Chapter 14: Conclusions and Recommendations

Contents

Tables & Figures

CHAPTER 14. CONCLUSIONS AND RECOMMENDATIONS

14.1 INTRODUCTION

This section presents the conclusion on the most significant impacts identified through the EIA process; together with the management actions required to avoid or mitigate the negative impacts, or to enhance the positive benefits.

The assessment of impacts is presented in the following sections:

- Impact on Terrestrial Flora and Fauna;
- Impact on Birds;
- Impact on Bats;
- Visual Impact;
- Noise Impact;
- Economic Impact;
- Impact on Archaeology; and
- Impact on Palaeontology.

For each of above impacts, specialist studies were conducted, the results of which are presented in Chapters 5 to 11 of the Draft and Final EIA Report.

14.2 IMPACT ON TERRESTRIAL FLORA AND FAUNA

Flora

Mucina & Rutherford classify vegetation units present within the wind farm sites as Humansdorp Shale Renosterveld (Endangered), Gamtoos Thicket (Least threatened) and Loerie Conglomerate Fynbos (Least threatened). Most of the wind farm infrastructure will occur in areas that are transformed cultivated pastures, thus minimising the overall impact to natural vegetation. Areas with an elevated vulnerability (moderate to high) include intact Humansdorp Shale Renosterveld, seeps, drainage lines and wetlands and thicket habitat on slopes. Sixteen terrestrial vegetation impacts that may occur during the construction and operational phases of the proposed project have been indentified, which can be divided into three key types of impacts, namely:

- Loss of vegetation habitat;
- Reduction or changes to ecological processes and functioning. This include temporary fragmentation of habitats, increased risk of alien invasion in drainage lines and disturbed areas, changes in natural fire regime and overall reduction of ecosystem functioning; and
- Loss of species of special concern (SSC) and SSC habitat.

Mitigation

- Protected flora or species of special concern must be removed from the development footprint to be safeguarded from destruction and relocated either to undeveloped areas or off-site in consultation with conservation authorities and relevant botanical specialists
- Permission must be obtained from the provincial authorities to destroy or remove any protected plant species as per legislation.
- A long term alien plant management plan to control these invasive species must be implemented within the designated Open Space areas.
- Appropriate measures must be implemented where infrastructure crosses drainage lines or seeps and no turbine footprints or lay down areas will be sited within recommended wetland and riparian buffers.
- Kikuyu grass must not be utilised during re-grassing of verges, turbine footprints and other landscaped areas within the site, particularly adjacent to riparian habitat.

Overall the impacts on terrestrial flora are estimated to be **negative** and of **low** significance (after mitigation).

Fauna

Five key faunal impacts have been identified and assessed, namely:

- Habitat destruction of habitat;
- Road mortalities;
- Increased poaching risk;
- Fauna harmed by fences; and
- Corridor disruptions as a result of habitat fragmentation.

The species that will be mostly affected during the construction phase of this project are those that can't vacate the affected area themselves, e.g. tortoises, burrowing reptiles and burrowing mammals. These species can suffer direct mortality during construction activities. Traffic on the access roads to and from the construction sites would most likely result in road kills, including possible amphibian migrations during rainy periods. As indicated, some species of special concern are found in the area and will be affected by this development. All amphibians are of least concern and are well protected elsewhere. The reptiles of special concern are the FitzSimons long-tailed Seps and the Elandsberg Dwarf Chameleon. Although these species are well protected elsewhere (e.g. Lady Slipper Nature Reserve), their known distribution is limited. The likelihood of them being significantly affected by the proposed development is however low. The impact on the terrestrial fauna will largely be temporary and is expected to return to its normal state after construction, other than road mortalities, the risk of which are likely to persist.

Mitigation

- Removal of animals from the affected areas before the start of site clearing and construction, and relocating these to safe areas would only be a valid mitigation option in the case of tortoises, so far as reasonable possible. All other reptile and small mammal species are extremely difficult to catch and it would be futile to attempt to relocate them. Before site clearing, affected areas should be thoroughly searched for tortoises. Tortoises found must be released in adjacent unaffected areas.
- A speed limit of 60 km/h needs to be implemented on the access roads to the site and a 40 km/h speed limit on the construction sites and for the cranes.

- Appropriate speed control measures must be implemented to keep vehicular traffic speeds to within recommended limits.
- Road design must be such that it allows free movement of fauna.
- All staff active on site must be instructed and briefed regarding the strict faunal management requirements before construction commences.
- Any fencing must be kept to minimum and recommended measures implemented to minimise risk of impacts to fauna.

All terrestrial floral and faunal impacts have been assessed and it is estimated that these can be mitigated from moderate to low impact through implementation of the recommended mitigation measures during the operational and construction phases of the proposed wind farm development.

14.3 IMPACT ON BIRDS

The main potential impacts of the project on birds are collisions with the project infrastructure, potential displacement of priority bird species and habitat loss as a result of the project. These are discussed below.

WKN-Windcurrent has commissioned a pre-construction bird monitoring programme on site since January 2011. Subsequently the "*Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa*" (Jenkins *et al* 2011) by the Endangered Wildlife Trust (EWT) and BirdLife South Africa (BLSA) was released in the public domain on 31 March 2011. The monitoring protocol used in this study was designed before the publication of the guideline document but was subsequently, after the publication of the guidelines, adapted to conform more to the published guidelines.

Collision mortality on wind turbines

The following preliminary conclusions can be drawn from the pre-construction monitoring done to date as far as potential collision of priority species with wind turbines are concerned, subject to further monitoring:

- Soaring species e.g. African Fish-Eagle, African Harrier-Hawk, African Marsh-Harrier, and Jackal Buzzard are most at risk of collisions, with the exception of Secretarybirds, which seem to fly very seldom.
- Black Harriers spend most of their flying time below rotor height, which is typical of their foraging behaviour. Southern Pale Chanting Goshawks generally fly below rotor height, which is also typical foraging behaviour.
- No clear pattern emerged for large terrestrial species. Blue Crane and Denham's Bustard flew during light and strong wind conditions, with no flights recorded in calm and moderate wind conditions. White-bellied Korhaan flew in all wind conditions, with most flights in strong wind conditions.
- Terrestrial species i.e. Blue Cranes, White-bellied Korhaan and Denham's Bustard, based purely on the number of medium altitude flights recorded, may also be at risk, but in the case of Denham's Bustard, the risk could be reduced due to the potential of displacement when the wind farm is operational.
- Collision risk is higher in summer than in winter, when passage rates are higher, largely because of an influx of migrants.

- Flight patterns of priority species at medium altitude recorded to date do not indicate any distinct flight corridors which will necessitate the relocation of any of the proposed turbine locations. This is subject to further monitoring being conducted.
- Most flights take place during light and moderate wind conditions.
- Most flights take place during north-westerly winds.
- The overall collision risk estimates per turbine per year for priority species (summer and winter data only) as a group is low.

Potential displacement of priority bird species

The following preliminary conclusions can be drawn from the pre-construction monitoring done to date:

- The survey area is particularly well suited for Denham's Bustard and White-bellied Korhaan.
- Grassland is the most important priority species habitat – it comprises 50% of the habitat in the survey area, but it contained almost 93% and 74% of birds recorded in summer and winter respectively.
- For reasons not quite clear at this stage, Blue Cranes were recorded more regularly in summer than in winter.

At this stage, it can only be speculated about the impact of potential displacement on large terrestrial birds in the study area, particularly Denham's Bustard, White-bellied Korhaan, Blue Crane and Secretarybird as this will only become apparent once the post-construction monitoring commences. If the birds are displaced, this will potentially be the most significant impact of the wind farm on the avifauna.

In addition to transect surveys and point counts, focal point monitoring of suspected nest sites of priority species was also undertaken. In the course of the monitoring, a suspected Secretarybird nest was located (33^0 55' 35.33" S; 24^0 52' 29.70" E), which is about 340 m from the nearest proposed turbine.

Habitat Loss

The scale of direct habitat loss resulting from the construction of a wind farm and associated infrastructure depends on the size of the project but, generally speaking, is likely to be small per turbine base. Typically, actual habitat loss amounts to 2–5% of the total development area. Direct habitat loss is not regarded as a major impact on avifauna compared to the potential impact of collisions with the turbines and, in particular, potential displacement due to disturbance.

The infrastructure footprint must be restricted to the minimum, in accordance with the recommendations of the ecological specialist study.

Assessment rating

As far as collision mortality is concerned, it is predicted that the project will have a negative impact of **Low** significance (with mitigation). This will have to be verified by post-construction monitoring. It can be stated with confidence that wind farms generally have a lower collision mortality impact than power lines, which has proven to be a major cause of significant unnatural mortality. Birds generally have a high avoidance rate for wind turbines.

As far as displacement of birds is concerned, no firm conclusions can be drawn without actual post construction monitoring. Priority species likely to be affected include Blue Cranes, Secretarybirds and korhaans. It is predicted that the project will have a negative impact of **Low to Medium** significance (with mitigation), depending on whether habituation takes place, or off-set compensation is implemented.

Mitigation

- Post-construction monitoring should be implemented to assess the impact of displacement, particularly on priority species. Initially, a 12-month period of post-construction monitoring should be implemented, using the same protocol as is currently implemented. Thereafter, the need for further monitoring will be informed by the results of the initial 12-month period;

- The breeding activity of the pair of Secretarybirds at the site must be carefully monitored. If the birds actually commence with breeding at the nest site, their nesting activity must continue to be monitored throughout 2011. In the unlikely case of them re-using the nest in 2012, appropriate mitigation must be agreed upon between the avian specialist and the project proponent to ensure that the birds are not disturbed during the critical nesting period of August to October.

- Should the results of the post-construction monitoring indicate significant displacement of priority species, appropriate offset compensation should be negotiated with developer to compensate for the loss of priority species habitat. Another mitigation measure is to halt operation during peak flight periods, or reducing rotor speed to reduce the risk of mortality.

- During the construction period, activity should be restricted to the construction footprint itself. Access to the rest of the properties must be strictly controlled to prevent unnecessary disturbance of birds.

This report should be seen as work in progress since full results of the pre-construction monitoring programme will only become available later in 2011, when the spring monitoring has been completed. The final results of the current baseline monitoring will then be available to feed into the final lay-out of the turbines.

14.4 IMPACT ON BATS

Bats play important functional roles as insect predators, pollinators and seed dispersers. They are sensitive to changes in mortality rates and their populations tend to recover slowly from declines. Bats can be classified into three broad functional groups on the basis of their wing morphology and echolocation call structure. Of these groups, open-air foragers, bats that have a wing design and echolocation call adapted to flying fast, high above the vegetation, are mostly at risk from wind turbine developments.

The Ubuntu Wind Energy Project falls within the distributional ranges of 13 species that have been recorded in the area. Open-air foragers, who could forage up to 500 m above ground, are most likely to be negatively impacted upon by the turning turbine blades, because the blades will be within the range of their foraging altitude. Species that migrate over the proposed development site will be further at risk, regardless of their foraging behaviour.

The most important aspect of the project that would affect bats adversely are the wind turbines themselves, and in particular, the operational turning blades. The main direct impacts related to the proposed development are:

- Loss of foraging habitat;
- Direct collisions with the rotating turbine blades; and
- Fatalities from barotraumas (i.e. effect of a change in air pressure caused by the rotation of the wind turbine blades on the internal organs of the bats, such as lungs).

There is furthermore a cumulative impact related to the density of wind farms in the Jeffrey's Bay/Humansdorp vicinity.

The site was visited during January and May 2011. Except for a few buildings, which at the time of the site visits had no indication of bat roosts, the proposed site does not contain habitat that is attractive to bats. It must be noted though that areas bordering the proposed development have habitat that is attractive to bats, such as open water bodies and the overhanging cliffs of the Kabeljous valley.

WKN-Windcurrent has commenced with a bat monitoring programme on site from 19 May 2011. The monitoring is informed by "*The South African Good Practice Guidelines for Surveying Bats in Wind Farm Development (*Sowler and Stoffberg, 2011)". During May three Anabat bat detecting recorders were installed on site. The monitoring data for May and June have been included in the bat specialist report included as Chapter 7 of the DEIA. Limited numbers of *Neoromicia capensis, Miniopterus natalensi* (Near Threatened), *Myotis tricolor* (Near-threatened in SA), *Taphozous mauritianus, Tadarida aegyptiaca* were recorded on site. Of these species, *Tadarida aegyptiaca and Taphozous mauritianus* are open air foragers. It is therefore expected that they will be negatively impacted upon by the wind turbine development.

The current turbine layouts have been informed by recommendations from the bat specialist working on this project. Therefore buffer zones have been incorporated in the layout to exclude areas that might have bat activity, such as open water bodies and derelict buildings.

If data collected up to now is taken into account, the impact of the wind turbines on bats at the Ubuntu Wind Energy Project is predicted to be of **low** significance with mitigation. Confidence levels are medium, as only two months of monitoring data have been incorporated, but the report will be updated with additional information from the forthcoming monitoring results.

Mitigation

- Bat monitoring to continue and include spring and Summer, as well as more extensive Autumn monitoring;
- Post-construction monitoring should be implemented;
- If further monitoring data confirms **low bat activity**, the main mitigation proposed is to completely seal off roofs of new buildings within the study area, and those of existing buildings that do not have any bats roosting in them at present within the study area, so as to prevent bats from moving in, thus making them more prone to coming into contact with the turbines in the surrounding area; If a high number of bats are recorded during the following ten months monitoring, bat roost sites could be established (e.g. roost boxes) as a trade-off to offset potential mortalities during turbine operation;
- If a high number of bats are recorded during the following ten months monitoring, bat roost sites could be established (e.g. roost boxes) as a trade-off to offset potential mortalities during turbine operation; and

- If future monitoring data shows high activity, the client together with a bat specialist should investigate further mitigation measures. This includes an increase in buffer zone distance, depending on the foraging habitat of species that will be impacted upon, and refining operational procedures of the turbines, such as to increase turbine cut-in speed. (i.e. minimum wind speed at which blades start rotating, currently 4 m/s).

14.5 VISUAL IMPACT

Visual or aesthetic impacts will occur during the construction, operational and decommissioning phases of the proposed project. The main visual impacts of the proposed BioTherm wind energy project are:

- Visual impact on the landscape;
- Visual impact on viewers;
- Intrusion of large highly visible wind turbines on the existing views of sensitive visual receptors; and
- Visual impact of night lights of a wind farm on existing nightscape.

The wind farm will be located within a mixed landscape containing agricultural and coastal resort elements. Agricultural landscapes have a low sensitivity to changes brought by wind farms, and the coastal resort landscapes in Kouga are rapidly changing as towns expand and merge.

The wind farm will be built on a highly visible plateau above the N2, and it will potentially be visible over a large region. Viewers who will be most affected by the wind farm are those living on farms surrounding the development site, especially for viewpoints west and south of the site where existing views contain relatively few man-made structures and a sense of remoteness prevails. However, there are not many sensitive viewers in these areas who will be highly exposed to the wind farm. Views from Jeffrey's Bay are unlikely to be affected severely since scenic views are normally directed at the mountains to the north or towards the sea. Protected areas in the region are generally too far from the site to be highly impacted.

Assessment rating:

The significance of the impact on the landscape character of the region is **moderate** since the impact duration is long and its extent regional, but the intensity is expected to be low.

The significance of the visual impact on sensitive viewers during the construction phase of the wind farm is **high** due to the number of sensitive viewers who will be affected. Not all of the construction phase will necessarily have a negative visual impact since the construction of wind turbines is an incredible engineering feat and viewers are likely to find it fascinating to observe.

The overall significance of the visual impact on sensitive viewers during the operational phase of the wind farm is **high** due to the regional extent, long term and severe effect of the impact. The intensity of the impact is expected to be high for a number of highly sensitive viewers (residents) who will potentially be highly exposed to the wind farm, and since there are no structures of similar size in their existing views the visual intrusion will be high.

The significance of the impact of lighting of the turbines according to aviation regulations is expected to be **moderate** for residents living in close proximity, but **low** overall since it is unlikely to contribute to light pollution and there is an existing sky-glow produced by settlements and other developments in the region which will often be a backdrop to views of the lights.

Mitigation

- Dust suppression is important as dust will raise the visibility of the development.
- New road construction should be minimised and existing roads should be used where possible.
- The contractor should maintain good housekeeping on site to avoid litter and minimise waste.
- Clearance of indigenous vegetation should be minimised and rehabilitation of cleared areas should start as soon as possible.
- Erosion risks should be assessed and minimised as erosion scarring can create areas of strong visual contrast with the surrounding vegetation, which can often be seen from long distances since they will be exposed against the hillslopes.
- Laydown areas and stockyards should be located in low visibility areas (e.g. valleys between ridges) and existing vegetation should be used to screen them from views where possible.
- Night lighting of the construction sites should be minimised within requirements of safety and efficiency.
- Ensure that there are no wind turbines closer than 500 m to a residence.
- Maintenance of the turbines is important. A spinning rotor is perceived as being useful. If a rotor is stationary when the wind is blowing it is seen as not fulfilling its purpose and a negative impression is created (Gipe 1995).
- Signs near wind turbines should be avoided unless they serve to inform the public about wind turbines and their function. Advertising billboards should be avoided.
- According to the Aviation Act, 1962, Thirteenth Amendment of the Civil Aviation Regulations, 1997: "Wind turbines shall be painted bright white to provide maximum daytime conspicuousness. The colours grey, blue and darker shades of white should be avoided altogether. If such colours have been used, the wind turbines shall be supplemented with daytime lighting, as required."
- Lighting should be designed to minimise light pollution without compromising safety. Investigate using motion sensitive lights for security lighting. Turbines are to be lit according to Civil Aviation regulations.
- An information centre (provided that it is located in a low visibility area) and trails along the wind farm can enhance the project by educating the public about the need and benefits of wind power. 'Engaging school groups can also assist the wind farm proponent, as energy education is paramount in developing good public relations over the long term. Instilling the concept of sustainability, and creating awareness of the need for wind farm developments, is an important process that can engage the entire community' (Johnston 2001). This has also been borne out by a more recent study on the effect of wind farms on tourism in which respondents said they would visit wind farms as long as there was an information centre (Frantál & Kunc 2010).
- The aviation standards have to be followed and no mitigation measures are applicable in terms of marking the turbines. Lighting of ancillary buildings and structures should be designed to minimise light pollution without compromising safety. Motion sensitive lighting can be used for security purposes.

14.6 NOISE IMPACT

The noise impact during the construction period will be localised around the turbine sites, as well as noise from construction vehicles accessing the sites. There will be a short term increase in

noise in the vicinity of the site during the construction phase as the ambient noise level will be exceeded. The impact during the construction phase will be difficult to mitigate. The significance of the construction noise impact is predicted to be **low** (without mitigation).

Noise impacts were modelled for the operational phase, taking into consideration noise sensitive areas (i.e. receptors of noise impacts, such as offices or houses). The noise modelling (using WindPro Software) is precautionary, and does not take into account the masking effect that ambient wind noise will have on the turbine noise. Ambient noise increases as the wind speed increases. Under very stable atmospheric conditions (e.g. temperature inversion or a light wind), the turbines will in all likelihood not be operational as the cut-in speed is 4 m/s. As the wind speed increases above the cut-in speed, the ambient noise will also increase. If the atmospheric conditions are such that the wind is very light (<4 m/s) at ground level but exceeds the cut-in speed at hub height, it is feasible that little ambient noise masking will occur. The critical wind speeds are thus between 4-6 m/s when there is a possibility of little masking. Above 8 m/s the wind noise starts masking the turbine noise. The noise modelling indicates that, in general, noise from the turbines will be below the SANS10103 limits for rural areas at a distance of approximately 500m from the turbines.

Provided that the mitigation measures presented bellow are implemented effectively the overall noise impact (with mitigation) is expected to be negative and of **Low** significance.

Mitigation

- All construction operations should only occur during daylight hours if possible.
- 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.
- Ensuring that construction staff is given "noise sensitivity" training.
- Ambient noise monitoring is recommended at three NSA's per year over a three year period.

14.7 ECONOMIC IMPACTS

The main impacts identified during the construction and operational phases of the project include the following:

- Impacts on land owners within the site boundaries;
- Impact on surrounding land uses;
- Impacts on tourism; and
- Impacts on commercial activity associated with expenditure linked to the construction and operation of the development.

It is highly likely that the impacts on land owners within the site boundaries would be net positive. The project would provide a welcome source of additional income while allowing existing farming activities to continue and introducing relatively minimal risks and potential negative impacts with adequate mitigation. No significant negative impacts on the agricultural activities on surrounding farms are anticipated for the same reason mentioned above.

Assessing the overall risk to tourism (i.e. considering negatives and positives) needs to be recognised as an exercise with high levels of uncertainty. Nevertheless, considered as a whole, a low to medium level of risk for tourism with mitigation is anticipated.

The project has the potential to have a highly significantly positive impact on economic activity in the local area and sub-region given the size of the new spending injection associated with it and the need for economic opportunities. Preliminary estimates indicate that a total of approximately R1.6 billion would be spent on the entire construction phase. Approximately 187 jobs of one year duration would be associated with the entire construction phase with the majority of jobs in the low and medium skill sectors as expected. It is anticipated that approximately 82 of these jobs would be allocated to workers from the Kouga Municipal area and a further 72 to workers from the rest of the Eastern Cape. Direct incomes flowing to construction workers from the Kouga Municipality area would amount to R9.7 million over the course of the project while R11.7 million would accrue to workers from the rest of the Eastern Cape. With regard to direct employment during operations, it is expected that approximately 10 direct employment opportunities would be created by the project equally spread across skill levels. Although initially high skill positions probably will have to be filled by foreign technicians (with a view to filling positions with locals over time), medium and low skill positions will offer immediate opportunities for locals and those from the region.

The overall impact on economy (with mitigation) is expected to be **negative** and of **low** significance. The impacts associated with project investment/expenditure is expected to be **positive** and of m**edium** significance given the significance of the injection relative to economy.

Mitigation

- Implement recommendations of noise, visual, ecological, bird and bat specialist studies;
- Adequate setbacks from buildings, structures and residences to be strictly enforced;
- Set targets for use of local labour and maximise opportunities for training;
- Use local sub-contractors where possible; and
- Explore ways to enhance local community benefits with a focus on broad-based BEE through mechanisms such as community shareholding schemes and trusts.

14.8 IMPACT ON ARCHAEOLOGY

Only a few weathered quartzite Middle Stone Age stone tools were observed where the pebble/cobble gravels were exposed by ploughing. These stone tools date between 30 000 and 250 000 years old. They were mainly thick, small 'informal' flakes and chunks manufactured from quartzite. All stone tools were in secondary context and not associated with any other remains. Although none was found, one would also expected to find occasional Earlier Stone Age stone tools (1,5 million – 250 000 years old) in the gravels as well.

The nearest important cultural sites to the proposed development are the Kabeljous Rock Shelters (2,5 kilometres south of the closest turbine), a large number of sites along the coastline (7 kilometres south of the closest turbine) and Sara Baartman's grave site at Hankey (8 kilometres north of the closest turbine). The turbines will have little or no visual impact on the Kabeljous Rock Shelters because the shelters face south and are situated in the kabeljous River valley along the eastern embankment. The turbines will be visible from the coastal sites and possibly also from Sara Baartman's grave.

The area investigated appears to be of low archaeological sensitivity and the impact of construction will be insignificant. The isolated distribution of the finds, their very low numbers, and the fact that all of the occurrences occur in a disturbed context (ploughed fields) mean that the archaeological remains located during the study are in secondary context and are rated as

having **low** significance. It is also highly unlikely that any archaeological heritage remains of any value will be found in situ or of any contextual value. The impact of the development on archaeological sites/materials will be limited. The area is also situated more than five kilometres from the coast which is further than the maximum distance shell middens are expected to be found inland. No such features were observed.

Mitigation

- In the unlikely event that any concentrations of archaeological material are uncovered during further development of the site, it should be reported to the Albany Museum and/or the South African Heritage Resources Agency immediately so that systematic and professional investigation/excavations can be undertaken. Sufficient time should be allowed to remove/collect such material.
- The visual effect of the development on important cultural sites in the wider area, such as Sara Baartman's grave and archaeological sites along the nearby coast must be included in the visual investigation for community/public consultation. The development will have little or no effect on the Kabeljous River Rock Shelters due to their location in the Kabeljous River valley.
- 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. It is suggested that a person be trained to be on site to report to the site manager if sites are found.

14.9 IMPACT ON PALAEONTOLOGY

The study area is largely underlain by fluvial conglomerates and minor sandstones of the Mesozoic Enon Formation (Uitenhage Group) that are locally mantled with a veneer of pebbly relictual soils of the so-called Bluewater Bay Formation (Algoa Group). Both of these rock units are very sparsely fossiliferous, so any proposed development on the coastal plateau here is likely to have very little impact on the local palaeontological heritage.

On the other hand, beds of sandy marls reported towards the base of the Enon succession near the Kabeljourivier may prove fossil-rich (*e.g.* plant compressions) and are therefore of palaeontological interest. Marine sediments – mainly dark mudrocks - of the Devonian Bokkeveld Group underlying the Kabeljousrivier valley on the western margin of the study area have yielded invertebrate fossils (notably various brachiopods) in the past, although most fossils in these rocks have probably been destroyed by tectonic deformation or weathering since the break-up of Gondwana in Cretaceous times.

The operational and decommissioning phases of the Ubuntu wind energy project are unlikely to have any significant impacts on local fossil heritage. The overall impact on palaeontology (with mitigation) is therefore expected to be negative and of **Low** significance.

Mitigation

- Any substantial fresh excavations into lower Enon or Bokkeveld Group rocks in the Kabeljousrivier Valley area should be recorded, sampled and monitored by a qualified palaeontologist during the construction phase of this development, at the expense of the

project proponent. An appropriate schedule and *modus operandi* for monitoring should be negotiated by the palaeontologist with the proponent before construction starts.

- Should substantial fossil remains be exposed at any stage during development, these should be safeguarded - *in situ*, if feasible – and recorded by the responsible Environmental Control Officer (photos, GPS readings). SAHRA should be alerted as soon as possible so that appropriate mitigation measures may be considered.

14.10 OTHER IMPACTS

Historical and cultural features

No cemeteries or burial sites have been identified or mapped on the sites proposed for the Ubuntu wind energy project. Therefore no impacts on such features are expected. Nonetheless, it is noted as a general mitigation measure that should any historical or cultural features (e.g. burial sites) be identified during the construction process, then any disturbance thereof must be avoided, and the features must be fenced off. No disturbance or development should occur in an area of 20 m from the fence around the historical or cultural features.

Shadow flicker

Shadow flicker is unlikely to be an issue since the wind farm layout has gone through a number of iterations to ensure that wind turbines are far enough away from buildings that shadow flicker will not impact on residents.

Impact on agriculture

An agricultural study for the Ubuntu site was commissioned by WKN-Windcurrent during the preparation of the Draft EIA report. Johann Lanz, a soil scientist, was contracted to investigate and report on soil conditions at the Ubuntu wind farm site. The aim of the investigation was to make an assessment of the agricultural suitability of the land that will be potentially impacted by the proposed wind farm project. The study was commissioned in response to a request from DEA to undertake a soil study after the review of the Scoping Report.

Soil conditions and agricultural capability are very uniform across the site. The soils are well drained, yellow-brown, sandy soils with abundant stone throughout the profile, and are classified as Clovelly soil form in terms of the South African soil classification system. These soils are limited by the very high stone content which serves as a mechanical limitation to cultivation. It also severely limits the total water holding capacity and nutrient holding capacity of the soils, which is further limited by the low clay content. The soils are therefore categorised as having medium agricultural potential. The land capability (which includes both soil and climate factors) is classified as non-arable, low to moderate potential grazing land. It is classified as having a grazing capacity of 6 hectares per large stock unit.

Impacts on agricultural potential and productivity were identified as:

1. Loss of agricultural land;
2. Interruption of current agricultural activities; and
3. Disturbance of run-off and resultant potential impact on erosion

The approximate loss of agricultural land was determined as only 15 hectares which represents a mere 0.36% of the agricultural land on the site. Mitigation measures were recommended for

some of the impacts. All the identified impacts on agricultural potential and productivity were considered to be of low significance.

In conclusion, the proposed wind farm seems to represent an opportunity for multiple land use on the site, with a very low level of disturbance to current or likely future agricultural productivity.

Aviation
WKN-Windcurrent obtained approval from the South African Civil Aviation Authority for the proposed Ubuntu project (see Appendix F of the Draft EIA Report).

14.11 NO GO OPTION

The "no go" option was investigated during the EIA. If the project does not proceed, the following opportunities would be lost:

- Lost income for workers from the Kouga Municipality which would probably amount to R9.7 million over the course of the project,
- Lost opportunity to establish renewable energy facilities in the Kouga region and in the promotion of renewable energy.
- Lost opportunity for increased generation capacity in the Eastern Cape, especially in the Kouga area, a region that requires increased power supply and grid stability.
- Delay in the metro reaching its target of 10% power from renewable energy.
- Lost opportunity to contribute 100 MW of additional generative capacity of green energy to the South Africa, with zero CO_2 emissions. The proposed Ubuntu project of 100 MW could offset over 200 000 tonnes of CO_2 per year, or 4 000 000 tonnes of CO_2 over the lifetime (20 years) of the project[1],[2]. Additional power to the local grid will continue to be provided via Eskom, with power generation approximately 90% coal-based with associated high levels of CO_2 emissions and water consumption.
- Lost opportunity to reduce the requirement for new long-distance high-voltage transmission lines to the Eastern Cape and thereby reduce the significant impacts of these transmission lines, especially in terms of visual impacts and impacts on birds (e.g. from collisions, causing injury or mortality). The generation of coal-based power to provide an additional 100MW in the western region of the Eastern Cape requires the transport of the power over considerable distances (e.g. approximately 1200 km from coal power stations in Mpumalanga).

Conversely, if the project does not proceed, the following negative impacts could be avoided:

- Avoid the visual impact of a maximum of 50 turbines on the local environment.
- Avoid the impact of the turbines on birds and bats. However, additional fossil-fuel based electricity could still be required to meet the projected growth of the Kouga municipal area and the Nelson Mandela Bay Metro, necessitating additional transmission lines, which would in turn escalate the risk of bird and bat mortalities.

Based on the findings of this EIA process, the "no-go" option is not recommended, for the following reasons:

[1] http://www.iea.org/co2highlights/
[2] http://www.sunearthtools.com/dp/tools/CO2-emissions-calculator.php?lang=de#txtCO2_3

- The proposed project area is an appropriate location for a wind energy project of this scale, in terms of factors such as need for the energy, suitable wind regime, and available supporting infrastructure such as grid connection and road access;
- If wind energy is not promoted in this area of the Eastern Cape, additional power may need to be transported to the region via new high-voltage transmission lines extending over more than a thousand kilometres (e.g. from coal-power stations in Mpumalanga). These power lines would have significant environmental impacts (e.g. visual impacts and impacts on birds).
- With mitigation applied effectively, the predicted negative impacts of the project are mostly of **Low** to **Medium** significance. The only exception is the visual impacts of the turbines, which are predicted to be of **High** significance (negative), given the vertical scale of the project. However, the impact could be perceived as a positive visual impact as the project represents a move towards renewable energy, which is a strategic priority for South Africa and the Western Cape Province.
- The impact of the wind turbines on bats is predicted to be of **Medium** significance (with mitigation). Monitoring is essential to building a better understanding and to manage these impacts. WKN-Windcurrent has started with a pre-construction bat monitoring programme on site and is committed to continue this programme to obtain at least one full year of pre-construction bat monitoring data.
- WKN-Windcurrent has commenced with a pre-construction bird monitoring programme on site in accordance with the "Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa", which was released by the Endangered Wildlife Trust and Birdlife South Africa in April 2011. WKN-Windcurrent supports establishing a public reporting process.

14.12 CONSIDERATION OF ALTERNATIVES

During the pre-feasibility for the project, WKN-Windcurrent reviewed a range of potential sites in the Kouga Region. Based on the review of various factors, the Ubuntu site near Jeffrey's Bay was selected to be taken forward in this EIA. Following site selection WKN-Windcurrent moved forward towards a feasibility study. An environmental screening study for the Ubuntu site was undertaken by the CSIR in November 2009. Based on this preliminary screening, it was concluded that there were no fatal flaws identified from an environmental perspective that would necessitate termination of the project at this stage, provided that the exclusion criteria are reviewed in more detail as part of the forthcoming planning in the EIA phase.

Apart from the "no-go" alternative, various other types of alternatives are considered in this EIA. These are described in Chapter 4 of this EIA Report, with the main alternatives being:

- **Land use alternatives** – The physical footprint of the turbines is very limited. Turbines will be supported on foundations dimensioned to the geotechnical properties, for example reinforced concrete spread foundations of approximately 20 m by 20 m and 3 m in depth. The farm covers approximately 1138 hectares. After construction, the turbine mast footprints will cover approximately 0.09 % of the total area. Current cattle farming activities would continue beneath and around the turbines.
- **Technology alternatives** – Options such as vertical axis technology for wind turbines were considered at a conceptual level, and found to be unsuitable for the proposed project.
- **Turbine scale and layout alternatives** – Different scales of turbines and different turbine technology providers were considered by WKN-Windcurrent. When considering alternative suppliers, key factors were availability of turbines on the international market,

suitable to the South African wind climate, and service levels and experience in South Africa. Currently WKN-Windcurrent has selected the alternative turbine suppliers and sizes listed below for the proposed Ubuntu wind energy project. The selection of the turbine providers might however still change according to market and price variables. WKN-Windcurrent has prepared three alternative layouts based on these alternative suppliers and turbine sizes.

- Vestas V90 (2 MW) – will comprise 50 turbines (see layout in Chapter 4; Figure 4.7);
- Vestas V112 (3 MW) – will comprise 33 turbines (see layout in Chapter 4; Figure 4.8); and
- Nordex N100 (2.5 MW) – will comprise 40 turbines (see layout in Chapter 4; Figure 4.9).

In addition to the three potential turbine layouts listed above WKN-Windcurrent is also proposing four additional turbine locations. These alternative turbine locations will be used should individual turbine locations of the current proposed locations not be favourable from an environmental perspective.

14.13 CUMULATIVE EFFECTS

In terms of cumulative effects, other wind energy EIAs are in process or have received Environmental Authorisation in the Kouga region (see Table 14.1).These projects are currently in the EIA phase, except for two of them that have received Environmental Authorisation, i.e. the Mainstream SA wind farm project between Humansdorp and Jeffrey's Bay comprising 180 MW; and the Redcap project near St Francis Bay and Oyster Bay that consists of three separate clusters of turbines with a maximum capacity of 300 MW.

The cumulative impacts of the projects listed in Table 14.1 have been considered and assessed in the specialist studies included in this Draft EIA Report. However, the specialists noted that it is impossible to predict at this stage what the cumulative impact of all the proposed wind developments will be on birds and bats, firstly because there is no baseline to measure it against, and secondly because the extent of actual impacts will only become known once a few wind farms are developed. It is imperative that pre-construction and post-construction monitoring programmes are implemented at all the proposed sites, in accordance with the *Best practice guidelines* available locally for bird and bat monitoring.

Furthermore, it needs to be understood that the existing power grid in the Kouga area can only accommodate a limited capacity for electrical transmission. Table 14.1 shows that the proposed wind energy projects total more than 700 MW additional installed capacity (including the Ubuntu project) and therefore when considering cumulative effects it needs to understood that it is not currently possible to connect all these projects to the grid.

Table 14.1: Proposed Wind Farms in the Kouga Region

Environmental Practitioner	Last document released, approval status	Applicant	Location	Number of Turbines	Capacity MW
Savannah Environmental (Pty) Ltd	Draft EIA Report	VentuSA Energy Corp (Pty) Ltd	Dieprivier Mond, 17km west of Humansdorp north of the N2	50	100
Savannah Environmental (Pty) Ltd	Background Information Document	African Clean Energy Developments (Pty) Ltd	Near Cookhouse in the Eastern Cape	Up to 50 turbines	Capacity not indicated in BID
Savannah Environmental (Pty) Ltd	Draft EIA Report	VentuSA Energy Corp (Pty) Ltd	Happy Valley, 3 km west of Humansdorp near the N2	20	40
Savannah Environmental (Pty) Ltd	Draft Scoping Report	Exxaro Resources and Watt Energy (Pty) Ltd Tsitsikamma community	The proposed site is situated approximately 30 km west of Humansdorp, south of the N2 National Road in the Tsitsikamma area	Maximum of 50	100MW
CSIR	Environmental Authorisation granted (April 2011)	Mainstream SA	Between Jeffrey's Bay and Humansdorp north of the N2	40 to 85	180
CSIR	Draft Scoping Report	Windcurrent SA	Banna Ba Pifhu, 3.5 km south of Humansdorp	14 - 25	50
Arcus Gibb http://projects.gibb.co.za/Projects	Environmental Authorisation granted (June 2011)	Redcap Invest.	Western Sector to the east of the Tsitsikamma River	50 to 150	100 to 300
			Central Sector near Oyster Bay		
			Eastern Sector north of St Francis Bay		

14.14 PERMIT AND PERMISSION REQUIREMENTS

Before clearing of the proposed site is initiated, the appropriate Environmental Authorisation must be obtained in terms of the National Environmental Management Act (NEMA) and associated 2006 NEMA Regulations. Should the project proceed, micro-siting and planning of access roads would need to be conducted.

If the project leads to the removal of protected plant or animal species, then a permit is needed from the provincial department of Economic Development and Environmental Affairs (DEDEA) for the removal and/or destruction of species protected by the Provincial Nature Conservation Ordinance of 1974. In order to obtain permission to remove or destroy species occurring under the Provincial Nature Conservation Ordinance of 1974 DEDEA must receive notification of the area(s) intended to be cleaned together with an application form.

Should any archaeological or palaeontological materials/sites be found during construction of the wind farm, a permit must be obtained from the South African Heritage Resources Agency (SAHRA) to remove such remains. Such removal should be undertaken by a professional archaeologist/palaeontologist.

14.15 OVERALL EVALUATION OF IMPACTS BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

No negative impacts have been identified that, in the opinion of the Environmental Assessment Practitioner, should be considered "fatal flaws" from an environmental perspective, and thereby necessitate substantial re-design or termination of the project.

The EIA process included a synthesized mapping of "no go" areas using environmental constraints provided by the specialist team (Figure 14.1). This mapping guided the layout of turbines and internal access roads and cabling. In this way, the environmental and social constraints of the site informed the scale and configuration of the proposed project. Through the course of the EIA process, the project layout went through several iterations after consultation with the specialists on the project team. This indicates how the EIA process has actively and effectively informed the project planning. The specialists have used the three layouts as presented in Chapter 4. They were satisfied with these layouts provided their proposed mitigation measures were implemented.

Residual impacts are those that are expected to remain once appropriate mitigation has been implemented. The main residual negative impacts of the Ubuntu Wind Energy Project are the predicted impact on birds and bats, and the visual impact.

- The impact on birds arises from the possible displacement of priority bird species during the construction and operational phases of the project. The impacts are predicted to be low to medium (after mitigation).
- Another impact is infrequent bat mortality due to collision with the wind turbine blades or barotrauma and the visual impact of the turbines on the sense of place. The impacts on bats are predicted to be of **low** significance after mitigation (**confidence level is medium** as this is based on preliminary bat monitoring data). There is a general paucity of bat data in South Africa, and therefore ongoing pre-construction monitoring of bats on site is proposed to build a better understanding

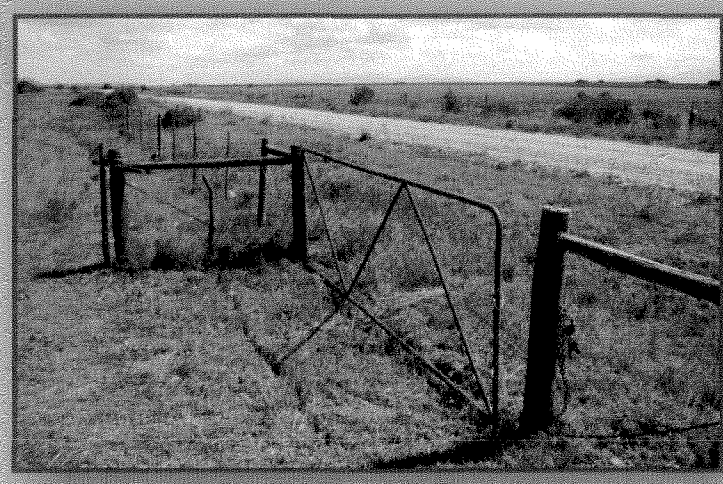
of the bat populations present and determine what management actions could be effective.

- The visual impacts of the turbines on the landscape character are predicted to be of **high** significance (negative). However, the visual impact could be perceived as a positive impact as the project represents a move towards renewable energy, which is a strategic priority for South Africa and the Eastern Cape Province. Of the several wind projects proposed in the Kouga area, the Ubuntu project is in perhaps the least sensitive location in terms of visual impacts, in that it is located at least 3km inland of the N2 national road, and well inland from the coastal towns such as St Francis Bay and Jeffreys Bay,

If the Ubuntu wind farm is established, the actual physical footprint of the wind turbines is limited to approximately 0.09 % of the total study area of 1 138 ha, and grazing and other agricultural activities can continue in parallel with the operation of the turbines. The project will have no significant impact in terms of loss of agricultural productivity.

In conclusion, given South Africa's need for additional electricity generation and efforts to decrease the country's proportional dependency on coal-based power, renewable energy has been identified as a national priority, with wind energy identified as one of the most readily available, technically viable and commercially cost-effective sources of renewable energy. Taking into consideration the findings of the EIA process for the proposed Ubuntu project near Jeffrey's Bay, it is the opinion of the Environmental Assessment Practitioner that the project benefits outweigh the costs, and that the project will make a positive contribution to steering South Africa on a pathway towards sustainable development. Provided that the specified mitigation measures are applied effectively, it is proposed that the project receives Environmental Authorization in terms of the EIA Regulations promulgated under the National Environmental Management Act (NEMA).

Chapter 15: References



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Environmental Impact Assessment for the proposed Ubuntu Wind Energy Project near Jeffrey's Bay, Eastern Cape: Draft Environmental Impact Assessment Report

APPENDICES:

Appendix A:	CVs: Paul Lochner and Minnelise Levendal
Appendix B:	DEA's Acceptance letter of the Final Scoping Report and Plan of Study for EIA
Appendix C:	Database of Interested and Affected Parties
Appendix D:	Comments and Responses Trail
Appendix E:	Copies of the comments received
Appendix F:	Letter 3 to I&APs regarding notification of submission of the Final Scoping Report
Appendix G:	Letter of approval from the South African Civil Aviation Authority

Environmental Impact Assessment for the proposed Ubuntu Wind Energy Project near Jeffrey's Bay, Eastern Cape: Draft Environmental Impact Assessment Report

APPENDIX A:

Curriculum Vitae: Paul Lochner and Minnelise Levendal

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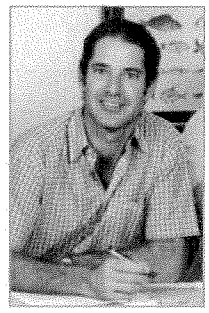

Curriculum Vitae

Paul Lochner

Name of firm	CSIR
Name of staff	Paul Andrew Lochner
Profession	Environmental Assessment and Management
Position in firm	Project Leader in Environmental Assessment & Management
Date of birth	13 June 1969
Years with firm	18 years
Nationality	South African

Biographical sketch

Paul Lochner commenced work at CSIR in 1992, after completing a degree in Civil Engineering and a Masters in Environmental Science, both at the University of Cape Town. His initial work at CSIR focused on sediment dynamics and soft engineering applications in the coastal zone, in particular, beach and dune management. He conducted several shoreline erosion analyses and prepared coastal zone management plans for beaches. He also prepared wetland management plans.

As the market for environmental assessment work grew, he led Environmental Impact Assessments (EIAs), in particular for coastal resort developments and large-scale industrial developments located on the coast; and Environmental Management Plans (EMPs), in particular for wetlands, estuaries and coastal developments. He has also been involved in researching and applying higher-level approaches to environmental assessment and management, such as Strategic Environmental Assessment (SEA). In 1998 and 1999, he coordinated the SEA research programme within the CSIR, and was a lead author of the Guideline Document

for SEA in South Africa, published jointly by CSIR and the national Department of Environmental Affairs and Tourism in February 2000.

In 1999 and 2000, he was the project manager for the legal, institutional, policy, financial and socio-economic component of the Cape Action Plan for the Environment ("CAPE"), a large-scale multi-disciplinary study to ensure the sustainable conservation of the Cape Floral Kingdom. This was funded by the Global Environmental Fund (GEF) and prepared for WWF-South Africa. The study required extensive stakeholder interaction, in particular with government institutions, leading to the development of a Strategy and Action Plan for regional conservation.

In July 2003, he was certified as an Environmental Assessment Practitioner by the Interim Certification Board for Environmental Assessment Practitioners of South Africa. In 2004 he was lead author of the *Overview of IEM* document in the updated Integrated Environmental Management (IEM) Information Series published by national Department of Environmental Affairs and Tourism (DEAT). In 2004-2005 he was project manager for an Environmental and Social Impact Assessment (ESIA) conducted for a bauxite mine and alumina refinery in the Komi Republic (Russia), prepared in accordance with World Bank and EU policies, guidelines and standards.

In 2004-2005, he was part of the CSIR team that coordinated the preparation of the series of *Guidelines for involving specialists in EIA processes* prepared for the Western Cape Department of Environmental Affairs and Development Planning (DEADP); and authored the *Guideline for Environmental Management Plans* published by the Western Cape government in 2005.

Over the past 6 years has been closely involved with several environmental studies for industrial and port-related projects in Coega Industrial Development Zone (IDZ), near Port Elizabeth. This included an EIA and EMP for a proposed aluminium smelter, and assistance with environmental permit applications for air, water and waste. He has also conducted environmental assessments for port development, manganese export and rail development at the Coega IDZ and port.

He is currently leading the EIA for a desalination plant in Namibia; an EIA for a wind energy facility near Jeffreys Bay, South Africa; and an EIA for a proposed crude oil refinery at Coega.

Education

1990	B.Sc. Civil Engineering (awarded with Honours)	University of Cape Town
1992	M. Phil. Environmental Science	University of Cape Town

Employment record

January 1992 to June 1992: Completed Masters thesis, working in conjunction with the Environmental Evaluation Unit at the University of Cape Town. The thesis investigated the potential future ecological and socio-economic impacts resulting from the closure of a large diamond mining operation, and developed actions to mitigate these impacts.

October 1992 to present: Employed by the CSIR in Stellenbosch. Involved in coastal engineering studies; and various forms of environmental assessment and management studies. (A track record of experience is listed below).

PROFESSIONAL INVOLVEMENT IN COMMITTEES:

1996/97:	Committee Member of the Western Cape Branch of the International Association for Impact Assessment (IAIA)
1997/98:	Chairperson of the Western Cape Branch of IAIA and member of the national IAIA committee
1998/99:	Committee Member of the Western Cape Branch of IAIA
1996 to present:	Chairperson of the Intaka Island/Blouvlei Environmental Committee at Century City, Cape Town (This committee is tasked with overseeing the management of a wetland in the midst of a new mixed-use urban development)

Experience record

The following table presents an abridged list of projects that Paul Lochner has been involved in, indicating his role in each project:

Completion Date	Project description	Role	Client
2011 *(in progress)*	**EIA for the proposed Ubuntu wind energy project,** Eastern Cape, South Africa	Project leader	Windcurrent SA (Pty) Ltd in a Joint Venture with WKN Windkraft Nord AG
2011 *(in progress)*	**EIA for the proposed Banna ba pifhu wind energy project,** Eastern Cape, South Africa	Project leader	Windcurrent SA (Pty) Ltd in a Joint Venture with WKN Windkraft Nord AG
2009/2010 *(in progress)*	**EIA for the proposed BioTherm wind energy project,** Overberg region, South Africa	Project leader	Biotherm South Africa (Pty) Ltd
2009/2010 *(in progress)*	**Basic Assessment (BA) for monitoring masts for the proposed Biotherm wind energy project,** Overberg region, South Africa	Project leader	Biotherm South Africa (Pty) Ltd
2009/2010 *(in progress)*	**EIA for the proposed InnoWind wind energy project,** Western Cape, South Africa	Project leader	InnoWind South Africa (Pty) Ltd
2009/2010 *(in progress)*	**BA for the proposed InnoWind test turbines and monitoring masts,** Western Cape, South Africa	Project leader	InnoWind South Africa (Pty) Ltd
2009/2010 *(in progress)*	**EIA for the proposed Electrawinds Phase 2 wind energy facility,** Coega IDZ, Eastern Cape	Project leader	Electrawinds N.V. (Belgium)

Completion Date	Project description	Role	Client
2009/2010 *(in progress)*	**BA for the national wind Atlas for South Africa**	Project leader	SANERI and SA Wind Energy Programme, Dept of Energy
2009/2010 *(in progress)*	**EIA for the proposed Gecko soda plant,** Otjivalunda and Arandis, Namibia	Project leader	Gecko, Namibia
2009	**BA for the proposed Electrawinds test turbine and monitoring mast,** Coega IDZ, Eastern Cape	Project leader	Electrawinds N.V. (Belgium)
2009	**EIA for the proposed desalination plant** at Swakopmund, Namibia	Project leader	NamWater, Namibia
2009	**EMP for the Operational Phase of the Berg River Dam**, Franschoek, South Africa	Project leader and report co-author	TCTA, South Africa
2009/2010 *(in progress)*	**EIA for the proposed crude oil refinery** at Coega, South Africa	Project leader and lead author	PetroSA, South Africa
2008	**Environmental Risk Review** for proposed LNG/CNG import to Mossel Bay, South Africa	Project leader and lead author	PetroSA, South Africa
2008	**Review of the Business Plan** for catchment management for the Berg Water Dam Project, Franschoek, South Africa	Project reviewer and co-author	TCTA, South Africa
2007 – 2008 *(in progress)*	**EIA for proposed Jacobsbaai Tortoise Reserve eco-development**, Saldanha, Western Cape	Project Leader and co-author	Jacobsbaai Tortoise Reserve (Pty) Ltd
2007 – 2008 *(in progress)*	**Independent reviewer** for the EIA proposed Amanzi lifestyle development, Port Elizabeth	Independent reviewer appointed to advise EAP	Public Process Consultants and Pam Golding
2007 – 2008 *(in progress)*	**EIA for proposed Kouga wind energy and pumped storage scheme**, Eastern Cape	Project Leader and co-author	Genesis Eco-Energy
2007	**Review of EIA for the proposed Hanglip Eco-Development**, Plettenberg Bay, Western Cape	Co-author of review of EIA, undertaken on behalf of DEADP	Dept of Environmental Affairs & Development Planning, Western Cape
2006-2007 *(in progress)*	**Environmental Impact Assessment for the proposed Coega LNG-to-Power Project** at the Port of Ngqura, Coega IDZ	Project Leader and co-author	Eskom and iGas
2006-2007 *(in progress)*	**Guideline** for Scoping, Environmental Impact Assessment and Environmental Management Plans for mining in South Africa	Project leader and co-author	Dept of Minerals and Energy (DME), South Africa
2006	**Environmental Impact Assessment (EIA)** for the extension of the Port of Ngqura, Eastern Cape	Project Leader and co-author	Transnet
2006	**Integrating Sustainability Into Strategy: Handbook** (Version 1)	Project Leader and co-author	CSIR (STEP research report)
2005	**Technology Review** for the proposed aluminium smelter at Coega, South Africa	Project Leader and lead author	Alcan, Canada
2005	**Environmental and Social Impact Assessment (ESIA) report** for the proposed alumina refinery near Sosnogorsk, Komi Republic, Russia	Project manager and co-author	Komi Aluminium, Russia, IFC, EBRD
2005	**Guideline for Environmental Management Plans (EMPs)** for the Western Cape province, including conducting a training course for provincial government	Author	Dept of Environmental Affairs & Development Planning, Western Cape
2005	**Guideline for the review of specialist studies** undertaken as part of environmental assessments	Member of Steering Committee and project facilitator	Dept of Environmental Affairs & Development Planning, Western Cape
2004	**Review of Strategic Management Plan** for Table Mountain National Park (2001-2004)	Reviewer and co-author	South African National Parks

Completion Date	Project description	Role	Client
2004	**Strategic Needs Assessment Process** for mainstreaming sustainable development into business operations	Researcher and co-author	CSIR (internal research)
2004	**Environmental Monitoring Committees** booklet in the IEM Information Series for DEAT	Contributing author	Department of Environmental Affairs and Tourism (DEAT)
2004	**Overview of Integrated Environmental Management** (IEM) booklet in the IEM Information Series	Lead author and researcher	DEAT
2003	**Environmental Screening Study** for gas power station, South Africa	Project Manager and lead author	Eskom, iGas and Shell
2003	**Environmental Management Programme** (EMP) Framework for the proposed Coega Aluminium Smelter; and assistance with preparing permit and licence applications	Project Manager and lead author	Pechiney, France
2003	**Environmental Management Plan** for the Operational Phase of the wetlands and canals at Century City, Cape Town	Project leader and lead author	Century City Property Owners' Association
2002	**Environmental Impact Assessment** for the proposed Pechiney aluminium smelter at Coega, South Africa	Project Manager and lead author	Pechiney, France
2002 - 2003	**Research project:** Ecological impact of large-scale groundwater abstraction on the Table Mountain Group aquifer	Project Manager	Water Research Commission
2002	**Environmental Management Plan** for the Eskom Wind Energy Demonstration Facility in the Western Cape	Co-author	Eskom
2001-2002	**Environmental Impact Assessment** for the Eskom Wind Energy Demonstration Facility in the Western Cape	Quality control & co-author	Eskom
2001	**Environmental Due Diligence** study of four strategic oil storage facilities in South Africa	Project manager and co-author	SFF Association
2000	**Cape Action Plan for the Environment**: a biodiversity Strategy and Action Plan for the Cape Floral Kingdom - legal, institutional, policy, financial and socio-economic component	Project manager and contributing writer	World Wide Fund for Nature (WWF): South Africa
1999	**Environmental Management Plan** for the establishment phase of the wetlands and canals at Century City, Cape Town	Project manager and lead author	Monex Development Company
1999	**Environmental Management Programme** for the Thesen Islands development, Knysna	Process design and Co-author	Chris Mulder Associates Inc; Thesen and Co.
1999	***Management Plan*** *for the coastal zone between the Eerste and Lourens River, False Bay, South Africa*	Project manager and lead author	Heartland Properties and Somchem (a Division of Denel)
1998	**Environmental Assessment** of the Mozal Matola Terminal Development proposed for the Port of Matola, Maputo, Mozambique	Project manager and author.	*SNC-Lavalin-EMS*
1998	**Strategic Environmental Assessment (SEA)** for the Somchem industrial complex at Krantzkop, South Africa	Project manager and co-author	Somchem, a Division of Denel
1997	**Strategic Environmental Assessment (SEA)** for the proposed Industrial Development Zone and Harbour at	SEA project manager and report writer	Coega IDZ Initiative Section 21 Company

Completion Date	Project description	Role	Client
	Coega, Port Elizabeth, South Africa		
1996	**Environmental Impact Assessment** of Development Scenarios for Thesen Island, Knysna, South Africa	Project manager and report writer	Thesen and Co.
1996	**Environmental Impact Assessment** of the Management Options for the Blouvlei wetlands, Cape Town	Project manager and report writer	Ilco Homes Ltd (now Monex Ltd)
1995	**Environmental Impact Assessment** for the Saldanha Steel Project, South Africa	Report writing and management of specialist studies	Saldanha Steel Project
1994	**Environmental Impact Assessment** for the upgrading of resort facilities on Frégate Island, Seychelles	Member of the project management team, co-author, process facilitator	Schneid Israelite and Partners
1994	**Environmental Impact Assessment** for exploration drilling in offshore Area 2815, Namibia	Project manager and co-author	Chevron Overseas (Namibia) Limited
1994	**Management Plan** for the Rietvlei Wetland Reserve, Cape Town	Project manager and lead author	Southern African Nature Foundation (now WWF-SA)
1993	**Beach management plan** for Stilbaai beachfront and dunes, South Africa	Project manager and lead author	Stilbaai Municipality
1993	**Beach and dune management plan for Sedgefield** for the beach east of the mouth of the Swartvlei estuary	Project manager and lead author	Nel and De Kock Planners, George
1993	**Coastal Stability analysis and beach management plan** for the Table View coastline north of Blaauwberg Road, Cape Town	Project manager and lead author	Milnerton Municipality

Publication record

A comprehensive list of publications, book chapters and contract reports is available upon request, with a summary provided below.

Publications in journals, peer reviewed conference proceedings and CSIR internal research reports:

Lochner P, Munster F and Burns M, 2006. Integrating Sustainability into Strategy (ISIS): a process to inform sustainability strategies and frameworks, *In:* IAIA South Africa Annual Conference proceedings, South Africa.

Rossouw N and Lochner P, 2006. Environmental Monitoring Committees (EMCs): purpose, function and structure. *In:* IAIA South Africa Annual Conference proceedings, South Africa.

Munster F and Lochner P, 2006, Integrating Sustainability Into Strategy: Handbook (Version 1) – describing a process to inform sustainability strategies, frameworks and reports, *CSIR Report ENV-S-I 2005-001*, ISBN 0-7988-5560-6, Stellenbosch.

Van Zyl H, de Wit M, Munster F, Lochner P, Gerber G, 2005. Economics in Environmental Impact Assessment: demystifying the

theory and practice, *In:* Conference Proceedings of the IAIA South Africa 2005 Annual National Conference. South Africa.

Lochner P, Weaver A, Gelderblom C, Peart R, Sandwith T and Fowkes S, 2003. Aligning the diverse: the development of a biodiversity conservation strategy for the Cape Floristic Region. *Biological Conservation Vol. 112, ISSN:* 0006-3207.

Lochner P, Münster F, Msutu M, Wren S, 2003. The role of stakeholder engagement in the EIA for the Coega Aluminium Smelter. *In:* Conference Proceedings of the IAIA South Africa 2003 Annual National Conference. ISBN 1-919891-04-8. South Africa.

Lochner P, Brooks W, Pesch P & Münster M. 2003, Stakeholder engagement process in the EIA of an aluminium smelter, Published in *Light Metals* 2003 (Ed. Paul Crepeau), Published by TMS (the Minerals, Metals & Materials Society), ISBN Number 0-87339-531-X, USA.

Rossouw N, Audouin M, Lochner P, Heather-Clark S and Wiseman K, 2000. Development of strategic environmental assessment in South Africa. *Impact Assessment and Project Appraisal.* Vol 18, no. 3, pp 217-223. United Kingdom.

Lochner P and Fowkes S, 2000. Building partnerships for the conservation of the biodiversity of the Cape Floral Kingdom: experiences and lessons learnt from the Cape Action Plan for the Environment. IAIA-SA Conference Proceedings 2000. South Africa.

Lochner P and Rossouw N, 1997. The development of an Environmental Management Plan for incorporating a wetland into a large mixed use development: the Century City example. IAIA-SA Conference Proceedings 1997. South Africa.

Language capability

	Speaking	*Reading*	*Writing*
English	Excellent	Excellent	Excellent
Afrikaans	Average	Average	Average

Paul Lochner
August 2011

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PO Box 320
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South Africa

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Fax: +27 21 888 2693
Email: mlevendal@csir.co.za

Curriculum Vitae

Minnelise Rouchelle-Ann Levendal

Name of firm	CSIR
Name of staff	Minnelise Levendal
Profession	Environmental Assessment and Management
Gender:	Female
Years with firm	Seven years
Nationality	South African
Languages	Afrikaans and English

CONTACT DETAILS:

Postal Address:	P O Box 320, Stellenbosch, 7599
Telephone Number:	021-888 2495/2661
Cell:	0833098159
Fax:	0865051341
e-mail:	mlevendal@csir.co.za

EDUCATION

- M.Sc. (Botany) Stellenbosch University 1998
- B.Sc. (Hons.) (Botany) University of the Western Cape 1994
- B.Sc. (Education) University of the Western Cape 1993

MEMBERSHIPS:

- International Association for Impact Assessment (IAIA), Western Cape (member of their steering committee from 2001-2003)
- IUCN Commission on Education and Communication (CEC); World Conservation Learning Network (WCLN)
- American Association for the Advancement of Science (AAAS)
- Society of Conservation Biology (SCB)

EMPLOYMENT RECORD:

- **1995:** Peninsula Technicon. Lecturer in the Horticulture Department.
- **1996:** University of the Western Cape. Lecturer in the Botany Department.
- **1999:** University of Stellenbosch. Research assistant in the Botany Department
- (3 months)
- **1999:** Bengurion University (Israel). Research assistant (Working in the Arava valley, Negev – Israel; 2 months). Research undertaken was published (see first publication in publication list)
- **1999-2004:** Assistant Director at the Department of Environmental Affairs and Development Planning (DEA&DP). Work involved assessing Environmental Impact Assessments and Environmental Management Plans; promoting environmental management and sustainable development.
- **2004 to present:** Employed by the CSIR in Stellenbosch:
- September 2004 – May 2008: Biodiversity and Ecosystems Services Group
- May 2008 to present: Environmental Management Services Group (EMS)

PROJECT EXPERIENCE RECORD:

The following table presents a list of projects undertaken at the CSIR as well as the role played in each project:

Completion Date	Project description	Role	Client
2011 *(in progress)*	EIA for the proposed Ubuntu wind energy project, Eastern Cape, South Africa	Project Manager	Windcurrent SA (Pty) Ltd in a Joint Venture with WKN Windkraft Nord AG
2011 *(in progress)*	EIA for the proposed Banna ba pifhu wind energy project, Eastern Cape, South Africa	Project Manager	Windcurrent SA (Pty) Ltd in a Joint Venture with WKN Windkraft Nord AG
2011 (in progress)	BA for a powerline near Swellendam	Project Manager	BioTherm Energy (Pty Ltd
2010 (in progress)	EIA for a proposed wind farm near Swellendam in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd
2010 (in progress)	BA for a powerline as part of the proposed wind farm project near Swellendam in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd
2010 (complete)	Basic Assessment for the erection of two wind monitoring masts near Swellendam and Bredasdorp in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd
2010 (complete)	EIA for the erection of two wind monitoring masts near Jeffrey's Bay in the Eastern Cape	Project Manager	Windcurrent (Pty Ltd

Completion Date	Project description	Role	Client
2010 (in progress)	EIA for a proposed wind farm near Jeffrey's Bay in the Eastern Cape	Project Manager	Windcurrent (Pty Ltd
2010 (complete)	Basic Assessment Process for the proposed erection of wind monitoring masts as part of the national wind atlas project	Project Manager	Department of Energy and SANERI
2010 (complete)	South Africa's Second National Communication under the United Nations Framework Convention on Climate Change	Project Manager	SANBI
2009 (complete)	Basic Assessment Report for a proposed boundary wall at the Port of Port Elizabeth, Eastern Cape	Project Manager	Transnet Ltd
2008	Developing an Invasive Alien Plant Strategy for the Wild Coast, Eastern Cape, South Africa	Co-author	Eastern Cape Parks Board
2006-2008	Monitoring and Evaluation of aspects of Biodiversity	Project Leader	Internal project awarded through the Young Researchers Fund
2006	Integrated veldfire management in South Africa. An assessment of current conditions and future approaches.	Co- author	Working on Fire
2004-2005	Biodiversity Strategy and Action Plan Wild Coast, Eastern Cape, SA	Co-author	Wilderness Foundation
2005	Western Cape State of the Environment Report: Biodiversity section. (Year One).	Co- author and Project Manager	Department of Environmental Affairs and Development Planning

PUBLICATIONS:

Bowie, M. (néé Levendal) and Ward, D. (2004). Water status of the mistletoe Plicosepalus acaciae parasitic on isolated Negev Desert populations of Acacia raddiana differing in level of mortality. Journal of Arid Environments 56: 487-508.

Wand, S.J.E., Esler, K.J. and **Bowie, M.R** (2001). Seasonal photosynthetic temperature responses and changes in ^{13}C under varying temperature regimes in leaf-succulent and drought-deciduous shrubs from the Succulent Karoo, South Africa. South African Journal of Botany 67:235-243.

Bowie, M.R., Wand, S.J.E. and Esler, K.J. (2000). Seasonal gas exchange responses under three different temperature treatments in a leaf-succulent and a drought-deciduous shrub from the Succulent Karoo. South African Journal of Botany 66:118-123.

LANGUAGES

Language	***Speaking***	***Reading***	***Writing***
English	*Good*	*Good*	*Good*
Afrikaans	*Excellent*	*Excellent*	*Excellent*

Minnelise Levendal

August 2011

APPENDIX B:

DEA's Acceptance letter of the Final Scoping Report and Plan of Study for EIA

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Private Bag X 447 · PRETORIA · 0001 · Fedsure Building · 315 Pretorius Street · PRETORIA
Tel (+ 27 12) 310 3911 · Fax (+ 2712) 322 2682

NEAS Reference: DEAT/EIA/12744/2011
DEA Reference: 12/12/20/1752
Enquiries: Linda Poll-Jonker
Telephone: 012-395-1767 **Fax:** 012-320-7539 **E-mail:** lpoll-jonker@environment.gov.za

Mr Paul Lochner
Council for Scientific and Industrial Research (CSIR)
PO Box 320
STELLENBOSCH
7599

Fax no: 021-888-2693

PER FACSIMILE / MAIL

Dear Mr Lochner

APPLICATION FOR ENVIRONMENTAL AUTHORISATION: ACCEPTANCE OF THE FINAL SCOPING REPORT AND PLAN OF STUDY (12/12/20/1752) FOR THE PROPOSED CONSTRUCTION OF THE UBUNTU WIND ENERGY PROJECT, JEFFREY'S BAY, EASTERN CAPE

The final scoping report (FSR) and plan of study for the environmental impact assessment dated April 2011 and received by the Department on 14 April 2011 refers.

The Department has evaluated the submitted FSR dated April 2011 and is satisfied that the FSR complies with the minimum requirements of the Environmental Impact Assessment (EIA) Regulations, 2006. The FSR and plan of study is hereby accepted by the Department in terms of GN R.385 (31) (1) (a) of the EIA Regulations, 2006.

You may proceed with the environmental impact assessment process in accordance with the tasks contemplated in the plan of study for environmental impact assessment as required in terms of the EIA Regulations, 2006. In addition, the impact of the wind farm on the agricultural potential of the proposed site must also be determined and reported on within the EIR. Please find attached information regarding the format of this study.

Please ensure that comments from all relevant authorities are submitted to the Department with the Final Environmental Impact Report. This includes but is not limited to the National Department of Agriculture, Forestry and Fisheries (DAFF), relevant provincial departments and the Department of Water Affairs (DWA). Proof of correspondence with the various stakeholders must be included in the Final EIR.

The applicant is hereby reminded to comply with the requirements of GN R.385 (77) with regard to the time period allowed for complying with the requirements of the Regulations, and GN R. 385 (58) and (59) with regard to the allowance of a comment period for interested and affected parties on all

reports submitted to the competent authority for decision-making. The reports referred to are listed in GN R. 385 (58) (3a-3g).

Please ensure that the Final EIR includes at least one A3 regional map of the area and the locality maps included in the Final EIR illustrate the different proposed alignments and above ground storage of fuel. The maps must be of acceptable quality and as a minimum, have the following attributes:

- Maps are relatable to one another;
- Cardinal points;
- Co-ordinates;
- Legible legends;
- Indicate alternatives;
- Latest land cover;
- Vegetation types of the study area;
- A3 size locality map; and
- A3 size layout plan

The locality map must indicate the route of the overhead line from the wind farm to the off-site Eskom substation.

The layout plan must include the final positions of the turbines as well as the roads, hard standing areas, substation and the operations and maintenance building on site.

Further, it must be reiterated that, should an application for Environmental Authorisation be subject to the provisions of Chapter II, Section 38 of the National Heritage Resources Act, Act 25 of 1999, then this Department will not be able to make nor issue a decision in terms of your application for Environmental Authorisation pending a letter from the pertinent heritage authority categorically stating that the application fulfils the requirements of the relevant heritage resources authority as described in Chapter II, Section 38 (8) of the National Heritage Resources Act, Act 25 of 1999.

Please find attached information that should be used in the compilation of the EIR. This will ensure that a decision on the application can be made speedily.

Please submit at least one electronic copy (CD/DVD) of the complete final report with the hard copy documents.

You are hereby reminded that the activity may not commence prior to an environmental authorisation being granted by the Department.

Yours sincerely

Mr Ishaam Abader
Deputy Director General: Environmental Quality and Protection
Department of Environmental Affairs
Letter signed by: Mr Dumisani Mthembu
Designation: Director: Environmental Impact Evaluation
Date: 7/07/2011

CC: Mr Allan Wolfromm (WindCurrent SA) 866 102 779

EIA INFORMATION REQUIRED FOR WIND FARM APPLICATIONS

1. General site information

The following general site information is required:

- Descriptions of all affected farm portions
- 21 digit Surveyor General codes of all affected farm portions
- Copies of deeds of all affected farm portions
- Photos of areas that give a visual perspective of all parts of the site
- Photographs from sensitive visual receptors (tourism routes, tourism facilities, etc.)
- Turbine design specifications including:
  - Nacelle height
  - Blade length
  - Turbine shaft dimensions
  - Foundation dimensions
  - Laydown area dimensions (construction period and thereafter)
  - Blade rotation direction
  - Generation capacity
- Onsite measured wind parameters (speed, variability, etc.)
- Generation capacity of the facility as a whole at delivery points

This information must be indicated on the first page of any Scoping or EIA document. It is also advised that it be double checked as there are too many mistakes in the applications that have been received that take too much time from authorities to correct.

2. Site maps and GIS information

Site maps and GIS information should include at least the following:

- All maps/information layers must also be provided in ESRI Shapefile format
- All affected farm portions must be indicated
- The exact site of the application must be indicated (the areas that will be occupied by the application)
- A status quo map/layer must be provided that includes the following:
  - Current use of land on the site including:
    - Buildings and other structures
    - Agricultural fields
    - Grazing areas
    - Natural vegetation areas (natural veld not cultivated for the preceding 10 years) with an indication of the vegetation quality as well as fine scale mapping in respect of Critical Biodiversity Areas and Ecological Support Areas
    - Critically endangered and endangered vegetation areas that occur on the site
    - Bare areas which may be susceptible to soil erosion
    - Cultural historical sites and elements
  - Rivers, streams and water courses
  - Ridgelines and 20m continuous contours with height references in the GIS database
  - Fountains, boreholes, dams (in-stream as well as off-stream) and reservoirs
  - High potential agricultural areas as defined by the Department of Agriculture, Forestry and Fisheries
  - Buffer zones (also where it is dictated by elements outside the site):

- 500m from any irrigated agricultural land
- 1km from residential areas

- Indicate isolated residential, tourism facilities on or within 1km of the site

- A slope analysis map/layer that include the following slope ranges:
  - Less than 8% slope (preferred areas for turbines and infrastructure)
  - between 8% and 12% slope (potentially sensitive to turbines and infrastructure)
  - between 12%and 14% slope (highly sensitive to turbines and infrastructure)
  - steeper than 18 % slope (unsuitable for turbines and infrastructure)
- A map/layer that indicate locations of birds and bats including roosting and foraging areas (specialist input required)
- A site development proposal map(s)/layer(s) that indicate:
  - Turbine positions
  - Foundation footprint
  - Permanent laydown area footprint
  - Construction period laydown footprint
  - Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible)
  - River, stream and water crossing of roads and cables indicating the type of bridging structures that will be used
  - Substation(s) and/or transformer(s) sites including their entire footprint.
  - Cable routes and trench dimensions (where they are not along internal roads)
  - Connection routes to the distribution/transmission network (the connection must form part of the EIA even if the construction and maintenance thereof will be done by another entity such as ESKOM)
  - Cut and fill areas at turbine sites along roads and at substation/transformer sites indicating the expected volume of each cut and fill
  - Borrow pits
  - Spoil heaps (temporary for topsoil and subsoil and permanently for excess material)
  - Buildings including accommodation

With the above information authorities will be able to assess the strategic and site impacts of the application.

3. **Regional map and GIS information**

The regional map and GIS information should include at least the following:

- All maps/information layers must also be provided in ESRI Shapefile format
- The map/layer must cover an area of 20km around the site
- Indicate the following:
  - roads including their types (tarred or gravel) and category (national, provincial, local or private)
  - Railway lines and stations
  - Industrial areas
  - Harbours and airports
  - Electricity transmission and distribution lines and substations
  - Pipelines
  - A visibility assessment of the areas from where the facility will be visible
  - Critical Biodiversity Areas and Ecological Support Areas
  - Critically Endangered and Endangered vegetation areas
  - Agricultural fields

- Irrigated areas
- An indication of new road or changes and upgrades that must be done to existing roads in order to get equipment onto the site including cut and fill areas and crossings of rivers and streams.

4. Important stakeholders

Amongst other important stakeholders, comments from the National Department of Agriculture, Forestry and Fisheries must be obtained and submitted to the Department. Request for comment must be submitted to:

Mrs. Anneliza Collett
Directorate: Land Use & Soil Management
Department of Agriculture, Forestry & Fisheries
Tel: 012 - 319 7508
Fax: 012 - 329 5938
e-mail: AnnelizaC@nda.agric.za
www.agis.agric.za

In addition, comments must be requested from Eskom (Mr Kevin Leask or Mr Ronald Marais (011) 8008111) regarding grid connectivity and capacity.

Agricultural study

- Detailed soil assessment of the site in question, incorporating a radius of 50 m surrounding the site, on a scale of 1:10 000 or finer. The soil assessment should include the following:
  - Identification of the soil forms present on site
  - The size of the area where a particular soil form is found
  - GPS readings of soil survey points
  - The depth of the soil at each survey point
  - Soil colour
  - Limiting factors
  - Clay content
  - Slope of the site
  - A detailed map indicating the locality of the soil forms within the specified area,
  - Size of the site
- Exact locality of the site
- Current activities on the site, developments, buildings
- Surrounding developments / land uses and activities in a radius of 500 m of the site
- Access routes and the condition thereof
- Current status of the land (including erosion, vegetation and a degradation assessment)
- Possible land use options for the site
- Water availability, source and quality (if available)
- Detailed descriptions of why agriculture should or should not be the land use of choice
- Impact of the change of land use on the surrounding area
- A shape file containing the soil forms and relevant attribute data as depicted on the map

Environmental Impact Assessment for the proposed Ubuntu Wind Energy Project near Jeffrey's Bay, Eastern Cape: Draft Environmental Impact Assessment Report

APPENDIX C:

Database of Interested & Affected Parties

Appendix C:
I&AP Database

Title	First Name	Last Name	Organisation	Capacity	I&AP Sector	Town	Code	Email	Let 1: Notice of Scoping	Req to Register	Comment Pre Scoping	Let 2: Draft SR	Comment Draft SR	Pub Mtg Attendance	Let 3: Final SR	Comment Pre DEIA	Let 4: DEIA	Comment DEIA	Pub Mtg DEIA	Focus Group Mtg DEIA	Let 5: FEIA	Let 6: Authorisation	Let 7: Outcome of Appeal
Mr	Godfrey	Africa	Oyster Bay Community Trust	Member	Community Trust	Jeffreys Bay	6330	ggaconsultants@hotmail.com						x	x								
Ms	Carolyn	Ah Shene-Verdoorn	Birdlife EC	Policy and Advocacy Manager	Environmental NGO	Randburg	2125	advocacy@birdlife.org.za	x			x			x								
Ms	Carolyn	Ah Shene-Verdoorn	Birdlife EC	Policy and Advocacy Manager	Environmental NGO	Randburg	2125	advocacy@birdlife.org.za				x			x								
Mr/Mrs	Dave & Carole	Barkes	Resident Kabeljouws	Homeowner	Homeowner	Humewood	6013	info@kabeljauws.co.za	x	x	x	x			x								
Mr	Chris	Barratt	St Francis Kromme Trust	Chairperson	Environmental NGO	St Francis Bay	6312	krommetrust@barratt.co.za	x	x		x			x								
Ms	Marisa	Bloem	DWAF, Port Elizabeth		Provincial Dept.WA	Port Elizabeth	6000	bloemm@dwa.gov.za	x	x		x	x		x								
Mr	John	Bouwer	Kouga Black Chamber of Commerce	President	Business	Jeffreys Bay	6330	kbcc@live.co.za/john@bouwercorp.com	x	x		x			x								
Mr	JH	Buys	Directorate Land Use and Soil Management	Director	National Dept of Agriculture	Pretoria	0001	agriland@nda.agric.za					x		x								

Title	First Name	Last Name	Organisation	Capacity	I&AP Sector	Town	Code	Email	Let 1: Notice of Scoping	Req to Register	Comment Pre Scoping	Let 2: Draft SR	Comment Draft SR	Pub Mtg Attendance	Let 3: Final SR	Comment Pre DEIA	Let 4: DEIA	Comment DEIA	Pub Mtg DEIA	Focus Group Mtg DEIA	Let 5: FEIA	Let 6: Authorisation	Let 7: Outcome of Appeal
Mr	Andre	Cilliers		Landowner	Adjacent Landowner 865	Fichardt Park	9317	andre.cilliers@yahoo.com	x	x	x	x			x								
Mr	Chris	Coombes	Crown Chickens	Landowner	Adjacent Landowner 1/854	Uitenhage	6230	ccoombes@sovfoods.co.za	x	x		x			x								
Mr	Patrick	Cull	Times Media		Media	Walmer	6065	pdhcull@iafrica.com	x	x		x			x								
Mr	Philip & Sharon	Darne	Flashcor 158 cc	Landowner	Adjacent Landowner 4/341 and Re 845	Sunridge Park	6008	philip@darne.co.za	x			x		x	x								
Mr	Jacobus Johannes	Du Plessis		Landowner	Adjacent Landowner 8/341 Mooi Draai &2/307	Port Elizabeth	6001		x			x			x								
Mr	Kenneth	Du Preez	Kouga Municipality	Engineering & Electrical	Local Authority	Humansdorp	6300		x			x			x								
Mr/Ms	Gcinile	Dumse	Dept of Agriculture, Forestry Management : Land Use and Soil Management EL	Resource Auditor	Provincial Authority	East London	5214	GcinileD@nda.agric.za	x			x			x								
Mr	Ncamile	Dweni	DWAF, Port Elizabeth	Scientist Production	Provincial Dept.WA	Port Elizabeth	6000	dwenin@dwa.gov.za	x	x	x	x			x								
Ms	Lorraine	Egan	Kouga Municipality	Conservation Division	Local Authority	Loerie	6370	eganb@eastcape.net;l	x			x			x								

Title	First Name	Last Name	Organisation	Capacity	I&AP Sector	Town	Code	Email	Let 1: Notice of Scoping	Reg to Register	Comment Pre Scoping	Let 2: Draft SR	Comment Draft SR	Pub Mtg Attendance	Let 3: Final SR	Comment Pre DEIA	Let 4: DEIA	Comment DEIA	Pub Mtg DEIA	Focus Group Mtg DEIA	Let 5: FEIA	Let 6: Authorisation	Let 7: Outcome of Appeal
								oregan@mweb.co.za															
Mr	Gerald	Ehlers	Africoast		Business	Port Elizabeth	6065	gerald@africoast.com						x	x								
Mr/Mrs	Edmund&Bridget	Elton	Private		Private	St Francis Bay	6312	eltonem@telkomsa.net	x	x		x			x								
Mr	Greg	Ferguson	Cobcreek	Manager	Business	Noorfkloof	6331	greg@cobcreek.com		x		x			x								
Mr	Daniel Theodore	Ferreira	Sonop Boerdery Trust	Re/310, 1/310	Adjacent landowner to Re/845	Patensie	6335	spitzbak@gamtoos.co.za	x			x			x								
Ms	Lizna	Fourie	DWAF, East London	Permit officer	National Dept. for NWA, 1998	East London	5200	FourieL@dwaf.gov.za	x	x	x	x			x								
Dr	Mariagrazia	Galimberti	SA Heritage Resources Agency	CEO Archaeology, Palaeontology & Meteorite Unit	SAHRA	Cape Town	8000	mgalimberti@sahra.org.za	x		x	x	x		x								
Mr	John	Geeringh	National Authority		National Authority	Pretoria	0001	jgeeringh@deat.gov.za	x			x			x								
Mr	Shaun	Geswindt	Kouga Chamber of Business	Vice Chairperson	Business	Jeffreys Bay	6330	s.geswindt@hotmail.com	x	x		x			x								
Ms	Nanna	Gouws	SA National Roads Agency Limited	Statutory Control Officer	SA National Roads Agency 10/319, 4/320, 31/321	Greenacres	6057	gouwsj@nra.co.za	x			x			x								

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Mr	Dayalan	Govender	Department of Economic Development and Environmental Affairs (DEDEA)	Deputy Director	Environmental Authority	Greenacres	6057	dayalan.Govender@deaet.ecape.gov.za	x			x			x								
Mr	Morgan	Griffiths	Wildlife & Environment Society of South Africa, EP Region	Environmental Officer	Environmental NGO	Centrahil	6006	morgan@wessaep.co.za	x			x			x								
Mr	Iqbal	Hoosen	SANRAL - Southern Region	Project Manager		Greenacres	6057	hooseng@nra.co.za	x			x			x								
	Willem	Jansen Van Vuuren	Kransplaas and the Backbone	Landowner	Adjacent Landowner 343 & 344	Humansdorp	6300		x			x			x								
Mr	Marius	Keyser	District Roads Engineer	EC Dept. of Roads and Transport	Provincial Authority	Algoa Park	6005	wilma.snyman@dot.ecprov.gov.za;marius.keyser@dot.ecprov.gov.za	x			x	x		x								
Ms	Maggie	Langlands	St Francis Kromme Trust	Renewable Energy Portfolio	Environmental NGO	St Francis Bay	6312	langlands@wirelessza.co.za		x						x							
Mr	Eddie	Leach	Eskom Southern Region	Sales & Marketing	Eskom	Beacon Bay	5241	eddie.leach@eskom.co.za	x			x			x								
Ms	Minnelise	Levendal	EIA	CSIR	Project Management	Stellenbosch	7599	mlevendal@csir.co.z	x			x			x								

Title	First Name	Last Name	Organisation	Capacity	I&AP Sector	Town	Code	Email	Let 1: Notice of Scoping	Reg to Register	Comment Pre Scoping	Let 2: Draft SR	Comment Draft SR	Pub Mtg Attendance	Let 3: Final SR	Comment Pre DEIA	Let 4: DEIA	Comment DEIA	Pub Mtg DEIA	Focus Group Mtg DEIA	Let 5: FEIA	Let 6: Authorisation	Let 7: Outcome of Appeal
								a															
Mr	Paul	Lochner	EIA Project Manager	CSIR	Project Manager	Stellenbosch	7599	plochner@csir.co.za	x			x			x								
Mr	Frank	Lotter	Vlakteplaas	Landowner	854/2/3/4/5/6/7	Jeffreys Bay	6300	frank@truewan.co.za	x			x			x								
Mr	Theo	Madatt	Kouga Municipality	Electricity Department	Local Authority	Jeffrey's Bay	6330	tmadatt@ec108.org.za	x			x			x								
Mr	MC	Marubini	Dept of Agriculture, Forestry Management : Land Use and Soil Management EL	Delegate of the Minister	National Government Agriculture	Pretoria	0001			x	x	x			x								
Mr	Donald	Mc Gillivray	Africoast	Director	Business	Port Elizabeth	6065	donaldmc@africoast.com		x		x			x								
Mr	HB	Meyer	Groen Akkers	Landowner	Adjacent landowner	Jeffreys Bay	6330	manus@agnet.co.za	x			x			x								
Mr	Revival	Mnguni	Dept of Agriculture	Land Use Advisor	National Agriculture	Pretoria	0001	RevivalM@daff.gov.za	x	x		x			x								
Ms	Leila	Mohomed-Weideman	Mainstream Renewable Power South Africa	Director	Business	Claremont	7735	leila.mahomed-weideman@mainstreamrp.com	x	x		x			x								
Ms	Lerato	Mokgwatlheng	Eskom Transmission (Thyspunt	Environmental Adviser:	Eskom	Witbank	1035	Lerato.Mokgwatlheng@eskom.c		x						x							

Title	First Name	Last Name	Organisation	Capacity	I&AP Sector	Town	Code	Email	Let 1: Notice of Scoping	Req to Register	Comment Pre Scoping	Let 2: Draft SR	Comment Draft SR	Pub Mtg Attendance	Let 3: Final SR	Comment Pre DEIA	Let 4: DEIA	Comment DEIA	Pub Mtg DEIA	Focus Group Mtg DEIA	Let 5: FEIA	Let 6: Authorisation	Let 7: Outcome of Appeal
			Transmission Lines Integration Project)					o.za															
Ms	Yvonne	Nhlapo	National Energy Regulator	PA	National Authority	Pretoria	0007	yvonne.nhlapo@nersa.org.za	x			x			x								
Mr	Hermann	Oelsner	African Wind Energy Association	President	NGO	Cape Town	7345	oelsnergrp@wcaccess.co.za	x			x			x								
Ms	Elizabeth	Pereira	Papiesfontein	Landowner	Adjacent Landowner 8/319	Jeffrey's Bay	6331	nuplant@yodamail.co.za	x	x		x			x								
Mr	Jerome Quinton	Pereira	Farm 5/320	Adjacent Landowner	Adjacent Landowner - 5/320	Pretoria	0043	jerome@evergreens.co.za	x	x		x			x								
Mr	Russell	Phillips	FAPX - Secretary Airfield Association	Paradise Beach Airfield	Aviation	Walmer	6065	russellphillips@nmmu.ac.za	x			x			x								
Mr	Mark	Ralph	Crown Chickens	EIA	Adjacent Landowner 1/854	Uitenhage	6230	MRalph@sovfoods.co.za	x	x		x			x								
Dr	Eddie	Rankwana	Kouga Municipality	Municipal Manager	Adjacent Landowner 4/346	Jeffreys Bay	6330		x			x			x								
Mr	Danie	Rautenbach	Kouga Development Agency	Planning & Development Manager	Local Authority	Jeffrey's Bay	6330	danie@kougadevelopent.co.za	x			x			x								
Mr	Kobus	Reichert	Gamtkwa First Nation		Heritage NGO	Jeffery's Bay	6330		x			x			x								

Title	First Name	Last Name	Organisation	Capacity	I&AP Sector	Town	Code	Email	Let 1: Notice of Scoping	Reg to Register	Comment Pre Scoping	Let 2: Draft SR	Comment Draft SR	Pub Mtg Attendance	Let 3: Final SR	Comment Pre DEIA	Let 4: DEIA	Comment DEIA	Pub Mtg DEIA	Focus Group Mtg DEIA	Let 5: FEIA	Let 6: Authorisation	Let 7: Outcome of Appeal
Ms	Zanele	Sishuba	DWAF, East London	Permit officer	Provincial Dept.WA	East London	5200		x	x	x	x			x								
Mr	Kaptein	Slamdeel	Demascus Farming Trust	Landowner	Adjacent Landowner Re/307	Port Elizabeth	6059		x			x			x								
Mr	Jaques	Steenkamp	Peet Steenkamp Familie Trust and Graafwater Trust	Affected Landowner - Re/845	Affected Landowner & adjacent owner 6/307, 7/307 , 830, 845, 8/307, 191, 3/191	Humansdorp	6300	njalasafaris@xsinet.co.za	x	x		x		x	x								
Ms	Lizelle	Stroh		Obstacle Specialist	Civil Aviation Authority	Halfway House	1685	strohl@caa.co.za	x			x			x								
Mr	Ockert	Strumpher	Flashcor 158 cc	Landowner	Adjacent Landowner 4/341 and Re 845	Walmer	6070	Ockie.strumpher@sappi.com	x	x	x	x			x								
Mr	Andries	Struwig	Dept of Economic Affairs Environment and Tourism	Deputy Director	Affected Organ of State	Greenacres	6057	Andries.Struwig@deaet.ecape.gov.za	x			x			x								
Ms	Carina	Strydom	Kouga Municipality	LED Manager	Local Authority	Jeffrey's Bay	6330		x			x			x								
Mr	Mark	Tanton	Red Cap	Managing Director	Business	Hout Bay	7806	mark@red-cap.co.za	x	x	x	x			x								
Mr	Vonnie	Thalwitzer	Orchard Bounty Pty Ltd	Adjacent Landowner	Adjacent Landowner - 4/319	Jeffries Bay	6330	vonnie@capefruits.co.za	x			x			x								
Mr	SJ / Hennie	Theron		Adjacent Landowner	Adjacent Landowner - RE/8/321	Jeffreys Bay	6330	heni.tron@gmail.com				x			x								

Title	First Name	Last Name	Organisation	Capacity	I&AP Sector	Town	Code	Email	Let 1: Notice of Scoping	Req to Register	Comment Pre Scoping	Let 2: Draft SR	Comment Draft SR	Pub Mtg Attendance	Let 3: Final SR	Comment Pre DEIA	Let 4: DEIA	Comment DEIA	Pub Mtg DEIA	Focus Group Mtg DEIA	Let 5: FEIA	Let 6: Authorisation	Let 7: Outcome of Appeal
Ms	Henda	Thiart	Jeffrey's Bay Rate Payers Association	Chairperson	Ratepayers Association	Jeffrey's Bay	6330	johhen@telkomsa.net	x			x			x								
Mr	David Ernest	Eldendorff	Kouga Municipality	Councillor, Ward 8	Councillor Gamtoos River	Jeffery's Bay	6330																
Ms	Mercia	Ungerer	Kouga Municipality	Former Councillor, Ward 8	Councillor Gamtoos River	Jefferey's Bay	6330		x			x			x								
Mr	S	Van Tonder	Brandkoppen	Adjacent Landowner	Adjacent Landowner - 1/186	Jeffreys Bay	6330	svt@telkomsa.net				x			x								
Ms	Nicolene	Venter	Sivest	PP Manager	Thyspunt EIA	Rivonia	2128	nicolenev@sivest.co.za					x		x								
Mr	Thinus	Visser	Applefields Enterprizes Pty Ltd	1/316	Adjacent landowner to Re/845	Jeffreys Bay	6330	thinus@grasslands.co.za	x			x			x								
Mr	Pieter	Walsh	Demascus Farming Trust	Landowner	Adjacent Landowner Re/307	Port Elizabeth	6059		x			x			x								
Mr	Dean	Wilson	Eskom Transmission (Thyspunt Transmission Lines Integration Project)	Negotiator: Land and Rights	Eskom	Witbank	1035	dean.wilson@eskom.co.za		x						x							
Mr	Alan	Wolfromm	Windcurrent	Director	Applicant	Wilderness	6560	mrwolf@mweb.co.za	x			x			x								
Mr	Ross	Zietsman	Birdlife EC	Chairperson	Environmental	Greenacres	6057	zietsmanfa	x			x			x								

Title	First Name	Last Name	Organisation	Capacity	I&AP Sector	Town	Code	Email	Let 1: Notice of Scoping	Req to Register	Comment Pre Scoping	Let 2: Draft SR	Comment Draft SR	Pub Mtg Attendance	Let 3: Final SR	Comment Pre DEIA	Let 4: DEIA	Comment DEIA	Pub Mtg DEIA	Focus Group Mtg DEIA	Let 5: FEIA	Let 6: Authorisation	Let 7: Outcome of Appeal
					NGO			mily@imagi net.co.za															
Ms/Mr	Siphesihle	Zwane	Department of Agriculture	ActingDeputy Director	Provincial Authority	Pretoria	0001		x			x			x								
	The Director		Cathcart Road View Pty Ltd	Adjacent Landowner	Adjacent Landowner 1/320	Port Elizabeth	6000		x			x			x								
Mrs	Anneliza	Collett	Dept of Agriculture Forestry and Fisheries	Directorate: Land Use and Soil Management	National Dept of Agriculture	Pretoria	0001	Anneliza@ nda.agric.z a															
Mr	Kevin	Leask	Eskom		Eskom	Johannesburg	2000																

Environmental Impact Assessment for the proposed Ubuntu Wind Energy Project near Jeffrey's Bay, Eastern Cape: Draft Environmental Impact Assessment Report

APPENDIX D:

Comments and Responses Trail

Comments received from I&APs subsequent to the submission of the Final Scoping Report

Sense of Place

	Comment	Commentator	Date	Response
	Construction of all these facilities would permanently alter the nature of this rural landscape.	*Maggie Langlands, St Francis Kromme Trust, Renewable Energy*	28/06/2011 email	*Response from CSIR:* Yes, the construction of wind farms in the Kouga region would alter the visual character of the landscape. The visibility of the wind farms from sensitive receptors (e.g. tourism locations) therefore needs to be investigated. It should also be borne in mind that the power currently utilised in the Kouga area is mostly generated from coal powerstations (e.g. in Mpumalanga) and is transported over 1200 km via high-voltage lines to the Kouga area. These powerlines themselves have significant visual impact on the landscape they traverse. Any energy production facility will have a visual influence. The production of energy from the wind farm will not emit carbon and does not need fossil fuels that have been excavated at this or other places.

Impacts on Birds

	Comment	Commentator	Date	Response
	The effect on bird species would also be significant. This particular area is the country's stronghold for Denham's Bustard, a vulnerable species, and Blue Cranes, White-bellied Korhaan, White Stork. Greater and Lesser Flamingo and Secretary bird are also found here in high densities.	*Maggie Langlands, St Francis Kromme Trust, Renewable Energy*	28/06/2011 email	Monitoring is currently taking place and will be completed in spring this year. This will determine the final lay-out of the turbines. Both densities and flight patterns of priority species are being recorded.

	Comment	Commentator	Date	Response
	The most severely threatened of South Africa's ten bustard species is the Denham's Bustard. Wind farms, like power lines, pose a serious threat to bustards (and to cranes). Internationally, bustards are at the top of the mortality lists for wind turbines. The reason has recently been identified through research, which shows that bustard visual fields have large blind sectors projecting forwards. Unlike herons, which need comprehensive forward vision for close-range stealth-foraging, bustards need wide ranging vision to detect predators and food sources at considerable distances. Blind spots are the evolutionary price they pay, and without man-made obstacles in their flight paths the price would be negligible.			There is very little published information available on the impacts of wind developments (as opposed to power lines) on cranes and bustards. The statement that bustards are at the top of mortality lists for wind turbines needs verification, this statement is definitely true for power lines, but not necessarily for bustards. Indications are that bustards might be displaced from the area by the activities of the wind farm, which amounts to loss of habitat, rather than collision mortality. The monitoring programme that is currently in place will continue after construction to assess the actual impacts on bustards (and other species).

Cumulative Impacts

	Comment	Commentator	Date	Response
	Hundreds of giant turbines, sunk into huge cubes of concrete, planted over hectare after hectare of rural landscape. There are at least ten wind farms planned in the area of the Kouga Municipality in the Eastern Cape. Eight of these facilities are within a 20km radius of one another, and four of them either border on one another or almost do (Tsitsikamma, Red Cap West, RES Oyster Bay, and Red Cap Central). Four of these proposed developments have	*Maggie Langlands, St Francis Kromme Trust, Renewable Energy*	28/06/2011 email	*Response from CSIR:* It needs to be understood that the existing power grid in the Kouga area can only accommodate an additional input of approximately 150 MW. Table 14.1 (in Chapter 14 of the DEIA Report) shows that the proposed wind energy projects total more than 700 MW additional installed capacity (including the Ubuntu project) and therefore when considering cumulative effects it needs to be understood that it is not currently possible to connect all these projects to the grid.

	Comment	Commentator	Date	Response
	already received environmental authorisation. The Jeffrey's Bay Wind Project, Red Cap's Western Cluster, Red Cap's Central Cluster, and Red Cap's Eastern Cluster will be spread over 12 000 hectares – almost 6% of the whole Kouga area.			For further detail, please refer to the discussion on cumulative effects in Chapter 14 (Conclusions and recommendations) of the Ubuntu EIA Report.

Project Need and Motivation

	Comment	Commentator	Date	Response
	The St Francis Kromme Trust supports the quest for renewable energy production for South Africa and particularly environmentally-friendly sources of renewable energy. The issues we have with wind power are its inefficiency, high cost, and major impact on the environment. An Eskom spokesperson estimates that a wind farm is doing well if it's putting power into the grid 27% of the time. The actual amount of power produced is minimal, about a quarter of the capacity claimed. And it is extremely expensive: in Britain at least twice the price of electricity from conventional power stations. In South Africa, if the 2009 REFIT tariff applies, it will be two and a half times the price. But most of all, the impact on the environment is substantial.	*Maggie Langlands, St Francis Kromme Trust, Renewable Energy*	28/06/2011 email	*Response from CSIR:* It is expected that the capacity factor will be higher than those quoted by Eskom. The cost of wind power needs to be benchmarked against coal power, given that approximately 93% of South Africa's power generation is derived from coal. In 2009, NERSA predicted that wind energy (costed at R 1.25 per kWh as per 2009 feed-in tariffs) would be cheaper than coal-based power by 2020 to 2025. However, given the recent multi-year increases in the Eskom electricity rates and reduced wind energy tariff and competitive bidding (announced by Dept of Energy on 3 August 2011), it appears that the price of wind power may be competitive with coal-based power from as early as 2015. Furthermore, if you take into account the externality costs of coal-power (such as water usage, CO_2 emissions and effects on climate change), then the "total cost" of wind power is even more

	Comment	Commentator	Date	Response
				attractive. The proposed Ubuntu project of 100 MW could offset over 200 000 tonnes of CO_2 per year, or 4 000 000 tonnes of CO_2 over the lifetime (20 years) of the project. Coal fired power stations used approximately 292 million cubic metres of water, or 1.5% of national water consumption, for electricity generation during 2005.
	We submit that, for an inefficient power source, these environmental costs are too high.	*Maggie Langlands, St Francis Kromme Trust, Renewable Energy*	28/06/2011 email	*Response from CSIR:* Comment noted.

EIA and Public Participation Process

	Comment	Commentator	Date	Response
	Can you please inform when was the Final BAR submitted to the authorities and what is the latest status re this project? It might fall within the EIA Thyspunt Tx Power Lines Project. Can I request that the following stakeholders are also registered on the project database: - Lerato Mokgwatlheng - Environmental Adviser: Eskom Transmission (Thyspunt Transmission Lines Integration Project) - Dean Wilson - Negotiator: Land and Rights - Eskom Transmission (Thyspunt Transmission Lines Integration Project)	*Nicolene Venter, Sivest, Eskom Consultant*	24/01/2011 email	*Response from CSIR:* A Final Application for wind monitoring masts for Ubuntu was submitted to the authorities in July 2010. However, the amended 2010 EIA regulations came into effect in August 2010 and wind monitoring masts no longer require environmental authorisation. The CSIR has subsequently initiated the EIA for the Wind Energy component of the project. The Final Scoping Report has been submitted to DEA and approval has been obtained for the Plan of Study for EIA. The project is now at the stage where comment is required on the Draft EIA and EMP. The I&APs as requested have been placed on the project database and will be notified of the review period for the Draft EIA and EMP.

APPENDIX E:

Copies of comments received

Copies of correspondence received from I&APs subsequent to the submission of the Final Scoping Report and Review of the Draft EIA and EMP

From: Dean Wilson [dean.wilson@eskom.co.za]
Sent: 01 April 2011 08:09 AM
To: Sandy Wren; 'Nicolene Venter'
Subject: RE: Public Process Consultants: WINDCURRENT BA PROJECT - Status

D.D Wilson
Postnet P32
Private Bag X7260
Witbank
1035

>>> "Sandy Wren" <sandy@publicprocess.co.za> 2011/03/31 09:02 AM >>>

Nicolene, please can you send me their postal addresses so that I can place them on the project database.

Sandy Wren
Public Process Consultants
PO Box 27688, Greenacres, 6057
120 Diaz Road, Adcockvale, PE, 6001
Phone: 041 374 8426
Fax: 041 373 2002
Cell: 082 4909 828
www.publicprocess.co.za

-----Original Message-----
From: Nicolene Venter [mailto:NicoleneV@sivest.co.za]
Sent: 30 March 2011 11:56 PM
To: Sandy Wren
Cc: Paul da Cruz; LeratoMokgwatlheng; Dean Wilson
Subject: RE: Public Process Consultants: WINDCURRENT BA PROJECT - Status

Dear Sandy

Thank you so much for the feedback, it is appreciated.

Can I request that the following stakeholders are also registered on the project database:
- Lerato Mokgwatlheng - Environmental Adviser: Eskom Transmission (Thyspunt Transmission Lines Integration Project)

- Dean Wilson - Negotiator: Land and Rights - Eskom Transmission (Thyspunt Transmission Lines Integration Project)

There e-mails are as above.

Kind regards

Nicolene
-----Original Message-----
From: Sandy Wren [mailto:sandy@publicprocess.co.za]
Sent: Monday, March 28, 2011 1:38 PM
To: Nicolene Venter
Subject: RE: Public Process Consultants: WINDCURRENT BA PROJECT - Status

Hi Nicolene

I am following up on the email below. Please ignore (in part) my previous email in response to your email below. The status with Ubuntu is as follows:

Basic Assessment Wind Monitoring Masts (Ubuntu/Windcurrent) A Final Application was submitted for wind monitoring masts on the property in July last year. However, when the new EIA regulations came into effect in August the need to obtain environmental authorisation for wind monitoring masts fell away and thus there has been no further correspondence on the Basic Assessment for the Wind Monitoring Masts

EIA for Wind Energy (Ubuntu/Windcurrent SA) As indicted in my email to you we have subsequently initiated the EIA for the Wind Energy component of the project. I have placed you on the project database so that you will be kept updated on the project. We will shortly be submitting the Final Scoping Report on the project. You can access project information on our website www.publicprocess.co.za

Apologies for any confusion caused from my side.

Sandy Wren
Public Process Consultants
PO Box 27688, Greenacres, 6057
120 Diaz Road, Adcockvale, PE, 6001
Phone: 041 374 8426
Fax: 041 373 2002
Cell: 082 4909 828
www.publicprocess.co.za

-----Original Message-----
From: Nicolene Venter [mailto:nicolenev@sivest.co.za]

Sent: 24 January 2011 11:32 AM
To: sandy@publicprocess.co.za
Subject: Public Process Consultants: WINDCURRENT BA PROJECT - Status

This is an enquiry e-mail via http://publicprocess.co.za from:
Nicolene Venter <nicolenev@sivest.co.za>

Hi Sandy

Can you please inform when was the Final BAR been submitted to the authorities and what is the latest status re this project.

It might fall within the EIA Thyspunt Tx Power Lines Project.

Kind regards
Nicolene

No virus found in this incoming message.
Checked by AVG - www.avg.com
Version: 8.5.449 / Virus Database: 271.1.1/3527 - Release Date: 03/24/11 19:34:00

NB: This email and its contents are subject to the Eskom Holdings Limited EMAIL LEGAL NOTICE which can be viewed at
http://www.eskom.co.za/email_legalnotice

From: Maggie Langlands [langlands@wirelessza.co.za]
Sent: 28 June 2011 03:23 PM
To: Sandy Wren
Subject: Registration as I&AP - Ubuntu
Attachments: Ubuntu Zuurbron I&AP registration.doc; Issues re Kouga wind farms.doc

Hi Sandy,
Herewith registration form and overview of issues the St Francis Kromme Trust with the Ubuntu project.
Kind regards,
Maggie Langlands
Renewable Energy Portfolio
St Francis Kromme Trust

DRAFT SCOPING REPORT COMMENT FORM

Registration and comments form for Issues & Concerns

SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
UBUNTU WIND ENERGY PROJECT

DEA Ref no: 12/12/20/1752

Windcurrent SA (Pty) in a Joint Venture with WKN Windkraft Nord AG (jointly referred to as "WKN Windcurrent", the project applicant), is proposing to construct a wind energy facility, with a maximum generation capacity of 100 MW, on the Farms Zuurbron and Vlakteplaas in the Kouga Municipal area, Eastern Cape Province

Listed Activities: **GN R387 Activity 1. (a) (i), (ii) and (l); and 10. and in GN R386 Activity 15.**

Return Completed Reply Form by to:

Public Process Consultants, PO Box 27688, Greenacres 6057

Phone: 041 – 374 8426 or Fax 041-373 2002 or Email sandy@publicprocess.co.za

Please Complete all Relevant Sections Below and Return By:

28 March 2011

Please provide your full contact details:

FIRST NAME: MAGGIE
SURNAME: LANGLANDS
ORGANISATION: ST FRANCIS KROMME TRUST
DESIGNATION: RENEWABLE ENERGY PORTFOLIO
POSTAL ADDRESS: PO BOX 293, ST FRANCIS BAY
CODE: 6312
PHONE: 042 294 1075
FAX: 086 504 1082
CELL: 082 458 8063
EMAIL: langlands@wirelessza.co.za
Email:

Please clearly state any interest you may have in the project and/or list concerns or questions you may have (use additional pages if required)

See page 2

St Francis Kromme Trust

The St Francis Kromme Trust supports the quest for renewable energy production for South Africa and particularly environmentally-friendly sources of renewable energy. The issues we have with wind power are its inefficiency, high cost, and major impact on the environment.

An Eskom spokesperson estimates that a wind farm is doing well if it's putting power into the grid 27% of the time[1]. The actual amount of power produced is minimal, about a quarter of the capacity claimed[2]. And it is extremely expensive: in Britain at least twice the price of electricity from conventional power stations. In South Africa, if the 2009 REFIT tariff applies, it will be two and a half times the price. But most of all, the impact on the environment is substantial.

Hundreds of giant turbines, sunk into huge cubes of concrete, planted over hectare after hectare of rural landscape. There are at least ten wind farms[3] planned in the area of the Kouga Municipality in the Eastern Cape. Eight of these facilities are within a 20km radius of one another, and four of them either border on one another or almost do (Tsitsikamma, Red Cap West, RES Oyster Bay, and Red Cap Central).

Four of these proposed developments have already received environmental authorisation. The Jeffreys Bay Wind Project, Red Cap's Western Cluster, Red Cap's Central Cluster, and Red Cap's Eastern Cluster will be spread over 12 000 hectares – almost 6% of the whole Kouga area.

Construction of all these facilities would not only permanently alter the nature of this rural landscape, the effect on bird species would also be significant. This particular area is the country's stronghold for Denham's Bustard, a vulnerable species, and Blue Cranes, White-bellied Korhaan, White Stork. Greater and Lesser Flamingo and Secretarybird are also found here in high densities.

The most severely threatened of South Africa's ten bustard species is the Denham's Bustard. Wind farms, like power lines, pose a serious threat to bustards (and to cranes). Internationally, bustards are at the top of the mortality lists for wind turbines. The reason has recently been identified through research, which shows that bustard visual fields have large blind sectors projecting forwards. Unlike herons, which need comprehensive forward vision for close-range stealth-foraging, bustards need wide ranging vision to detect predators and food sources at considerable distances. Blind spots are the evolutionary price they pay, and without man-made obstacles in their flight paths the price would be negligible. (*Information from Birdlife SA's Bustard Beat: research by Graham Martin and Jessica Shaw*)
We submit that, for an inefficient power source, these environmental costs are too high.

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[1] News 24, 'Eskom 'keen' on solar, wind power', www.news24.com

[2] John Etherington, 'The Wind Farm Scam: An Ecologist's Evaluation' (2009)

[3] Ubuntu, Jeffreys Bay, Happy Valley, Banna ba Pifhu, Deep River, Tsitsikamma, RES Oyster Bay, Red Cap West, Red Cap Central and Red Cap East.

APPENDIX F:

Letter 3 to I&APs regarding notification of submission of the Final Scoping Report

PO Box 27688 Greenacres 6057
120 Diaz Road Adcockvale, PE 6001
Phone 041 374 8426 Fax 041 373 2002
Email sandy@publicprocess.co.za
Ck 97/32984/23 VAT 44601 68273

Public Process Consultants

13 April 2011

«Title» «First_Name» «Last_Name»
«Organisation»
«Address_1_»
«Address_2»
«Town»
«Code»

Dear «Title» «Last_Name»

RE: Notice of Submission of the Final Scoping Report for the Proposed Ubuntu Wind Energy Project, Farm Zuurbron and Vlakteplaas, Kouga Municipality (*DEA Ref no: 12/12/20/1752*)

As a registered interested and affected party on the database for the above project you are hereby notified of the submission of the Final Scoping Report to the National Department of Environmental Affairs for their decision making (DEA reference no: *12/12/20/1752*).

Report Availability

Copies of the Draft Scoping Report are available for public viewing at the **Jeffrey's Bay** as well as **Humansdorp** Main Libraries and can be downloaded through the website, **www.publicprocess.co.za**

The next stage in the EIA process will entail the release of the Draft Environmental Impact Assessment and EMP (Draft EIA and EMP) for a 40 day review period. As a registered interested and affected party on the database for this project you will receive written notification of the review period and any public meetings scheduled to be held during this period.

We thank you for providing us with your input to date and look forward to your participation in the next stage of the process.

Yours sincerely

SANDY WREN

APPENDIX G:

Letter of approval from the South African Civil Aviation Authority

SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Windcurrent SA (Pty) Ltd

P O Box 963, George, 6530

Tel 049 1511 264 2271

30 May 2011 Our Ref: - CA15/02/Caledon

Attention: David Wolfromm

Comments on Wind Farm application received in July 2010 for the Environmental Impact Assessment process on the construction of the Proposed Development near Hankey known as Ubuntu Wind farm.

The CAA recognizes the national need for renewable energy resources and as such is supportive of the development of any such projects within its mandate to ensure aviation safety in South Africa.

In light of this, a provisional assessment of your proposal has been conducted in relation to the terms and provisions as contained in the Aviation Act (Act 13 of 2009) for the controlling and/or restricting of structures which will constitute an obstruction or potential hazard to aircraft moving in the navigable air space in the vicinity of aerodromes, along promulgated air routes and airspaces, or to aviation communication/navigation/surveillance assets, or which will adversely affect the performance of the said aviation assets or landing systems.

The Civil Aviation Authority has not identified any concerns regarding the potential negative impact of your proposal on aviation.

The Civil Aviation Authority therefore has no objections to the development of your proposal, subject to the submission of the final turbine layout, wherefore the SACAA will provide conditions of approval with regard to marking conditions as per Civil Aviation Technical Standards, Part 139.01.33.

Kindly contact the Ms Lizelle Stroh (011 545 1232 or StrohL@caa.co.za) if any further information is required.

Yours Truly,

SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Name: C.M. Newman

Date: 30/5/11

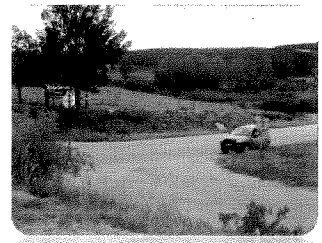
APPROVED ✓

Environmental Impact Assessment for the proposed Ubuntu Wind Energy Project near Jeffrey's Bay, Eastern Cape: Draft Environmental Impact Assessment Report

SECTION B:

Environmental Management Plan

Contents



1 PROJECT OVERVIEW

This Environmental Management Plan (EMP) is prepared as part of the requirements of the EIA Regulations promulgated under the National Environmental Management Act (Act 107 of 1998). The EMP is to be submitted to the national Department of Environmental Affairs (DEA) as part of the application for environmental authorisation for the proposed Ubuntu wind energy project commissioned by WKN-Windcurrent project near Jeffrey's Bay (DEA EIA reference no. 12/12/20/1752).

This draft EMP is made available for public comment, as part of the Draft EIA Report. Following the incorporation of comments from stakeholders, this EMP is intended as a "living" document and should continue to be updated regularly by WKN-Windcurrent.

A detailed description of the proposed Ubuntu project is contained in Chapter 2 of the EIA Report; and a description of the affected environment is provided in Chapter 3 of the EIA Report.

2 APPROACH TO PREPARING THE EMP

The Environmental Management Plan is divided into four phases of the project cycle:

- Detailed design phase, including wind monitoring micro-siting of turbines (section 4);
- Construction phase (section 5);
- Operations phase (section 6); and
- Decommissioning phase (section 7).

The EMP is based largely on the findings and recommendations of the EIA process. However, the EMP is considered a "live" document and must be updated with additional information or actions during the design, construction and operations phases.

The EMP follows an approach of identifying an over-arching goal and objectives, accompanied by management actions that are aimed at achieving these objectives. The management actions are presented in a table format in order to show the links between the goal and associated objectives, actions, responsibilities, monitoring requirements and targets. The management plans for the design, construction, operation and decommissioning phases consist of the following components:

- ***Goal***: Over-arching environmental goal proposed for the Ubuntu project near Jeffrey's Bay.
- ***Objectives***: The objectives necessary in order to meet the goal; these take into account the findings of the environmental impact assessment specialist studies.
- ***Management actions:*** The actions needed to achieve the objectives, taking into consideration factors such as responsibility, methods, frequency, resources required and prioritisation.

- ***Monitoring***: The key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting.

Criteria/targets: The criteria or targets that indicate the efficacy of the management plan. The targets should be readily measurable, understandable to the layperson, cost-effective to monitor, and meet legal requirements.

Remedial actions: Where necessary, actions to be undertaken if the targets are not being met; or if there is a catastrophic event.

Goal for environmental management:

The overall goal for environmental management for the Ubuntu project is to construct and operate the project in a manner that:

- Minimises the ecological footprint of the project on the local environment;
- Minimises impacts on birds, bats and other fauna on site;
- Facilitates harmonious co-existence between the project and other land uses in the area;
- Contributes to the environmental baseline and understanding of environmental impacts of wind farms in a South African context through providing monitoring records from the construction and operation phases, especially with regard to potential impacts on birds and bats.

3 ROLES AND RESPONSIBILITIES

For the purposes of the EMP, the generic roles that need to be defined are those of the:

- Project Developer;
- Environmental Control Officer (ECO);
- Construction Manager; and
- Operations Manager.

Note: The specific titles for these functions will vary from project to project. The intent of this section is to give a generic outline of what these roles typically require.

3.1 PROJECT DEVELOPER

The Project Developer (i.e. WKN-Windcurrent) is the 'owner' of the project and as such is responsible for ensuring that the conditions of the Environmental Authorisation issued by DEA in terms of NEMA (should the project receive such authorisation) are fully satisfied, as well as ensuring that any other necessary permits or licences are obtained and complied with. It is expected that the Project Developer will appoint the Construction Manager and the Operations Manager.

3.2 ENVIRONMENTAL CONTROL OFFICER

The Environmental Control Officer (ECO) will be responsible for overseeing the implementation of the EMP during the construction and operations phases, and for monitoring environmental impacts, record-keeping and updating of the EMP as and when necessary.

During *construction*, the Environmental Control Officer will be responsible for the following:

- Meeting on site with the Construction Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones;
- Weekly or bi-weekly (i.e. every two weeks) monitoring of site activities during construction to ensure adherence to the specifications contained in the EMP, using a monitoring checklist that is to be prepared by the ECO at the start of the construction phase;
- Preparation of the monitoring report based on the weekly or bi-weekly site visit; and
- Conducting an environmental inspection on completion of the construction period and 'signing off' the construction process with the Construction Manager.

During *operation*, the Environmental Control Officer will be responsible for:

Overseeing the implementation of the EMP for the operation phase;
Ensure that the necessary environmental monitoring takes place as specified in the EMP; and
Update the EMP and ensure that records are kept of all monitoring activities and results.

During *decommissioning*, the Environmental Control Officer will be responsible for:

- Overseeing the implementation of the EMP for the decommissioning phase; and
- Conducting an environmental inspection on completion of decommissioning and 'signing off' the site rehabilitation process.

At the time of preparing this draft EMP, the ECO appointment is still to be made by the proponent. The appointment is dependent upon the project proceeding to the construction phase.

3.3 LEAD CONTRACTOR

The lead contractor will be responsible for the following:

- Overall construction programme, project delivery and quality control for the construction for the wind project;
- Overseeing compliance with the Health, Safety and Environmental Responsibilities specific to the project management related to project construction;

- Promoting total job safety and environmental awareness by employees, contractors and sub-contractors and stress to all employees and contractors and sub-contractors the importance that the project proponent attaches to safety and the environment;
- Ensuring that safe, environmentally acceptable working methods and practices are implemented and that sufficient plant and equipment is made available properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely;
- Meeting on site with the Environmental Control Officer prior to the commencement of construction activities to confirm the construction procedure and designated activity zones;
- Ensuring that all appointed contractors and sub-contractors are aware of this Environmental Management Plan and their responsibilities in relation to the plan; and
- Ensuring that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in the Environmental Management Plan, to the satisfaction of the Environmental Control Officer.

At the time of preparing this draft EMP, the appointment of a lead contractor has not been made and will depend on the project proceeding to the construction phase.

3.4 OPERATIONS MANAGER

The Operations Manager will be responsible for the following:

- Operation of the wind energy facility;
- Required maintenance of the turbines; and
- Ensuring that the specified environmental monitoring programmes during operations are undertaken effectively and that the findings are analysed and applied.

4 MANAGEMENT PLAN FOR DESIGN PHASE

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
1. Turbine selection, design and layout to minimise impact on the visual character of the area.	Non uniform turbines, larger clusters of turbines, and haphazard layout in the landscape give rise to a strong visual impact and negative public response.	a) Turbines should have uniform design, speed, colour, height and rotor diameter. *Responsibility: Project Developer, WKN-Windcurrent*	Ensure that turbine design and layout is uniform. *Responsibility: Project Developer, WKN-Windcurrent*	Uniform and harmonious layout for the wind farm.	None identified.
2. Minimise noise emissions through selection of appropriate modern turbine technology.	Use of older technology turbines could generate higher noise levels.	a) Use modern wind turbines to ensure minimum noise emissions. *Responsibility: Project Developer, WKN-Windcurrent*	Confirm that t noise emissions for actual selected turbines are comparable to or better than examples of turbines used in noise study for the EIA. *Responsibility: Project Developer, WKN-Windcurrent*	Predicted noise from the turbines at the identified Noise Sensitive Areas to be less than the 45 dBA presented in SANS 10103:2008 for rural areas.	None identified.
4. Design of turbines and power lines to minimise risk of collisions for birds.	Turbine rotors inconspicuous to birds. Birds encouraged to perch on turbine towers. Above grounds power lines cross bird flight paths.	a) Turbine blades and towers to be white to maximize conspicuousness to flying birds. b) Plan power lines between turbines to be underground (except possibly where lines cross water courses) and minimise above-ground connection to sub-station. c) Continue with the pre-construction monitoring as agreed to with the appointed bird specialist. d) Results of the pre-construction survey to be recorded in a report. The results will determine	Review final design to confirm that turbine design colour is white.. Review the findings of the pre-construction bird survey. *Responsibility: Project Developer, WKN-Windcurrent*	Design of turbines to minimise impacts on birds.	None identified.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		the need and scope for post construction monitoring. *Responsibility: Project Developer, WKN-Windcurrent*			
5. Manage turbines to minimise the risk of collision or barotrauma for bats.	Turbines inconspicuous to bats	a) Continue with the pre-construction bat monitoring programme as agreed to with the bat specialist to better understand bat occurrences in the study area, and thereby to inform the management actions to minimise impacts on bats. *Responsibility: Project Developer, WKN-Windcurrent*	Conduct pre-construction bat monitoring to develop a baseline that can be used to inform management actions during the operations phase. *Responsibility: Project Developer, WKN-Windcurrent*	WKN-Windcurrent report on pre-construction bat monitoring at their sites over one year (four seasons) assists in developing a baseline for bats in the local area.	None identified.

5 MANAGEMENT PLAN FOR CONSTRUCTION PHASE

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
5.1 Minimising the project impact on flora and fauna (in particular designated areas for protecting ecosystem processes)					
1. Minimise loss of vegetation cover from construction of the turbines and access roads to the turbine sites	Turbine positions and design of roads are not informed by the "no-go" areas identified in the sensitivity map and leads to unnecessary clearing of natural habitat.	a) Micro-siting of footprints should avoid more sensitive vegetation as far as possible. b) Access roads to the turbines must avoid any ephemeral pans, if present. This is unlikely to be an issue, but must be considered in access road planning. The impact of access roads will be greater where they traverse habitats on exposed outcrops and small thicket clumps (microhabitats). c) River crossing and clearing of thicket should be avoided d) Crossing of riparian areas should use existing road crossings where possible *Responsibility: Construction Manager*	Ensure layout (design) of turbines and construction of the roads minimises the impact on natural habitat. Ensure that plant species of special concern (SSCs) are removed before clearing. Ensure river crossing and clearing of thicket are avoided. Ensure that crossing of riparian areas uses existing road crossings. *Responsibility: ECO*	Turbine positions and road layout is strictly in accordance with the current layouts prepared by WKN-Windcurrent which take due cognisance of the environmental constraints identified by the specialists. Removal and relocation of all SSC(species of special concern)	None identified.
2. Minimise direct loss of habitat from turbine	Construction impacts are not properly managed.	a) The construction site must be clearly demarcated prior to the commencement of	Final siting of footprints should be undertaken by the WKN-Windcurrent ECO in	In the final layout, sensitive micro-siting of the turbine	None identified.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
footprints	"No go" areas for construction are not enforced	construction. b) Contractors and construction workers must be clearly informed of the no-go areas on site (i.e. outside demarcated areas) and held accountable for any infringements that may occur. d) A suitable control measure (such as a fine system) must be implemented to discourage infringement by contractors on the no-go areas. e) Activities including but not restricted to the following must not be permitted in designated no go areas: Dumping of any material during and after construction; Turning of vehicles; or Trampling. f) Any additional project footprint (e.g. for construction and lay-down areas) should be sited in areas approved in consultation with the ECO and preferably in areas where habitat is already transformed. *Responsibility: Construction Manager*	consultation with respective specialists to minimise any unnecessary loss.	footprints lead to negligible impact on the designated conservation networks and areas.	
3. Protection of plant and animal species of special concern	Loss of species of special concern (SCC) through poor on-site management during construction.	a) Species of Special Concern (SCC) and protected plant species (identified in Table 5.4 in the EIA Report) must be removed from the sites prior to development taking place, so far as possible. A suitable timeframe must be allowed before construction commences to undertake the plant rescue and relocation. b) Relocation of SSC, where unavoidable,	If SSC have to be moved or relocated, the relevant permits must have been obtained from DEDEA, as per requirements of the Provincial Nature Conservation Ordinance of 1974.	Zero or close to zero loss of readily identifiable species of special concern on the project site species.	None identified.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		must be into adjacent areas or a suitable nursery. Plants that are not necessarily SSC but which can be used during rehabilitation should be identified and stored appropriately on-site for use after construction. *Responsibility: ECO*			
4. Remove and store all topsoil from areas to be excavated; and use this topsoil in later rehabilitation of disturbed areas, e.g. the lay-down area, construction yard, trenches for electrical cables, foundation areas, and the access roads.	Excessive and unnecessary clearing on natural habitat. Top soil is mixed with other material (e.g. rock and rubble) and cannot be replaced as part of the rehabilitation programme.	a) Demarcate the areas to be cleared at each turbine location and do not allow vehicles and construction activities to extend outside of these demarcated areas. b) Excavated topsoil (top 20 cm, if this exists) to be stockpiled in the demarcated areas. c) Excavated/disturbed areas on site and adjacent to the site (apart from on-site Borrow pits, which are subject of a separate application and approval) have topsoil replaced to a depth of at least 10 cm during the rehabilitation phase of the construction period (provided such soil is available from on-site stockpiles). This applies to the underground electrical cable route, road verges, area around turbine concrete foundation (to enable grazing to the edge of the foundation), parts of lay-down area where topsoil was disturbed, and the rehabilitation along on the edges of the access roads. *Responsibility (a) and (b): Construction Manager and contractors and sub-contractors*	Ensure that topsoil is stored as specified until replaced. Ensure that excavated / disturbed areas have topsoil replaced to a depth of at least 10 cm, (provided material is available). *Responsibility: ECO*	All topsoil is stored and replaced without loss. All topsoil is replaced in excavated / disturbed areas as part of the rehabilitation programme.	None identified.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
5. Minimise the risk of invasion by alien plant species into the disturbed areas	Alien plant species may pose a threat to the re-establishment of indigenous species.	a) A long term alien management plan to eradicate and control invasive plant species must be implemented by WKN-Windcurrent within their lease areas. b) Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but should be temporarily stored in a demarcated area (in consultation with the relevant botanical specialist). c) Cleared vegetation must be either removed from site or burned in-situ in the temporary storage area. d) Any seed bearing material should be removed from the drainage area to prevent the spread of seed. e) Chopped brushwood can be used to stabilise steep areas that may be susceptible to erosion during clearing activities. f) Kikuyu grass must NOT be utilised during redressing of verges, turbine footprints and other landscaped areas within the site. *Responsibility: Construction Manager*	An alien plant management programme has been developed, funded and implemented affectively within the WKN-Windcurrent lease area. A suitable re-vegetation or rehabilitation plan must be implemented after alien vegetation clearing. *Responsibility: ECO*	Removal of all alien species within the construction area	None identified.
6. Ensure that all disturbed areas are rehabilitated using indigenous species	Disturbed areas are not rehabilitated. Use of alien species for rehabilitation (e.g. grasses).	a) Disturbed areas will be rehabilitated with the placement of in situ material (top soil, where available) and the planting with indigenous species.	Visual check to ensure that rehabilitation has been undertaken for all accessible disturbed areas.	Disturbed areas are rehabilitated immediately after the construction phase & adequately	None identified.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		Responsibility: Construction Manager	*Responsibility: ECO*	maintained.	
7. Minimise the impact of construction on fauna on the turbine sites	Construction impacts are not properly managed.	a) Remove tortoises, mammals and amphibians from the turbine sites and new access roads before the start of site clearing construction and relocating these to a place similar to the place where it was found. *Responsibility: ECO* b) A speed limit of 60 km/h needs to be implemented on the access roads to the site and a 40 km/h speed limit on the construction sites and for the cranes. c) Professional reptile remover (with the necessary permits) should be contacted to remove dangerous reptiles (e.g. poisonous snakes) when in conflict with the workers. *Responsibility: Construction Manager*	Rescue operations have been conducted based on recommendations from ECO and Construction Manager. Monitor for injured fauna and DoR incidents *Responsibility: ECO*	Successful rescue operations being performed.	
8. Ensure that the storage and operation of construction equipment and activities of personnel are contained within the designated work areas	Dumping or damage of the environment by construction equipment outside of demarcated construction areas.	a) Before construction commences, a site map is to be prepared by the WKN-Windcurrent ECO in consultation with the Contractor, showing designated work areas, locations of temporary toilets, no-go areas, eating & cooking areas, smoking areas, concrete mixing areas (if any), fuel storage areas, vehicle routes and laydown areas. b) Before construction commences, mark the designated work areas on each site using	Construction Manager to ensure that all contractors and sub-contractors and other operators on site are briefed at the start of their contract on environmental controls and no-go areas. ECO to monitor compliance with the EMP during the construction phase, on weekly or bi-weekly basis, using a	Zero disturbance outside of designated work areas.	The ECO is to be notified within 24 hours if a disturbance incident occurs; penalties to be levied on defaulting contractors and sub-contractors.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		poles and hazard tape or snow netting. c) If possible, establish laydown areas in areas that are already degraded. *Responsibility (a), (b) and (c): ECO, in consultation with Construction Manager* d) Educate workers on the need to stay on paths and established tracks wherever practical. e) Construction equipment is not be operated outside the designated work area f) Activities of personnel are restricted to the designated work areas, unless under supervision by the ECO g) A penalty system is included in contractors and sub-contractors agreements, clearly documenting the penalties applicable for disturbance outside of demarcated areas. *Responsibility (d) to (h): ECO to identify transgressions; Construction Manager to levy penalties*	report card.		
9. Avoid soil erosion within and in the vicinity of the construction area.	Disturbed areas are left un-rehabilitated for a long period, leading to erosion, especially if on steep slopes.	a) Uncontaminated waste water and excess run off must not be concentrated but allowed to dissipate and seep slowly into the soil in a manner which inhibits soil erosion. *Responsibility: Construction Manager*	Weekly or bi-weekly visual inspection *Responsibility: ECO*	Minimal erosion inside the construction area and surroundings.	ECO to inform the Construction Manager if erosion occurs and investigate options to mitigate the damage.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
10. Effective rehabilitation of the turbine sites and new access roads after construction	Erosion and occur and alien vegetation can spread rapidly if areas have been poorly rehabilitated.	a) Implement an effective rehabilitation programme in accordance with the guidelines provided by the botanical specialist in Appendix B.1 of the EMP. *Responsibility: ECO or Construction Manager*	Audit of rehabilitation by the appointed botanist after construction.	Long-term successful rehabilitation.	Additional rehabilitation would be required.
11. Minimise risks to changes in natural fire regime	Fynbos vegetation on site at risk as elimination of all fires is negative for fynbos-	a) Fire management plan to be implemented	Record any fires	Zero risk to fynbos on site,	None
5.2 Avoiding any project impact on heritage (palaeontological, archaeological and historical features)					
1. Identify and protect archaeological features that may occur on the turbine sites.	Irreversible damage to archaeological features on the turbine sites.	a) An archaeologist/SAHRA must be informed if any features/sites are found accidentally. b) ECO to provide training for contractors and sub-contractors on site to assist them in identifying potential features of archaeological value. *Responsibility: ECO*	Contact the identified archaeologist if any heritage features (or suspected features) are uncovered. *Responsibility: ECO*	No damage to any significant archaeological features on site. Examination, documentation and/or removal of artefacts by archaeologist.	If archaeological features are uncovered unexpectedly during construction, stop construction and consult an archaeologist or SAHRA.
2. Identify and protect palaeontological features that may occur on the turbine sites.	Damage to or destruction of palaeontological features (e.g. fossils) that may occur on the turbine sites.	a) If construction involves substantial bedrock excavations WKN-Windcurrent ECO should be alerted to the possibility of buried fossil heritage and all major bedrock excavations should be examined at intervals for fossil material by the WKN-Windcurrent ECO. b) If any substantial fossil remains are found or exposed, these should be safeguarded, preferably in situ, while SAHRA is contacted	Contact the identified palaeontologist and archaeologist if any heritage features (or suspected features) are uncovered. *Responsibility: ECO*	No damage to any significant palaeontological or archaeological features on site. Examination, documentation and/or removal of artefacts by archaeologist or	ECO to inform the palaeontologist or archaeologist if any damages occur to features on site, and investigate options for mitigating damage.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		by the WKN-Windcurrent ECO and a qualified palaeontologist is contracted to record and sample the occurrence. Mitigation in the form of fossil recording and collection will have a positive impact on our appreciation of local fossil heritage. c) ECO to be present on site during major excavation and trenching. d) ECO to provide training for contractors and sub-contractors on site to assist them in identifying potential features of palaeontological value. *Responsibility: ECO*		palaeontologist.	
5.3 Prevention of soil and groundwater contamination					
1. Prevent the spillage of fuel, oil or grease on site and remedy this should it occur	Contamination of soil and risk of damage to vegetation and/or fauna through spillage of fuels and oils	a) Construction equipment is checked daily (by Contractor) to ensure that no fuel spillage takes place from construction vehicles or machinery, and monitored weekly by the WKN-Windcurrent ECO. b) Spilled fuel, oil or grease is retrieved where possible, and contaminated soil removed, cleaned and replaced. Contaminated soil to be collected by the Contractor (under observation of ECO) and disposed of at a waste site designated for this purpose. c) Portable bioremediation kit (to remedy chemical spills) is to be held on site and used as required. d) Bunded containment to be provided below	Check daily that no spills have taken place *Responsibility: Construction Manager*	Zero spillage of fuel, oil or grease on site	Rapid removal, cleaning and replacement of any soil contaminated by fuel, oil or grease.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		and around any fuel storage containers. *Responsibility (a), (b) & (c): Civil contractors and sub-contractors*			
2. Prevent spillage of cement, sand and stone into soil and vegetation beyond the defined area for concrete mixing and batching	Contamination of soil (change in pH) and risk of damage to vegetation and/or fauna through spillage of concrete	a) Concrete mixing area (if any) is defined in the site map. If any concrete mixing takes placed on site, this is be done on board or plastic sheeting, which is to be removed from the site once concreting is completed; or in areas to be covered by further construction. b) Sand, stone and cement are stored in demarcated areas, and are covered or sealed to prevent wind erosion and resultant deposition of dust on the surrounding indigenous vegetation. c) Any excess sand, stone and cement must be removed from site at the completion of the construction period *Responsibility (a) to (c): Civil contractors and sub-contractors.*	Check daily that sand, stone and cement are stored and handled as instructed *Responsibility: ECO*	Minimum spillage of cement into the environment; zero spillage beyond the site	None identified.
5.4 Effective management of civil contractors and sub-contractors					
1. Ensure disciplined operation of sub-contractors	Contractors and sub-contractors are not aware of the requirements of the EMP, leading to unnecessary impacts on the surrounding environment.	a) The terms of this EMP and the potential conditions in the environmental authorisation (from DEA) will be included in all tender documentation and contractors and sub-contractors contracts. b) Contractors and sub-contractors will not be permitted to remain on the site overnight. c) Contractors and sub-contractors will use the	Check compliance with specified conditions on a weekly or bi-weekly basis, using a report card, and allocate fines when necessary. *Responsibility: ECO*	Complete compliance with specified conditions	Significant fines to be imposed by ECO for infringements.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		chemical toilet situated in a designated area of the site; no personal hygiene (e.g. washing) will be permitted outside the designated area. d) Cooking will take place in a designated area shown on the site map and no firewood or kindling may be gathered from the site or surrounds. e) All litter will be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area; particular attention needs to be paid to food waste. f) No one other than the ECO or personnel authorised by the ECO, will disturb or pick plants outside the demarcated construction area g) No one other than the ECO or personnel authorised by the ECO, will disturb animals on the site (no trapping, shooting etc.) h) Animals disturbed during construction activities should not be harmed but should be allowed to move off to an undisturbed area of the site i) Feral dogs and cats should not be fed or encouraged to visit the site *Responsibility: Construction Manager* j) Fines system to be established clearly documenting the penalties to be applied for contravening the above requirements. This fines system must be established before			

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		construction commenced and included in sub-contracts. *Responsibility: ECO*			
5.5 Minimisation of Visual impacts					
1. Minimise contrast with surrounding environment and visibility of the turbines to humans	A non-specified turbine colour (i.e. a bright colour) could result in increased visual impact on local residents and passers by.	a) Ensure that the turbines are painted a non-reflective white colour (as required in the Civil Aviation legislation) b) Dust suppression is important during construction as dust will increase the visibility of the project c) Good housekeeping measures must be implementing-e.g. no dumping of waste *Responsibility: WKN-Windcurrent, Construction Manager and ECO*	Ensure that the specified paint colour is included in the purchasing specifications and complied with during construction. *Responsibility: WKN-Windcurrent*	Any departure from the specified colour should be corrected before operation commences.	None required.
5.6 Satisfy human safety and aviation requirements					
1. Ensure adequate earthing and lightning protection for the turbines	Risk to the turbines and surrounding environment from lightning and/or inadequate earthing.	a) Ensure proper bonding is carried out inside the turbines; a copper ring is attached below the soil surface to earth down conductors and earthing rods. *Responsibility: Construction Manager*	Ensure that earthing and lightning protection are installed and functional before construction is completed. *Responsibility: Construction Manager*	Earthing and lightning protection fully functional.	None required
2. Ensure that the facility complies with Civil Aviation Authority requirements for	Risk to aircraft.	a) Mount aviation warning lights on turbine hub and/or such measures required by the Civil Aviation Authority.	Ensure that aviation warning lights or other measures are functional before construction	Aviation warning lights or other measures are functional at all times.	None required

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
turbine visibility to aircraft, i.e. red pulsating light on the turbine tower		*Responsibility: WKN-Windcurrent*	is completed. *Responsibility: WKN-Windcurrent*		
3. Colour of turbines to be conspicuous to minimize aircraft collision risks and comply with the Civil Aviation Regulations of 1997.1	Turbine rotors inconspicuous to aircraft.	a) Turbine blades to be white to be conspicuous to aircraft pilots. *Responsibility: Operations Manager, WKN-Windcurrent*	Verify that the turbine blades are white. *Responsibility: ECO*	Turbine design maximizes conspicuousness to aircrafts.	None identified.
5.7 Minimise impacts on birds and bats					
1. Minimize the risk of birds and bats colliding with turbines and/or powerlines.	Birds attracted by perching opportunities, towers and turbines, leading to entanglement and bird deaths. Priority bird species are killed by electrocution or entanglement with powerlines.	a) Power line connections between the turbines to be underground, except where crossing streams (where erosion could occur). b) For above ground power lines, consult with a bird specialist to determine the need for fitting bird anti-collision markers to these power lines. *Responsibility: Construction Manager*	Minimise the extent of above-ground power lines. Ensure that anti-collision markers are fit to the power line prior commissioning of the wind farm. *Responsibility: ECO*	No collisions by birds during construction phase	If bird carcasses found, these must be collected and sent for analysis by an appropriate institution.
2. Minimize the risk of displacement of priority bird species by	Priority bird species displaced by disturbance	a) Restrict the construction activities to the footprint area. Do not allow any access to the	Ensure that construction activities are restricted to	Priority bird species are not displaced due	None identified.

[1] According to the Aviation Act, 1962, Thirteenth Amendment of the Civil Aviation Regulations (CAR's), 1997: "Wind turbines shall be painted bright white to provide maximum daytime conspicuousness. The colours grey, blue and darker shades of white should be avoided altogether. If such colours have been used, the wind turbines shall be supplemented with daytime lighting, as required." Camouflage, even if it were effective as a mitigatory measure (see Gipe 1995 and Stanton 1996), can therefore not be used.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
disturbance		remainder of the property. *Responsibility: Construction Manager and ECO*	footprint area. *Responsibility: ECO*	to disturbance.	
3. Minimize the loss of roosts for bat species using trees, aloes and man-made structures	Clearing of trees and aloes result in the loss of roosts for bat species. New bat habitat created on site.	a) Avoid the removal of clumps of indigenous trees and aloes. b) Seal all existing buildings which have not got bat roosts within the study area. c) Seal off all new building structures within the study area. *Responsibility: Construction Manager and ECO*	Ensure that construction activities are restricted to footprint area. Responsibility: ECO	Roosts for bat species are not lost.	None identified.
4. Prevent displacement or exclusion of bats from foraging areas and the loss or shifting of flight paths	Turbines erected too close to areas where bats may roost	a) Maintain setback of 500 m from areas where bats may roost, such as human dwellings or sheds, and a setback of 200 m around water bodies where bats might drink. *Responsibility: Construction Manager and ECO*	Ensure that 500 m setback is implemented.	Setback of 500 m from bat roost areas maintained.	

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
5.8 Minimise the risk of fire as a result of the construction activities					
1. Prevent veldt fires as a result of workers smoking and/or making fires for heating or cooking purpose.	Workers smoking/ starting fires (i.e. cooking, heating purposes) in undesignated areas	a) Designate smoking areas as well as areas for cooking, where the fire hazard could be regarded as insignificant. b) Educate workers on the dangers of open and/or unattended fires. *Responsibility: Construction Manager*	Adhoc checks to ensure workers are smoking/starting fires only in designated areas *Responsibility: ECO*	Zero veldt fires due to smoking/heating	None identified.
5.9 On-site waste management					
1. Avoid any storage of solid, liquid or hazardous waste on site and prevent waste spillages.	Solid and liquid wastes (i.e. wastewater from construction and painting activities) disposed of on the site could cause environmental problems (e.g. pollution / change in soil pH)	a) All construction waste (concrete, steel, rubbles etc.) to be removed from the site. b) Other non-hazardous solid waste (e.g. packaging material) to be disposed of at a licensed landfill. c) All liquid waste (used oil, paints, lubricating compounds and grease) to be packaged and disposed of by appropriate means. d) Adequate containers for the cleaning of equipment and materials (paint, solvent) must be provided as to avoid spillages. e) Waste water from construction and painting activities must be collected in a designated container and disposed off at a suitable disposal point off site. *Responsibility: Construction Manager*	Waste removal and disposal to be monitored throughout construction *Responsibility: ECO*	No waste storage or disposal on site; all waste disposed of as specified in the Record of Decision and relevant regulations.	The ECO to be notified within 24 hours of any waste spillage incidents on site (e.g. fuel spillage). ECO and Construction Manager to ensure necessary clean-up actions taken.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
2. Ensure that wastes are managed in an environmentally friendly manner	Wastes burned/buried on site. Dispersal of waste on site. Wastes remaining on site after the construction phase.	a) A refuse control system will be established for the construction period to efficiently separate and remove all forms of solid waste from the site for recycling, or disposal at a licensed disposal site. b) Under no circumstances is any solid waste to be burned or buried on or in the vicinity of the site. c) Waste collection points must be sealed/enclosed to eliminate the risk of wind scatter and scavenging by wildlife. d) All waste products resulting from electrical installations along the road will be entirely removed from the site. *Responsibility: ECO*	Waste removal and disposal to be monitored daily throughout construction *Responsibility: ECO*	Recycling of wastes where possible Zero impact of construction wastes on the environment	None identified.
5.10 Construction noise					
1. Minimise noise from construction	Vehicles, earth moving and terracing of sites, construction of access roads and hard standing areas.	a) Ambient noise monitoring to be conducted at the 11 NSAs as well as any other areas the specialist bird study will identify four times during the construction period. Project proponent to appoint a qualified noise specialist. b) Conduct noise sensitivity training for all construction staff *Responsibility: Project Developer, WKN-Windcurrent to appoint noise specialist*	Ambient noise monitoring to be conducted at the 11 NSAs four times during the construction period. *Responsibility: Project Developer, WKN-Windcurrent to appoint noise specialist*	SANS 10103:2008 maximum limit for ambient noise for rural areas of 45 dB(A).	None identified.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
5.11 Overall compliance with the conditions of the Environmental Authorisation					
1. Handover the site to the project operator at the end of the construction phase, in a form that satisfies all requirements of the Environmental Authorisation for the construction phase.	Environmental conditions of approval (issued by DEA) for the construction phase are not satisfied, leading to the project operation being delayed.	a) Audit the implementation of the EMP requirements for the construction phase. *Responsibility: ECO*	Audit report on compliance with actions & monitoring requirements in the Construction Phase EMP *Responsibility: ECO*	Full compliance with the EMP specifications & Environmental Authorisation requirements for construction phase	None identified.

6 MANAGEMENT PLAN FOR OPERATIONS PHASE

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
1. Minimise the impact of the wind turbines on birds, caused by collisions with turbines	Poor visibility of turbines to flying birds	a) Once the turbines have been constructed, post-construction monitoring as per *the Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa – Version 1* (Jenkins et al 2011) should be implemented to compare actual collision rates with predicted collision rates. If actual collision rates indicate unsustainable mortality levels, the following mitigation measures will have to be considered: • Negotiating appropriate off-set compensation for turbine related collision mortality; • As a last resort, halting operation of specific turbines during peak flight periods, or reducing rotor speed, to reduce the risk of collision mortality *Responsibility: WKN-Windcurrent or Operations Manager to appoint bird specialist*	Analyse monitoring results and compile annual monitoring report. Ensure that the report is made publicly available so that a database of bird monitoring impacts relevant to South African wind farms can be developed. *Responsibility: Operations Manager to appoint environmental consultant*	Zero bird strikes at turbine sites. This target can be revised based on monitoring data. The database on the effects of the WKN-Windcurrent turbines on South African species of birds contributes to the national database.	None identified.
2. Minimise or avoid displacement of priority bird species due to disturbance	Priority bird species displaced by disturbance	a) Post-construction monitoring should be implemented to assess the impact of displacement, particularly on priority species. Initially, a 12 month period of post-construction monitoring should be implemented, using the	Analyse post-construction monitoring results and compile annual monitoring report.	Priority bird species not displaced by disturbance.	Should the results of the post-construction monitoring indicate significant displacement of priority species, appropriate

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
caused by the operation of the wind farm.		same protocol as is currently implemented. Thereafter, the need for further monitoring will be informed by the results of the initial 12-month period. b) The breeding activity of the pair of Secretarybirds at the site must be carefully monitored. If the birds actually commence with breeding at the nest site, their nesting activity must continue to be monitored throughout 2011. In the unlikely event of them re-using the nest in 2012, appropriate mitigation must be agreed upon between the avian specialist and the project proponent to ensure that the birds are not disturbed during the critical nesting period of August to October. *Responsibility: WKN-Windcurrent or Operations Manager to appoint bird specialist*	Monitor the breeding activity of the pair of Secretarybirds at the site. *Responsibility: Operations Manager to appoint environmental consultant*	The breeding activity of the pair of Secretarybirds not affected if they were to re-use the nest on site in 2012.	offset compensation should be negotiated with project proponent to compensate for the loss of priority species habitat.
3. Minimise the impact of the wind turbines on bat mortality caused by collisions or barotrauma	Bats fly and forage in close proximity to the rotor blades. Bats are attracted to turbines.	a) Conduct carcass bat searches at a representative sample of turbines to determine the level of bat mortality around wind turbines. This is especially important during the periods April to May and August to September when bats are migrating between summer and winter roosts. Carcass searches should be made early in the morning to minimize the effect of scavengers (which remove carcasses).. It is suggested that monitoring be conducted for seven days per month for one year as per the bat monitoring guidelines (Sowler and Stoffberg, 2011. b) Depending on the outcome of bat monitoring and mortality counts during operations, consider the need to increase the cut-in speed	Analyse the bat monitoring data and re-evaluate the monitoring programme. Based on the bat monitoring and carcass counts, determine whether mitigation by of f-site bat boxes will off- set the mortalities. Operational management actions need to be applied to further reduce impacts on bats. *Responsibility: Operations Manager*	Create a database of bat mortalities occurring on the wind farm site. Thereby contribute information on the bat species occurring in the area and the impact of wind farms on bats.	None identified.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		for turbines to reduce bat fatality on calm evenings. *Note that this may not be economically viable for the project.* *Responsibility: Operations Manager to appoint a bat specialist*	*to appoint environmental consultant*		
4. Minimise visual impacts of the permanent structure and ancillary equipment	Spare parts and ancillary equipment stored in highly visible areas	a) No permanent outside storage of equipment, spare parts or other ancillary materials should be visible. Keep these off-site where possible, or limited to low visibility sites. b) The site should be kept in a clean and well-maintained condition. c) The exterior of any visible surface of the turbines should be cleaned, repainted, repaired or replaced if it rusts, corrodes or otherwise visibly deteriorates. d) All fencing should be kept in a clean and repaired condition. e) All fugitive waste or debris should be collected and removed from the site and properly disposed. f) Lighting should be designed to minimise light pollution without compromising safety. Investigate using motion sensitive lights for security lighting. Turbines are to be lit according to Civil Aviation regulations. Actions that may enhance the positive visual aspects of the development: a) Maintenance of the turbines is important. A spinning rotor is perceived as being useful. If a	Annual monitoring by an environmental consultant.	Wind project has a clean and harmonious presence in the landscape.	None identified.

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		rotor is stationary when the wind is blowing it is seen as not fulfilling its purpose and a negative impression is created. b) Signs near wind turbines should be avoided unless they serve to inform the public about wind turbines and their function. Advertising billboards should be avoided. c) An information kiosk (provided that the kiosk and parking area is located in a low visibility area) and trails along the wind farm can enhance the project by educating the public about the need and benefits of wind power. *Responsibility: Operations Manager*			
5. Minimise noise impacts during operations	Noise levels exceed the SANS 10103:2008 maximum limit for ambient noise for 45dB(A) for rural areas.	a) Ambient noise monitoring to be conducted at the 11 NSAs when operations commence to verify the noise emissions meet the noise rating limit. b) Monitoring to be done at three NSA's per year over a 3 year period to confirm that the actual noise complies with the predicted noise levels in the EIA. c) The monitoring to be done in the first year in the month that shows the most wind production from the historical data available. d) The monitoring to be done in the second year in the month that shows the least wind production from the historical data available. e) The monitoring to be done in the third year in the month that shows the "average" wind production from the historical data available. *Responsibility: Operations Manager*	Ambient noise monitoring at 11 NSA's when operations commence. Noise monitoring by a qualified noise specialist at three NSA's per year over a three year period.	SANS 10103:2008 maximum limit for ambient noise for 45dB(A) for rural areas.	None identified.

7 MANAGEMENT PLAN FOR DECOMMISSIONING

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
1. Return the area of the turbines to its original state.	Insufficient funds to finance decommissioning and the rehabilitation necessary.	a) Develop a closure and rehabilitation plan that satisfies best practice requirements for wind farms and for habitat management. This plan should include the removal of wind farm infrastructure, with the exception of the below ground foundations. *Responsibility: Operations Manager*	Audit the implementation of the closure and rehabilitation plan *Responsibility: Operations Manager*	Site returned in a condition that enables ongoing agricultural activities currently undertaken on site and does not foreclose other potential options.	None identified.

APPENDIX TO EMP

Appendix B1: Specification Guideline for Rehabilitation

1) Objectives

- To provide guidelines for vegetation clearing and rehabilitation during all phases of wind farm construction.
- To re-vegetate areas disturbed as a direct result of the WKN-Windcurrent project in a pragmatic manner to enhance sustainable re-growth of indigenous vegetation.

2) Materials

Plant species used should be those that occur naturally in the nearest site with a similar soil type and aspect. A suitably qualified botanist should be consulted with in this regard.

2.1. Shrubs and trees

1. Species of special concern shall be obtained either from the site prior to clearing or from an area in close proximity to and of the same vegetation type as the site, as indicated by the Botanist.
2. Seedlings and young plants of the abovementioned plants should be collected and placed in bags to be stored in the on-site nursery before construction commences to be used during re-vegetation in consultation with an appointed horticulturalist, the ECO and a botanist.
3. Nursery plants shall be grown from locally obtained seed unless approved by the Botanist.
4. Plants shall be obtained from their natural habitat.
5. The Horticulturalist shall ensure that each plant is handled and packed in the approved manner for that species or variety, and that all necessary precautions are taken to ensure that the plants arrive on Site in a proper condition for successful growth.
6. Trucks used for transporting plants shall be equipped with covers to protect the plants from windburn. Containers shall be in a good condition. Plants shall be protected from wind during the transportation thereof.
7. No plants or plants with exposed roots shall be subjected to prolonged exposure to drying winds and sun, or subjected to water logging or force-feeding at any time after purchase.
8. The Horticulturalist shall ensure that the plants are in a good condition and free from plant diseases and pests. The Horticulturalist shall immediately remove plants containing any diseases and/ or pests from the Site.
9. All plants supplied by the Horticulturalist shall be healthy, well formed, and well rooted. Roots shall not show any evidence of having been restricted or deformed at any time. The potting materials used shall be weed free.
10. There shall be sufficient topsoil around each plant to prevent desiccation of the root system. Where plants are stored on site prior to planting they shall be maintained to ensure that the root systems remain moist.

2.2. Grass

Sods and runners

1. Grass sods shall be clean of invasive plants or weeds.
2. Sods shall be obtained from a source approved by the Botanist. Sods rejected by the Botanist shall be removed from the site immediately.
3. Grass shall have been grown specifically for sod purposes, mown regularly and cared for to provide an approved uniformity to the satisfaction of the Botanist. It shall be harvested by special machines manufactured for this purpose to ensure an even depth of cut with sufficient root material and soil.
4. Sods shall be delivered in healthy conditions and be free from weeds and disease.
5. Sods shall be obtained from an approved nursery. Nursery sods shall have been maintained regularly to the required quality. Nursery grass sods shall have at least a 30 mm layer of topsoil.
6. Sods shall be obtained directly from the surrounding area and shall contain at least a 50 mm topsoil layer and the roots shall be minimally disturbed. They shall be obtained from the near vicinity of the site from an area selected by the Botanist. The soil shall be compatible with that removed from the area to be re-vegetated and shall not have been compacted by heavy machinery.
7. Runners shall be of an approved quality and free from disease or weeds.

Indigenous vegetation sods

1. Sods of indigenous vegetation (e.g., rushes, sedges and grass) shall be obtained from areas approved by the Botanist, within or near the site.
2. The Horticulturalist shall identify suitable sods, as directed by the Botanist.
3. Sods rejected by the Botanist shall be removed from the site immediately.
4. Indigenous vegetation sods shall be clean of weeds or invasive plants in specified areas before planting.

Seed

1. The seed mix quantities and purity levels shall be specified by the horticulturalist and approved by the Botanist.
2. Seed shall be utilised for the cultivation of material for revegetation.
3. Seed shall be utilised for direct sowing.
4. Seed must be pre-dried then stored under cool, dry, insect free conditions until required either for cultivation in the nursery or in the rehabilitation process. Only viable, ripe seed shall be used.
5. A record of stock relevant to the project that is held in the nursery shall be provided to the Botanist on a monthly basis.

Harvested seed

1. Indigenous seed shall be harvested in areas which are free of alien/ invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites, as indicated by the Botanist.

2. Following harvesting, the seed shall be dried under cool airy conditions. The seed shall be insect free and shall be stored in containers under cool conditions that are free of rodents or insects. No wet, mouldy or otherwise damaged seed is acceptable.
3. Seed harvested by hand from selected species, should be treated and stored separately.
4. Seed gathered by vacuum harvester, or other approved mass collection method, from suitable shrubs or from the plant litter surrounding the shrubs shall be kept apart from individually harvested seed .
5. Harvested seed obtained by means of vacuum harvesting, shall be free of excessive quantities of organic and/ or substrate material.

2.3. Mulch

Mulch shall be utilised as follows depending on local and seasonal availability of material.

Brush-cut mulch

1. The stockpiled vegetation from the clearing operations shall be reduced to mulch.
2. Indigenous plant material shall be kept separate from alien material. The vegetative material, shall be reduced by either mechanically means (chipper) or by hand-axing to sticks no longer than 100 mm. The chipped material shall be mixed with the topsoil at a ratio not exceeding 1:1.
3. Mulch shall be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
4. No harvesting of vegetation outside the area to be disturbed by construction activities shall occur.
5. Mulch shall be harvested from areas in close proximity to the site, as approved by the Botanist. Any collection of indigenous material from nearby area that will not be subject to complete denudation shall only be done in mature vegetation in areas identified by the Botanist.
6. Harvesting shall be performed in a chequer board fashion, cutting the indigenous vegetation down to ≥100 mm above the ground, in 2 m wide strips, leaving 2 m gaps of undisturbed vegetation in between.
7. The Horticulturalist shall take every effort to ensure the retention of as much seed as possible in mulches made from indigenous vegetation. Mulches shall be collected in such a manner as to restrict the loss of seed.
8. Brush-cut mulch shall be stored for as short a period as possible, and seed released from stockpiles shall be collected for use in the rehabilitation process.

Wood chips

1. Wood chips (including bark) shall be utilised as mulch during re-vegetation and rehabilitation of the site.
2. The chips shall be no longer than 50 mm in length or breadth and shall be free of seed. The Botanist shall approve the source of chips.
3. The wood shall be chipped during winter
4. Chips shall not be made from wood treated with preservatives.
5. Half-composted chips shall be utilised in preference to non-composted chips
6. Indigenous seed shall always be added to wood chip mulches.

Compost

1. Compost shall be utilised as mulch during re-vegetation and rehabilitation of the site.
2. The compost shall be well decayed, friable and free from weed seeds, dust or any other undesirable materials.
3. Seed free, half-composted material, such as mulled-bark, shall be used as an additive to extend indigenous mulch. No more than 50% compost shall be used under these circumstances.

2.4 Slope stabilizers and anti-erosion measures

Stabilisation cylinders

1. Stabilisation cylinders shall consist of cylindrical capsules approximately 125 mm in diameter by 1.5 m in length.
2. Stabilisation cylinders shall be manufactured from biodegradable material such as hessian or of extruded biodegradable plastic netting. The plastic material shall be sufficiently robust to last for a period of not less than 3 years and not more than 10 years before disintegrating under normal service conditions.
3. Stabilisation cylinders shall be filled with shredded or partly compressed pine chips or similar material. Only material passing through a 31 mm sieve with round holes and retained on a 5 mm sieve with square holes shall be used. Splinters and flat chips are not acceptable.
4. A seed approved by the Botanist shall be included in the cylinders.
5. Cylinders shall be anchored in position using biodegradable material.
6. Cylinders shall not be used to stabilise any rock faces.

Biodegradable netting / matting

1. Biodegradable netting/matting shall be made from jute, sisal, coir or similar material.
2. A 1 m^2 sample of the geofabric, geogrid or nylon (biodegradable) fabric shall be submitted to the Botanist for approval prior to procurement.
3. The netting/matting shall be sufficiently robust to last for a period of not less than 5 years under normal service conditions.
4. Holes in the netting/matting shall have a minimum size of 400 mm^2 and a maximum size of 900 mm^2 and be made from at least 4-6 mm thick cord.

Logs

1. For slopes of less than 1:3, the Site shall be stabilised by means of "geojute" (if available) and continuous rows of logs, secured to the slope with timber pegs, parallel to the contour. Logs shall be untreated pine (or gum) poles of not less than 150 mm with a taper of not more than 75 mm over its length. Timber pegs to be treated and not less than 400 mm in length. Timber pegs must be longer if thicker logs than the minimum are used.
2. Logs shall be secured to the slope in such a manner that they will not become dislodged during construction and/ or planting. Logs to be secured to the slope by means of a minimum of two pegs driven into the soil not less than 250 mm deep. For logs longer than 3 m, additional pegs shall be required. Log ends to be butt-jointed and plugged with wood chips or similar to prevent water from washing through at the joint. Logs shall be placed at 2 m intervals with a bottom row parallel to the edge of the road.

Logging of the slope to start at the top of the slope to prevent the stretching of the "geojute".

2.5. Soil stabilizers

1. Soil stabilisers shall consist of an organic or inorganic material to bind soil particles together and shall be a proven product able to suppress dust and form an encrustation.
2. Soil stabilisers shall be of such a quality that grass and indigenous seeds may germinate and penetrate the crust. Samples of the proposed material shall be supplied to the Botanist before any of the material is delivered to the Site.

2.6. Topsoil and subsoil

1. All soil imported to act as bedding material shall be free of alien plant seeds, and their use shall be restricted to 500 mm below the soil surface.

2.7. Boulders and rocks

1. Boulders or rocks used in rehabilitation shall come from comparable geomorphological units to those that they are being utilised to rehabilitate.
2. Where possible, boulders and rocks utilised during rehabilitation, shall be collected from the Site and stockpiled prior to the commencement of construction activities on Site.

3) Infrastructural Requirements

Vegetation clearing

1. A plant relocation and vegetation clearing plan should be designed if appropriate before construction commences
2. Areas to be cleared of vegetation should be clearly demarcated before clearing commences.
3. Areas should only be stripped of vegetation as and when required, especially grasses, to minimize erosion risk.
4. Once demarcated the area to be cleared of vegetation should be surveyed by the vegetation clearing team under the supervision of the botanist and horticulturalist to identify and mark species suitable for rescue.
5. Plants to be rescued should include both species of special concern requiring removal for relocation as well as species that would be suitable for use in rehabilitation.
6. Depending on growth form this material should be appropriately removed from its locality and stored in the nursery holding areas or immediately relocated where it may be required elsewhere immediately.
7. Small trees and shrubs (<1 m in height) can often be rescued and planted temporarily in potting bags for later use.
8. Arboreal species (orchids) should be collected attached to the substrate (i.e. branch) they are growing on and stored (hung) in a moist, lightly shaded nursery area for later relocation.
9. Wherever possibly any seed material should be collected immediately and stored for later use, particularly species that occur in low numbers.

10. Before any earthmoving activities are commenced any ripe grass seed should be collected (using a sickle or similar implement), dried and stored for use during regressing.
11. Comprehensive notes should be kept as to the identification, habitat, and any potential biophysical requirements of plants, and any species of special concern removed for relocation should have a GPS locality recorded.
12. Grass sods can also be collected for immediate use in any areas requiring revegetation.

Topsoil

1. Sufficient topsoil must be stored for later use during decommissioning, particularly from outcrop areas.
2. Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
3. All available topsoil shall be removed after consultation with the Botanist and horticulturalist prior to commencement of any operations.
4. The removed topsoil shall be stored on high ground within the footprint outside the 1:50 flood level within demarcated areas.
5. Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
6. The stockpiled topsoil shall be protected from being blown away or being eroded. The application of a suitable grass seed/runner mix will facilitate this and reduce the minimise weeds.

Road Construction

1. Should a portion of the access road be newly constructed the following must be adhered to:
    a. Water courses and steep gradients shall be avoided as far as practical;
    b. Adequate drainage and erosion protection in the form of cut-off berms or trenches shall be provided where necessary.
2. No other routes shall be used by vehicles or personnel for the purpose of gaining access to the site.
3. Newly constructed roads shall be adequately maintained so as to minimise dust, erosion or undue surface damage.
4. The liberation of dust into the surrounding environment shall be effectively controlled by the use of inter alia, water spraying and /or other dust-allaying agents. The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.
5. The access road to the site must be strictly maintained during the operation process. Sections of the access road that erode during the construction phase shall be suitably rehabilitated upon completion of the project.

Operating Procedures in the Study Area

1. Grass and vegetation of the immediate environment, or adapted grass / vegetation will be re-established on completion of construction activities, where applicable.
2. No firewood to be collected on site and the lighting of fires must be prohibited.
3. Cognisance is to be taken of the potential for endangered species occurring in the area and appropriate measures must be implemented.

Excavations and Disturbed Areas

Whenever any excavation is undertaken, the following procedures shall be adhered to:

1. Topsoil shall be handled as described in this EMP.
2. The construction site will not be left in any way to deteriorate into an unacceptable state.
3. Once overburden, rocks and coarse natural material have been placed in the waste pile, they will be profiled with acceptable contours (including erosion control measures), and the previous stored topsoil shall be returned to its original depth over the area.
4. The area shall be fertilised if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally occurring flora.

4) Construction

4.1. Preparation of ground surfaces

1. Prior to the application of topsoil, the ground surface shall be ripped or scarified with a mechanical ripper to a depth of approximately 150 mm.
2. Prior to the application of topsoil, the ground surface shall be ripped or scarified by hand tilling to a depth of approximately 150 mm. {this specification shall be used on small sites}
3. Compacted soil shall be ripped to a depth of greater than 250 mm. The ripped area shall be hand-trimmed.
4. The subsoil shall be thoroughly tilled to a depth of at least 100 mm by means of a plough, disc, harrow or any other approved method until the condition of the soil is acceptable, as approved by the Botanist.
5. Were tilling is difficult, the Horticulturalist shall use rotary tillage machinery until no clods or lumps larger than 40 mm in size remain, and the mixing of soil is acceptable to the Botanist.
6. In road cuttings, a weed-free gravel / sand / organic mix shall be utilised as a sub-surface layer.
7. Topsoil shall be applied.
8. Subsequent to the addition of the sub-soil, topsoil shall be spread evenly over the ripped or tilled surface to a depth of 75-150 mm on flat ground or to a minimum depth of 75 mm on slopes of 1:3 or steeper or as specified in this specification.
9. The final prepared surface shall not be smooth but furrowed to follow the natural contours of the land, with scattered rocks of varying sizes according to the natural condition of the area.
10. Where sodding is required slight scarification shall be carried out to contain the sods. The soil shall be uniformly moist to a depth of 150 mm prior to planting or seeding. If this condition is not met by rainfall, the Horticulturalist, as directed by the Botanist, shall carry out irrigation.

4.2. Soil stabilization

Various options can be utilized for soil stabilization, based on material availability.

Straw stabilisation

1. Straw shall be utilised as a binding material in areas with deep sand, where possible.
2. Baled straw shall be placed on the cleared area, opened and spread evenly by hand or machine at a coverage rate of 1 bale per 10 m^2 over the area to be stabilised. It shall then immediately be rotovated into the upper 100 mm layer of soil. This operation shall not be attempted when the wind strength is such as to remove the straw before it can be rotovated into the sand.

Mulch stabilisation

1. Mulch shall be applied by hand to achieve a layer of uniform thickness. The mulch shall then be lightly worked into the topsoil layer so that it mixes with the soil and serves to bind it.
2. The mulch shall be spread at a coverage rate of 100 kg per 250 m^2 or 4 t/ha.
3. Where brush-cut material is to be utilised as mulch, this material shall be evenly spread across the area to a uniform depth of 25 mm. The mulch shall then immediately be rotovated into the upper 100 mm layer of soil. This operation shall not be attempted when the wind strength is such as to remove the mulch before it can be rotovated in.
4. In very rocky areas a layer of mulch shall be added prior to adding the top-material. The mulch must then be worked into the top-material to bind it.
5. Alien vegetation mulch shall be in a non-seed bearing state and shall be chipped prior to application. The preparation of alien vegetation mulch shall be done at source.
6. The Horticulturalist shall cut bush to a height of 400 mm above ground level from designated areas. This vegetation shall then be passed through the chipping machine as above, and be stockpiled for later use as mulch.
7. If the area is exposed to strong wind the mulch stockpile shall be covered with a fine nylon net with 100 mm x 100 mm openings.

Compost stabilisation

- The soil shall be stabilised by placing and lightly compacting a 75 mm layer of compost over the designated areas or by working a 75 mm layer of compost into the ground to a depth of 150 mm.

Stabilisation of steep slopes

1. The Horticulturalist shall take measures to protect all areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible. The Horticulturalist shall take any other measures that may be necessary to prevent surface water from being concentrated in streams and from scouring the slopes, banks or other areas.
2. If runnels or erosion channels develop, they shall be back-filled and compacted, and the areas restored to a proper condition. The Horticulturalist shall not allow erosion to develop on a large scale before effecting repairs.
3. Where artificial slope stabilisers are used, these shall be applied to the slope, preferably before topsoiling, but according to the detailed construction plan and as specified in this specification.
4. Near vertical slopes (1:1 to 1:2) shall be stabilised using hard structures following specifications.

5. Where the slopes are 1.3 to 1:6 they shall be logged or otherwise stepped (using stabilisation cylinders or similar) in order to prevent soil erosion. Logs/ cylinders must be laid in continuous lines following the contours and spaced vertically 0.8-1.2 m apart, depending on the steepness of the slope. These logs/ cylinders must be secured by means of steel pegs and wire in rocky areas, and treated wooden pegs in other areas.
6. In areas where slopes are less than 1:6, horizontal grooves, shallow steps or ledges parallel to contours shall be made on the cut slopes. They shall be made at random to appear natural.
7. In areas where slopes are less than 1:6 these slopes shall be stabilised by using logs in parallel rows, or stabilisation cylinders fastened randomly into position or using biodegradable netting. These structures shall hold the top-material on the slopes and serve as erosion prevention structures.
8. Shallow slopes shall be stabilised using commercial available and approved anti-erosion compounds.

4.3. Slope modification and stabilization

Cut slopes adjacent to roads

1. Cut and fill slopes shall be shaped and trimmed to approximate the natural condition and contours as closely as possible and be undulating. Levels, incongruous to the surrounding landscape, shall be reshaped using a grader and other earthmoving equipment.
2. All cut and fill slopes shall be left as rough as possible, and shall contain ledges to facilitate the accumulation of topsoil. The ledges shall be dug at random to appear natural. Furthermore, the Horticulturalist shall ensure that any embedded rocks that will not pose a danger to traffic, remain on the slopes.
3. Boulders / rocks, collected on the site before disturbance, shall be scattered at a predetermined density approved by the Botanist.
4. Any eroded areas deeper than 50 mm shall be either trimmed down by back cutting the slope face or repaired to the satisfaction of the Botanist with boulders and soil or any other approved method.
5. Catchwater drains shall be installed above the cut slopes.
6. Where cut slopes are greater than 4 m in height, the Horticulturalist shall construct berms at regular intervals.
7. Natural water flow paths shall be identified and subsurface drains (using riprap or superfluous rock material) or surface drains and chutes {use water speed control structures where necessary}, preferably using cemented natural rock, shall be constructed along the flow paths.
8. Near vertical slopes (1:1 to 1:2) shall be stabilised using natural rock wall structures constructed using conventional building methods or in forms with slurry forced between the structures. All structures shall have a 'natural' look and facilities for plants to grow in.
9. Near vertical slopes (1:1 to 1:2) shall be stabilised using stacked precast concrete blocks. All structures shall have a 'natural' look and facilities for plants to grow in.
10. All areas where the slopes are 1.3 to 1:6 shall be logged or otherwise stepped (using stabilisation cylinders or similar) in order to prevent soil erosion. Logs/ cylinders shall be laid in continuous lines following the contours and spaced vertically 0.8-1.2 m apart,

depending on the steepness of the slope. These logs/ cylinders shall be secured by means of steel pegs and wire in rocky areas, and treated wooden pegs in other areas.

11. In areas where slopes are less than 1:6 horizontal groves and shallow steps and ledges parallel to contours shall be made on the cut slopes. They shall be made at random to appear natural.
12. In areas where slopes are less than 1:6 horizontal, these slopes shall be stabilised by using logs in parallel rows, or stabilisation cylinders fastened randomly into position shall be utilised. These structures shall hold the top-material on the slopes and serve as erosion prevention structures.

Blasted areas

1. Blasted areas shall be finished so as to be as rough as possible to facilitate establishment of vegetation, where revegation will be implemented.

Trees and shrubs

1. One third of the fertiliser shall be scattered at the bottom of the hole, one third dug into the topsoil to be replaced in the hole and the remainder watered into the soil at surface level.

Basic re-grassing

1. 2:3:2 fertiliser shall be applied with the seed mix, at the rate of 400 kg/ha. Super phosphate shall be applied post germination at the rate of 200 kg/ha

5) Rehabilitation

5.1. Rehabilitation Objective

The overall objective of the rehabilitation plan is to minimize adverse environmental impacts whilst maximizing the future utilization of the property. The key focus for rehabilitation for this project should therefore be on areas on site that are disturbed as a direct result of the WKN-Windcurrent project.

Additional broad rehabilitation strategies / objectives include the following:

1. Rehabilitating the disturbed areas to take place concurrently within prescribed framework established in the EMP.
    - All infrastructure, equipment, plant and other items used during construction will be removed from the site
    - Waste material of any description, including scrap and rubble will be removed entirely from the site and disposed of at a recognised landfill facility. It will not be permitted to be buried or burned on site.
    - Final rehabilitation shall be completed within a specified period.

5.2. Rehabilitation Plan

The overall re-vegetation plan will be as follows:

1. Repair the aesthetic impact of the site;
2. Stabilise disturbed soil and rock faces;
3. Minimize surface erosion and consequent siltation of natural water course located on site;
4. Control wind-blown dust problems;
5. Enhance the physical properties of the soil;
6. Re-establish nutrient cycling; and
7. Re-establish a stable ecological system.

Every effort must be made to avoid unnecessary disturbance of the surrounding natural vegetation during construction operations.

Drainage and Erosion Control

To control the drainage and erosion at site the following procedures will be adopted:

1. Areas where construction is completed should be rehabilitated immediately.
2. All existing disturbed areas will be re-vegetated to control erosion and sedimentation
3. Existing vegetation will be retained as far as possible to minimize erosion problems.

Visual Impacts Amelioration

The overall visual impact of the proposed activity will be minimised by the following mitigating measures:

1. Re-topsoiling and vegetating all disturbed areas

Topsoil and Subsoil Replacement

1. Topsoil and subsoil will be stripped separately from the area under construction. The topsoil and subsoil removed will be stockpiled separately and only used in rehabilitation work towards the end of the operation.
2. The vegetative cover will be stripped with the thin topsoil layer to provide organic matter to the relayed material and to ensure that the seed store contained in the topsoil is not diminished. Re-seeding may be required should the stockpiles stand for too long and be considered barren from a seed bank point of view. Stockpiles should ideally be stored for no longer than a year.
3. The topsoil and overburden will be keyed into the re-profiled surfaces to ensure that they are not eroded or washed away. The top-soiled surface will be left fairly rough to enhance seedling establishment, reduce water run-off and increase filtration.

5.3. Timing of planting

1. Reseeding shall occur in late Winter (July to September).
2. Replanting shall occur during April / June.
3. Wetland preparation shall occur during Autumn and planting shall occur during early Winter after the first rains (May to June). If planting occurs in a dry late Autumn (end March) or early Winter (April to June) season it shall be necessary to irrigate plants to ensure their successful establishment.

4. Plant material shall be planted into the ground within a maximum period of 5 days after delivery to the Site, unless otherwise specified by the Botanist.

5.4. Planting guidelines

1. Planting guidelines must be developed by a horticulturalist and/or botanist (appointed by WKN-Windcurrent) and agreed to by WKN-Windcurrent prior to the start of construction.
2. These planting guidelines should cover the following aspects
   - Re-seeding;
   - Basic re-grassing and planting of grass runners;
   - Sodding, including harvesting, planting and erosion management;
   - Sourcing, holding and planting of trees and shrubs (including indigenous species rescued from site); and
   - Planting guidelines, including protection of root systems, protection and placement of topsoil, application of fertilizers, spacing of plants, application of mulch, and watering of plants.

Erosion control

1. In the case of surface wash-away or wind erosion, the Horticulturalist shall implement remedial measures, as approved by Botanist, as soon as possible.
2. Appropriate erosion control/ soil stabilisation measures shall be implemented.

5.5 Monitoring and Reporting

1. Adequate management, maintenance and monitoring will be carried out annually by the applicant to ensure successful rehabilitation of the property.
2. To minimise adverse environmental impacts associated with operations it is intended to adopt a progressive rehabilitation programme, which will entail carrying out the proposed rehabilitation procedures concurrently with construction activities.

Inspecting and Monitoring

1. Regular monitoring of all the environmental management measures and components shall be carried out to ensure that the provisions of this programme are adhered to.
2. Ongoing and regular reporting of the progress of implementation of this programme will be done. An environmental audit shall be carried out by an independent consultant on an annual/biannual basis.
3. Inspections and monitoring shall be carried out on both the implementation of the programme and the impact on plant life.