment Report - Impact Phase. SiVEST Environmental Division, Rivonia.

GIBB, ANDREA, JACOBS, STEPHAN AND SCHWARTZ, KERRY 2018. Visual Impact Assessment for the proposed Rondekop Wind Energy facility south of Sutherland, Northern Cape Province. Banzai Environmental.

GODWIN LUKE 2011. The Application of Assessment of Cumulative Impacts in Cultural Heritage Management: A Critique. Australian Archaeology, No. 73 (December 2011), pp. 88-91

GOLD COAST DESALINATION ALLIANCE (GCDA) – 2006 Environmental Impact Assessment Queensland Desalination Plant (Chapter 11).

GOOGLE EARTH PRO

GOVERNMENT GAZETTE NO. 41445. 2018. Notice 114, page 92-96. Pretoria: Government Printing Works.
GROOMBRIDGE B (ed.) 1994. 1994 IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland.
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.
HALKETT D 2011. Heritage Impact Assessment Proposed Renewable Energy Facility at the Sutherland Site, Western and Northern Cape Provinces.
HALKETT D 2017. Heritage Impact Assessment: Proposed Construction of the 132Kv Powerline for the Maralla Wind Energy Facility near Sutherland Northern Cape.
HERRIES AIR 2011. A chronological perspective on the Acheulian and its transition to the Middle Stone Age in southern Africa: the question of the Fauresmith. International Journal of Evolutionary Biology 2011: 1-25.
HILTON-TAYLOR C 1994. Western Cape Domain (Succulent Karoo). In: S.D. Davis, V.H. Heywood and A.C. Hamilton (Eds). Centres of plant diversity. A guide and strategy for their conservation, pp. 201-203. IUCN Publications Unit, Cambridge.
HOLNESS S & OOSTHUYSEN E 2016. Northern Cape Critical Biodiversity Area map, SANBI BGIS.
HUMPHREYS AJB 1976. Note on the Southern Limits of Iron Age Settlement in the Northern Cape. The South African Archaeological Bulletin, 31: 54-57.
HUMPHREYS AJB 1988. A Prehistoric Frontier in the Northern Cape and Western Orange Free State: Archaeological Evidence in Interaction and Ideological Change. Kronos, 13: 3-13.
INDEPENDENT POWER PRODUCER OFFICE 2018a. Independent Power Producers Procurement Programme. An Overview. Centurion: Independent Power Producers Office.
INDEPENDENT POWER PRODUCERS PROCUREMENT OFFICE 2018b. Provincial Report Volume 1: Northern Cape Overview. Centurion: Independent Power Producers Procurement Office.
INDEPENDENT POWER PRODUCERS PROCUREMENT OFFICE 2018c. Provincial Report Volume 3: Western Cape Overview. Centurion: Power Producers Procurement Office.
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (Approved SPM – copyedit pending). (6 October 2018). Global Warming of 1.5 °C an IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate chan . Intergovernmental Panel on Climate Chang.
INTERNATIONAL FINANCE CORPORATION 2007 General EHS Guidelines: Environmental Noise.
ISO 9613-2 - Acoustics – Attenuation of sound during propagation outdoors. Part 2 – General method of calculation.
IUCN 2001. IUCN Red Data List categories and criteria: Version 3.1. IUCN Species Survival Commission: Gland, Switzerland.
JIRAH S & RUBIDGE BS 2010. Sedimentological, palaeontological and stratigraphic analysis of the Abrahamskraal Formation (Beaufort Group) in an area south of Merweville, South Africa. Proceedings of the 16th conference of the Palaeontological Society of Southern Africa, Howick, August 5-8, 2010, pp. 46-47.

JIRAH S & RUBIDGE BS 2014. Refined stratigraphy of the Middle Permian Abrahamskraal Formation (Beaufort Group) in the southern Karoo Basin. Journal of African Earth Sciences 100, 121–135.

JOHNSON M R, ANHAEUSSER CR & THOMAS RJ (Eds). 2009. The Geology of South Africa. GSSA, Council for Geoscience, Pretoria

JOHNSON MR, ANHAUSSER CR & THOMAS RJ (eds) 2006. The Geology of South Africa. Geological Society of South Africa: Johannesburg: Council for Geoscience, Pretoria: Geological Society of South Africa, 691pp.

JOHNSON MR, VAN VUUREN CJ, VISSER JNJ, COLE DI, De V WICKENS H, CHRISTIE ADM, ROBERTS DL & BRANDL G 2006. Sedimentary rocks of the Karoo Supergroup. In: Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (Eds.) The geology of South Africa, pp. 461-499. Geological Society of South Africa, Marshalltown.

JOHNSON MR, VAN VUUREN CJ, VISSER JNJ, COLE DI, WICKENS H DE V, CHRISTIE AD.M, ROBERTS DL & BRANDL G. 2006. Sedimentary rocks of the Karoo Supergroup. In: Johnson. M.R., Anhaeusser, C.R. & Thomas, R.J. (eds.) The geology of South Africa, pp. 461-499. Geological Society of South Africa, Johannesburg & the Council for Geoscience, Pretoria.

JOHNSON RT, RABINOWITZ H & SIEFF P 1959. Rock paintings at Katbakkies, Koue Bokkeveld, Cape. South African Archaeological Bulletin 14: 99-103.

KALIBBALA F 2012. Construction of a Photovoltaic (PV) Plant near Loeriesfontein, Northern Cape Province, South Africa: Final Environmental Impact Report. SiVEST Environmental Division, Rivonia.

KALIBBALA F 2012. Construction of a Wind Farm near Loeriesfontein, Northern Cape Province, South Africa: Final Environmental Impact Report. SiVEST Environmental Division, Rivonia.

KAPLAN J 2009. Phase 1 Archaeological Impact Assessment of the Proposed Driefontein Resort (Driefontein Farm No. 127) Sutherland, Northern Cape Province.

KAPLAN J 2015. Proposed borrow pit (Karusa East) on the Farm Rheebokke Fontein 209/2 & 209/3 near Sutherland, Northern Cape.

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).

KAPLAN J 2015. Proposed quarry on the farm Jakhals Valley 99 Portion 3 near Sutherland, Northern Cape.

KAROO NEWS GROUP (Undated). Karoo News Group – Appeal to Minister. Retrieved from Heratige Association of South Africa: http://heritagesa.org/wp/2222-2/

KELLER CM 1973. Montagu Cave in Prehistory: A Descriptive Analysis. California: University of California.

KENT L E 1980. Part 1: Lithostratigraphy of the Republic of South Africa, South West Africa/Namibia and the Republics of Bophuthatswana, Transkei and Venda. SACS, Council for Geosciences, Pp 535-574.

KEYSER AW & SMITH RMH 1977-78. Vertebrate biozonation of the Beaufort Group with special reference to the Western Karoo Basin. Annals of the Geological Survey of South Africa 12: 1-36.

KIKWASI G J & LUKWALE S R 2017. HIV/AIDS and Construction Workers: Knowledge, Risk Sexual Behaviours and Attitude. Global Journal of Health Science 10(1):37.

KITCHING JW 1977. The distribution of the Karroo vertebrate fauna, with special reference to certain genera and the bearing of this distribution on the zoning of the Beaufort beds. Memoirs of the Bernard Price Institute for Palaeontological Research, University of the Witwatersrand, No. 1, 133 pp (incl. 15 pls).

KLEIN RG & CRUZ-URIBE K 1991. The bovids from Elandsfontein, South Africa, and their implications for the age, palaeoenvironment, and origins of the site. The African Archaeological Review 9: 21-79.

KLEIN RG, AVERY G, CRUZ-URIBE K & STEELE TE 2007. The mammalian fauna associated with an archaic hominin skullcap and later Acheulean artifacts at Elandsfontein, Western Cape Province, South Africa. Journal of Human Evolution 52: 164-186.

KLEIN RG, AVERY G, CRUZ-URIBE K, HALKETT D, MILO RG & VOLMAN TP 1999. Duinefontein 2: an Acheulean site in the Western Cape Province of South Africa. Journal of Human Evolution 37: 153-190.

KLEYNHANS CJ, THIRION C & MOOLMAN J 2005. A Level 1 Ecoregion Classification System for South Africa, Lesotho and Swaziland. Report No. N/0000/00/REQ0104. Resource Quality Services, Department of Water Affairs and Forestry, Pretoria.

LAINGSBURG LOCAL MUNICIPALITY 2017. Laingsburg Municipality Integrated Development Plan: Draft 2017/18 Review. Laingsburg: Laingsburg Local Municipality.

LAINGSBURG LOCAL MUNICIPALITY 2018. Laingsburg Local Municipality Integrated Development Plan. Laingsburg: Laingsburg Local Municipality.

LAROM D, GARSTANG M, PAYNE K, RASPET R & LINDEQUE M 1997. The Journal of Experimental Biology 200, 421–431.

LI H, KUMAN K, LOTTER MG, LEADER GM and GIBBON RJ 2017. The Victoria West: earliest prepared core technology at >1Ma and implications for the cognitive evolution of early hominids. Royal Society Open Science 4: 170288 (http://dx.doi.org/10.1098/rsos.170288)

LOMBARD M, WADLEY L, DEACON J, WURZ S, PARSONS I, MOHAPI M, SWART J & MITCHELL P 2012. South African and Lesotho Stone Age sequence updated (I). The South African Archaeological Bulletin 67: 120-144.

LOOCK JC, BRYNARD HJ, HEARD RG, KITCHING JW & RUBIDGE BS 1994. The stratigraphy of the Lower Beaufort Group in an area north of Laingsburg, South Africa. Journal of African Earth Sciences 18: 185-195.

LUYT CJ, LEE-THORP JA & AVERY G 2000. New light on Middle Pleistocene west coast environments from Elandsfontein, Western Cape Province, South Africa. South African Journal of Science 96: 399-403.

MACFARLANE DM & BREDIN IP 2017. Buffer Zone Guidelines for Rivers, Wetlands and Estuaries Buffer Zone Guidelines for Rivers, Wetlands and Estuaries. WRC Report No TT 715/1/17 Water Research Commission, Pretoria.

MACRAE C 1999. Life etched in stone. Fossils of South Africa. 305 pp. The Geological Society of South Africa, Johannesburg.

MARAIS J 2004. A complete guide to the snakes of southern Africa. Struik Publishers, Cape Town.
Matthias N & Philipp D P 2018. The intricate relationship between energy transitions and regional marginalisation – insights from wind farm developments in rural Germany and Denmark. European Rural Geographies Conference 2017 - Braunschweig, Germany.
MCCARTHY T & RUBIDGE B 2005. The Story of Earth Life: A southern African perspective on a 4.6-billion-year journey. Struik. Pp 333
McCLURE A 2012. Orlight SA (Pty) Ltd - Visual Impact Assessment for the proposed development of five Solar Photovoltaic (PV) Power Plants in the Northern Cape and Western Cape Provinces. Digby Wells Environmental (Pty) Ltd, Pretoria.
MCNABB J, BINYON F & HAZELWOOD L 2004. The large cutting tools from the South African Acheulean and the question of social traditions. Current Anthropology 45: 653-677.
MEINTJES I, BOWEN P & ROOT D 2007. HIV/AIDS in the South African construction industry: Understanding the HIV/AIDS discourse for a sector-specific responce. Construction Managment and Economics, 25(3), 255-266
MILLER D 2011. Roggeveld Wind Farm: palaeontology study, 7 pp. Appendix to Archaeological, Heritage and Paleontological Specialist Report prepared by ACO Associates, St James.
MILLS G & HES L 1997. The complete book of southern African mammals. Struik Publishers, Cape Town.
MINERALS AND PETROLEUM RESOURCES DEVELOPMENT ACT 2002 (Act No. 28 of 2002), as amended.
MINTER LR, BURGER M, HARRISON JA, BRAACK HH, BISHOP PJ & KLOEPFER D (eds.) 2004. Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland. SI/MAB Series #9. Smithsonian Institution, Washington, DC.
MONADJEM A, TAYLOR PJ, COTTERILL EPD & SCHOEMAN MC 2010. Bats of southern and central Africa. Wits University Press, Johannesburg.
Moseley S & Naude-Moseley B, 2008. Getaway Guide to the Karoo, Namaqualand and Kalahari, Sunbird.
MOUTON P & LE FRAS N 2014. Ouroborus cataphractus (Boie, 1828). In BATES, M.F., BRANCH, W.R., BAUER, A.M., BURGER, M., MARAIS, J., ALEXANDER, G.J. & DE VILLIERS, M.S. 2014. Atlas and Red List of the Reptiles of South Africa. Suricata 1, South African National Biodiversity Institute.
MUCINA L & RUTHERFORD M C (eds.) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
MUCINA L & RUTHERFORD MC (editors) 2006. Vegetation map of South Africa, Lesotho and Swaziland: an illustrated guide. Strelitzia 19, South African National Biodiversity Institute, Pretoria.
Mucina L & Rutherford MC, (eds) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
MUCINA L, RUTHERFORD MC. & POWRIE IW (editors) 2005. Vegetation map of South Africa, Lesotho and Swaziland, 1:1 000 000 SCALE SHEET MAPS South African National Biodiversity Institute, Pretoria.

MURIMBIKA M 2014. Executive Summary For Phase 1 Heritage Impact Assessment Study Report: Proposed Gamma-Kappa 2nd 765kV Eskom Transmission Powerline and Substations Upgrade Development in Western Cape.

MYERS N, MITTERMEIR RA, MITTERMEIR CG, DE FONSECA GAB, & KENT J 2000. Biodiversity hotspots for conservation priorities. Nature 403, 853-858.

NAMAKWA DISTRICT MUNICIPALITY 2018. Namakwa District Municipality, Integrated Development Plan, Revision 2018/2019. Springbok: Namakwa District Municipality.

NATIONAL DEPARTMENT OF HEALTH 2015. The National Antenatal Sentinel HIV prevalence Survey, South Africa, 2013. Pretoria: National Department of Health.

NATIONAL ENVIRONMENTAL MANAGEMENT ACT 1998 (Act No. 107 of 1998), as amended.

NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999). Republic of South Africa. http://www.dac.gov.za/sites/default/files/Legislations.

NATIONAL WATER ACT 1998 (Act No. 36 of 1998), as amended

NEL JL, MURRAY KM, MAHERRY AM, PETERSEN CP, ROUX DJ, DRIVER A, HILL L, VAN DEVENTER H, FUNKE N, SWARTZ ER, SMITH-ADAO LB, MBONA N, DOWNSBOROUGH L & NIENABER S 2011. Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.

Northern Cape Province. (2014). Northern Cape Province Twenty Year Review 2014. Kimberly: Northern Cape Province.

Northern Cape Province. Department of Economic Development & Tourism. (2017). Annual Report for the year ended 31 March 2017. Kimberly: Northern Cape Province.

OBERHOLZER B 2005. Guideline for involving visual & aesthetic specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

PASSMORE NI & CARRUTHERS VC 1995. South African Frogs; a complete guide. Southern Book Publishers and Witwatersrand University Press. Johannesburg.

PAVÓN NP, HERNÁNDEZ-TREJO H & RICO-GRAY V 2000. Distribution of plant life forms along an altitudinal gradient in the semi-arid valley of Zapotitlán, Mexico. Journal of Vegetation Science 11, 39-42.

PGS HERITAGE (PTY) LTD 2018. Rondekop Wind Energy Facility (WEF) Heritage Impact Assessment.

POOL-STANVLIET R, DUFFELL-CANHAM A, PENCE G & SMART R 2017. The Western Cape Biodiversity Spatial Plan Handbook. Stellenbosch: CapeNature.

Ramjee G & Gouws E 2002. Prevalence of HIV Among Truck Drivers Visiting Sex Workers in KwaZulu-Natal, South Africa. Sexually Transmitted Diseases: Volume 29 - Issue 1, 44-49.

RAUNKIAER C 1934. The life forms of plants and statistical plant geography. Oxford University Press, Oxford.

RENEWABLE ENERGY RESEARCH LABORATORY - Department of Mechanical and Industrial Engineering. University of Massachusetts at Amherst. A White Paper on Wind Turbine Acoustic Noise. Authors: Anthony L. Rogers, Ph.D. James F. Manwell, Ph.D. Sally Wright. Amended January 2006

REPROBATE 2013, July 16. Tilting at windmills: Power politics and Wind farms in South Africa. Retrieved from Reprobate: reprobate.co.za/tilting-at-windmills-power-politics-and-wind-farms-in-south-africa/Research Chair in the Sociology of Land, Environment and Sustainable Development. Department of Sociology and Social Anthropology, Stellenbosch University. (2016, January). Cosmopolitan Karoo Sustainable Development. Retrieved from Why the Karoo: https://cosmopolitankaroo.co.za/about/why-the-karoo/

RODDISA P, CARVERA S, DALLIMERB M, NORMANA P & ZIVA G 2018. The Role of Community Acceptance in Planning Outcomes for Onshore Wind and Solar Farms: An energy justice analysis. Applied Energy 226 (2018), 353–364.

ROUSSOUW L 2007. Phase 1 Archaeological Impact Assessment and Palaeontological Impact Assessment of 30 Gravel Quarries in the R354 Between Calvinia and Sutherland, Northern Cape Province.

Roy S B, & Traiteur JJ 2010, October 19. Impacts of wind farms on surface air temperatures. Retrieved from National Academy of Sciences, 4 October 2010. Retrieved 10 March 2011. : http://www.pnas.org/content/107/42/17899?sid=47909b69-b82f-49d4-97d9-debb5d1ff65b

RUBIDGE BS (Ed.) 1995. Biostratigraphy of the Beaufort Group (Karoo Supergroup). South African Committee for Biostratigraphy, Biostratigraphic Series No. 1., 46 pp. Council for Geoscience, Pretoria.

RUTHERFORD MC & WESTFALL RH 1994. Biomes of Southern Africa. An objective characterisation. Memoirs of the Botanical Survey of South Africa 63, 1-94.

RUTHERFORD MC, MUCINA L & POWRIE LW 2006. Biomes and Bioregions of Southern Africa. In: L. Mucina and M.C. Rutherford (Eds). The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19, pp. 30-51. South African National Biodiversity Institute, Pretoria.

S GOUWS: “Concrete Towers – a business case for sustained local investment”, Concrete growth, www.slideshare.net/SantieGouws/concrete-towers-a-business-case-for-sustained-investmentrev-5

SADR K 2012. The origins and spread of dry laid stone-walled architecture in pre-colonial Southern Africa. Journal of Southern African Studies 38(2): 257-263.

SAFETECH 2018. Noise Impact Assessment: Basic Assessment for the proposed development of up to 325 mw Rondekop Wind Energy Facility located west of the R354 between Matjiesfontein and Sutherland in the Northern and Western Cape.

SAGER M 2014. Renewable Energy Vision 2030– South Africa. World Wide Fund for Nature (formerly World Wildlife Fund), South Africa.

SANS 10280/NRS 041-1:2008 - Overhead Power Lines for Conditions Prevailing in South Africa Road Safety Act (Act No. 93 of 1996)

SCHNEIDER J, MUDRA P & KOZUMPLÍKOVÁ A 2018. Public Participation in the Process of EIA Intentions of Wind Power Plants in the Czech Republic. Acta Univ. Agric. Silvic. Mendelianae Brun. Acta Univ. 2018, 66,, 171-182.

SCHWARTSZ K & GIBB A 2018. Proposed Construction of the Rondekop Wind Energy Facility near Sutherland, Northern Cape Province. SiVEST Environmental Division.

Singh Y N & Malaviya AN 1994. Long distance truck drivers in India: HIV infection and their possible role in disseminating HIV into rural areas. International Journal of STD & AIDS 5(2|), 137-138.

SKELTON P 2001. A complete guide to the freshwater fishes of southern Africa. Struik Publishers, Cape Town.
Smit D 2011. Alternative sources of energy for South Africa in various shades of green. Retrieved from University of Pretoria Features Innovation: https://www.up.ac.za/media/shared/Legacy/sitefiles/file/44/1026/2163/8121/alternativesourcesofenergyforsouthafricainvariousshadesofgreen.pdf
SMITH AB 2008. Eskom Gamma-Omega 765kV Transmission Line: Archaeological Desktop Survey.
SMITH R, RUBIDGE B & VAN DER WALT M 2012. Therapsid biodiversity patterns and Palaeoenvironments of the Karoo Basin, South Africa. Chapter 2 pp. 30-62 in Chinsamy-Turan, A. (Ed.) Forerunners of mammals. Radiation, histology, biology. xv + 330 pp. Indiana University Press, Bloomington & Indianapolis.
SMITH RMH & ALMOND JE 1998. Late Permian continental trace assemblages from the Lower Beaufort Group (Karoo Supergroup), South Africa. Abstracts, Tercera Reunión Argentina de Icnologia, Mar del Plata, 1998, p. 29.
SMITH RMH & KEYSER AW 1995a. Biostratigraphy of the Tapinocephalus Assemblage Zone. Pp. 8-12 in Rubidge, B.S. (ed.) Biostratigraphy of the Beaufort Group (Karoo Supergroup). South African Committee for Stratigraphy, Biostratigraphic Series No. 1. Council for Geoscience, Pretoria.
SMITH RMH & KEYSER AW 1995b. Biostratigraphy of the Pristerognathus Assemblage Zone. Pp. 13-17 in Rubidge, B.S. (ed.) Biostratigraphy of the Beaufort Group (Karoo Supergroup). South African Committee for Stratigraphy, Biostratigraphic Series No. 1. Council for Geoscience, Pretoria.
SNYMAN CP 1996. Geologie vir Suid-Afrika, Departement Geologie, Universiteit van Pretoria, Pretoria, Volume 1, Pp 513.
SOIL CLASSIFICATION WORKING GROUP 1991. Soil classification: a taxonomic system for South Africa. Soil and Irrigation Research Institute, Department of Agricultural Development, Pretoria.
SOUTH AFRICA - GNR.154 of January 1992: Noise control regulations in terms of section 25 of the Environment Conservation Act (ECA), 1989 (Act No. 73 of 1989)
SOUTH AFRICA - GNR.155 of 10 January 1992: Application of noise control regulations made under section 25 of the Environment Conservation Act, 1989 (Act No. 73 of 1989)
SOUTH AFRICA - SANS 10103:2008 Version 6 - The measurement and rating of environmental noise with respect to annoyance and to speech communication.
SOUTH AFRICA - SANS 10210:2004 Edition 2.2 – Calculating and predicting road traffic noise
SOUTH AFRICA - SANS 10357:2004 Version 2.1 - The calculation of sound propagation by the Concawe method
SOUTH AFRICAN GOVERNMENT 2003. White Paper on Renewable Energy. Pretoria: Government Printing Works.
SOUTH AFRICAN GOVERNMENT 2008. National Energy Act. No 34 of 2008. Pretoria: Government Printing Works.
SOUTH AFRICAN GOVERNMENT 2010a. Integrated Resource Plan 2010-2030. Pretoria: Government Printing Works.

SOUTH AFRICAN GOVERNMENT 2010b. New Growth Path Framework. Pretoria: Government Printing Works.
SOUTH AFRICAN GOVERNMENT 2012. National Infrastructure Plan. Pretoria: Government Printing Works.
STATISTICS SOUTH AFRICA 2011. Census 2011 Municipal Fact Sheet. Pretoria: Statistics South Africa.
STATISTICS SOUTH AFRICA 2018a. Mid-year population estimates 2018. Pretoria: Statistics South Africa.
STATISTICS SOUTH AFRICA 2018b. Quarterly Labour Force Survey: Quarter 2: 2018. Pretoria: Statistics South Africa.
STEAD S 2016. Environmental Impact Assessment for the Proposed Kokerboom 1 Wind Farm, Northern Cape Province, South Africa. Visual Impact Specialist Report: Visibility. Visual Resource Management (VRM) Africa, George.
STEAD S 2016. Environmental Impact Assessment for the Proposed Kokerboom 2 Wind Farm, Northern Cape Province, South Africa. Visual Impact Specialist Report: Visibility. Visual Resource Management (VRM) Africa, George.
STEAD S 2016. Environmental Impact Assessment for the Proposed Kokerboom 3 Wind Farm, Northern Cape Province, South Africa. Visual Impact Specialist Report: Visibility. Visual Resource Management (VRM) Africa, George.
Steyn HM, Bester SP, Bezuidenhout H 2013. An updated plant checklist for Tankwa Karoo National Park, South Africa, South African Journal of Botany, Volume 88, 2013, Pages 247-251, ISSN 0254-6299, https://doi.org/10.1016/j.sajb.2013.07.018.
STRAUSS M, GEORGE G, LANSDELL E, MANTELL J E, GOVENDER K, ROMO M, KELVIN E A 2018. HIV testing preferences among long distance truck drivers in Kenya: a discrete choice experiment. AIDS Care. 30(1), 72-80.
SWEDISH ENVIRONMENTAL PROTECTION AGENCY – Noise Annoyance from Wind Turbines – a Review. Authors: Eja Pedersen, Högskolan i Halmstad. August 2003.
TAKLE G, & LUNDQUIST J 2010. Wind turbines on farmland may benefit crops. Iowa: Ames Laboratory, U.S. Department of Energy. Iowa State University.
Taylor S 2014. Construction of the Loeriesfontein 2 - 140MW Wind Farm near Loeriesfontein, Northern Cape Province, South Africa: Final Environmental Management Programme (EMPr). SIVEST Environmental Division, Rivonia.
THE TECHNICAL RECOMMENDATIONS FOR HIGHWAYS (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads
THE WORLD BANK 2009. Gender in Agriculture Sourcebook. Washington: The World Bank.
THE WORLD BANK CLIMATE CHANGE Knowledge Portal available at http://sdwebx.worldbank.org/climateportal/
TOLLEY K & BURGER M 2007. Chameleons of southern Africa. Struik Publishers, Cape Town.
TREASURE KAROO ACTION GROUP WEBSITE: http://treasurethekaroo.co.za/

UNESCO. 2005. Operational Guidelines for the Implementation of the World Heritage Convention. UNESCO World Heritage Centre. Paris.

UNIVERSITY OF GRONINGEN - 11th International Meeting on Low Frequency Noise and Vibration and its Control. Do wind turbines produce significant low frequency sound levels? GP. van den Berg. September 2003.

VAN DER MERWE H 2009. Patterns of plant diversity in the Hantam-Tanqua-Roggeveld Subregion of the Succulent Karoo, South Africa. Submitted in partial fulfilment of the requirements for the degree Philosophiae Doctor in the Faculty of Natural and Agricultural Science, Department of Plant Science, University of Pretoria, Pretoria

VAN DER MERWE H, VAN ROOYEN MW & VAN ROOYEN N 2008a. Vegetation of the Hantam-Tanqua-Roggeveld subregion, South Africa. Part 1. Fynbos Biome related vegetation. Koedoe 50, 61-71.

VAN DER MERWE H, VAN ROOYEN MW & VAN ROOYEN N 2008b. Vegetation of the Hantam-Tanqua-Roggeveld subregion, South Africa. Part 2. Succulent Karoo Biome related vegetation. Koedoe 50, 160-183.

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.
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.
VAN DER WALT J 2015. Archaeological Impact Assessment Report for the Proposed Gunstfontein Wind Energy Facility, Northern Cape.

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.

VAN DER WALT M, DAY M, RUBIDGE B S, COOPER A K & NETTERBERG I 2010. Utilising GIS technology to create a biozone map for the Beaufort Group (Karoo Supergroup) of South Africa. Palaeontologia Africana, 45: 1-5.

VAN SCHALKWYK JA 2018. Phase 1 Cultural Heritage Impact Assessment: The Expansion of an Existing Borrow Pit on The Farm Tweedside 151 in The Laingsburg Local Municipality of Western Cape Province.

VAN WYK AE & SMITH GF (Eds) 2001. Regions of Floristic Endemism in Southern Africa: A review with emphasis on succulents, pp. 1-199. Umdaus Press, Pretoria.

VANCLAY F 2002. Conceptualising social impacts. Environmental Impact Assessment Review, 22, 183-211.

VANCLAY F, Esteves A M, Aucamp I & Franks D 2015. Social Impact Assessment: Guidance document. Fargo ND: International Association for Impact Assessment.

VENZO D 2013. Construction of a 140MW Wind Farm on Portion 1 and 2 of the Farm Aan De Karree Doorn Pan No. 213 near Loeriesfontein, Northern Cape Province, South Africa: Final Environmental Assessment Report. SiVEST Environmental Division, Rivonia.

VENZO D 2013. Construction of a 140MW Wind Farm on the remainder of the Farm Sous No. 226 near Loeriesfontein, Northern Cape Province, South Africa: Final Environmental Assessment Report. SiVEST Environmental Division, Rivonia.

WAGNER S, BAREIB R & GUIDATI G, Wind Turbine Noise, Springer, Berlin, 1996

Warren CR & McFadyen M 2010. Does community ownership affect public attitudes to wind energy? A case study from south-west Scotland. Land Use Policy. Volume 27, Issue 2 , 204-213.

WASIE B, TIRUNEH K, GEBEYEHU W, DESALEGN E, TADESSE F & KIROS K 2015. HIV prevalence, risk perception, and correlates of risky sexual practice among migrant workers in Northwest Ethiopia. Ethiopian Journal of Health Development Vol.29 No.2 , 90-98.

WEBLEY L 2017. Heritage Impact Assessment: Proposed Construction of the Maralla West Wind Energy Facility near Sutherland in the Northern Cape.

WESTERN CAPE GOVERNMENT 2014. Provincial Strategic Plan 2014 – 2019. Cape Town: Western Cape Government.

WITZENBERG LOCAL MUNICIPALITY 2012. Witzenberg Spatial Development Framework. Ceres: Witzenberg Local Municipality.

WITZENBERG LOCAL MUNICIPALITY 2017. Witzenberg Municipality Integrated Development Plan 2017 – 2022. Ceres: Witzenberg Local Municipality.

WONG B 2013. ocial Impact Assessment: The principles of the US and International Version, Criticisms and Social Impact Variables. Proceeding of the Global Conference on Business, Economics and Social Sciences 2013 (e-ISBN 978-967-12022-0-3) 25-26 June 2013 (pp. 137-147). Kuala Lumpur: Organized by: WorldResearchConference.com.

WORLD BANK GROUP 2016. Climate Change Action Plan 2016-2020. Washington: International Bank for Reconstruction and Development / The World Bank.

WORLD HEALTH ORGANIZATION – Guidelines for Community Noise. 1999

YATES R, MANHIRE A & PARKINGTON J 1993. Colonial era paintings in the rock art of the south-western Cape: some preliminary observations. South African Archaeological Society Goodwin Series 7:59-70.

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