

Executive Summary

South Africa Mainstream Renewable Power Noupoort (PTY) Ltd (Mainstream) intends to develop a wind farm near Noupoort in the Northern Cape Province of South Africa. SiVEST Environmental Division has been appointed as independent consultants to undertake the Environmental Impact Assessment (EIA) for the proposed wind farm. The objective of the project is to generate electricity to feed into the National Grid by constructing wind turbines (and associated infrastructure).

The proposed development requires environmental authorisation from the Department of Environmental Affairs (DEA). However, the provincial authority will also be consulted (i.e. the Northern Cape Department of Tourism, Environment and Conservation (NCDTEC)). The EIA for the proposed development will be conducted in terms of the newly released EIA Regulations promulgated in terms of Chapter 5 NEMA (National Environmental Management Act), which came into effect on the 2nd of August 2010. In terms of these regulations, a full EIA is required for the proposed project. All relevant legislations and guidelines (including Equator Principles) have been consulted during the EIA process and will be complied with at all times.

The proposed project is required to improve electricity supply to the Eskom Grid and to assist in achieving the Government's mandate for the establishment of renewable energy generation facilities.

The proposed project involves the construction of a wind farm. Layout alternatives have been investigated and these relate to the location of the proposed development and associated infrastructure on the site. These are illustrated below:

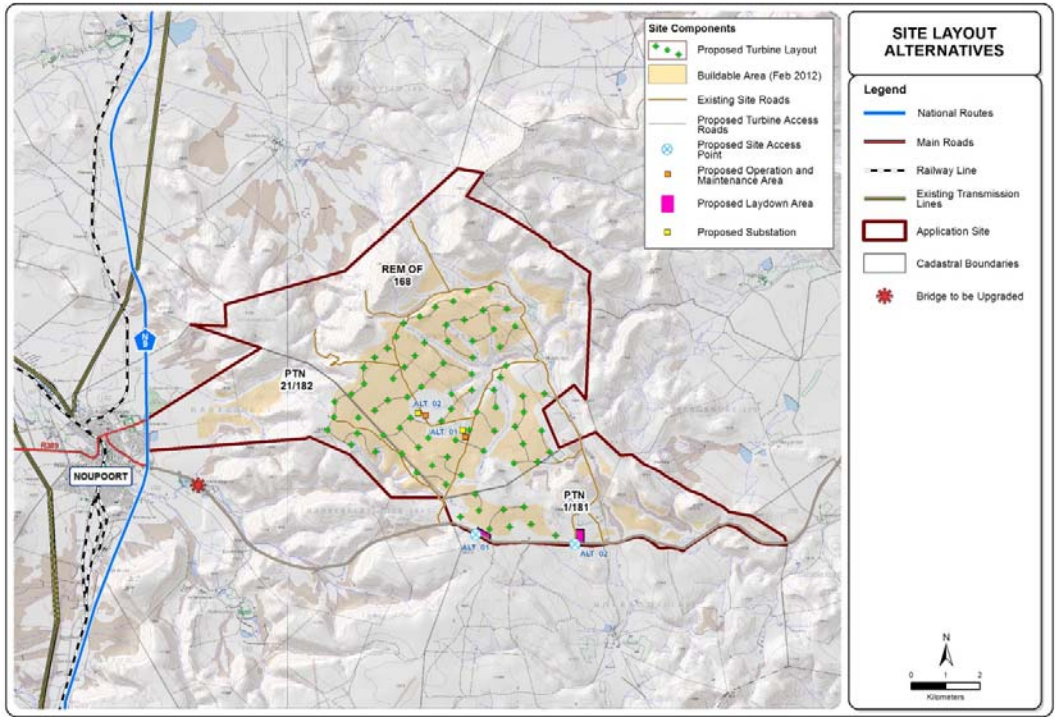


Figure i: Site layout alternatives (refer to Appendix 7 for A3 Maps)

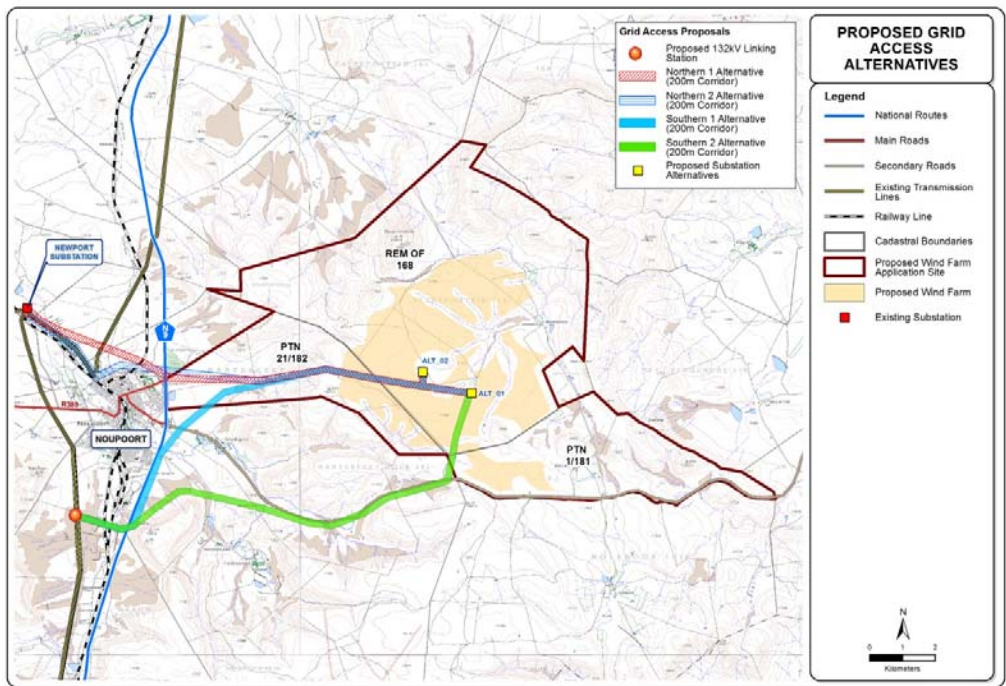


Figure ii: Proposed grid access alternatives (refer to Appendix 7 for A3 Maps)

The proposed wind farm site near Noupoort, falls within the following vegetation types: Karoo Escarpment Grassland; Tarkastad Montane Shrubland and Eastern Upper Karoo.

The following assessments were conducted during the Impact phase to identify the issues associated with the proposed development. These include the following:

- Biodiversity (including fauna and flora) Assessment
- Avi-faunal Assessment
- Bat Assessment
- Surface Water Impact Assessment
- Soils and Agricultural Potential Assessment
- Visual Impact Assessment
- Noise Impact Assessment
- Geotechnical Assessment
- Heritage Assessment
- Socio-economic Impact Assessment

Based on the impact studies that were conducted, a few sensitive aspects have been identified within the study area. These areas have been assessed and used to inform the final layout of the proposed wind farm. The table below summarises the specialist findings of the Impact Report.

Table i: Summary of findings

Environmental Parameter	Summary of major findings	Recommendations
Biodiversity (Flora and Fauna)	<ul style="list-style-type: none"> ▪ The study area consists of a mix of natural veld and unimproved grassland which is used as grazing land for cattle and sheep. Vast grazing land is interspersed incised river channels, which flow intermittently, are present. Large mountains are present within the study site. ▪ Various mammal, amphibian and reptile species are likely to occur within the study area. ▪ The potential impacts of the proposed development during the construction phase mainly related to loss of habitat for red data and general species; potential loss of species richness, edge effect and erosion. The impact of the proposed development will be limited to the turbine construction areas and the associated infrastructure such as roads. Surrounding vegetation will remain intact and will not be impacted upon. As such the impact is localised and if the mitigation measures are implemented, the overall impact can be reduced. ▪ No significant impacts on vegetation and habitat are expected during the operation phase of the proposed development, as long as rehabilitation of the impacted surrounding areas has taken place. 	<p>Sensitive areas have been identified within the boundaries of the study area. These relate to rocky cliffs, high mountain sides and tops as well as rivers and wetlands. The preservation of these features, as well as conservation of biodiversity should be maximised through the selection of a site that avoids areas of concern as highlighted in this report.</p> <p>The preferred area steers away from these sensitive areas and strict mitigation measures will further reduce the identified impacts</p>
Avi-fauna	<ul style="list-style-type: none"> ▪ This proposed development site contains some intrinsic avian biodiversity value. It does not contain any unique habitats or landscape features, nor does it affect any known, major avian fly-ways. However, the site contains 	<p>Identified sensitive and no-go areas have been identified and must be respected. Additionally, recommended buffer zones particularly around the Blue Crane nesting site must be enforced.</p>

	<p>two topographical characteristics that are usually linked to increased collision risk, namely slopes which could be used by soaring species for lift, especially during light wind conditions, and valleys which act as natural funnels for birds commuting through the site. If possible, these areas should be kept free of turbines.</p> <ul style="list-style-type: none"> There are regionally and/or nationally important impact susceptible species present (or potentially present), and the proposed facility may have a significant detrimental effect on these birds, both during the construction and operational phases of the development. 	<p>Implementation of the required mitigation measures should reduce potential mortalities due to collision with the wind turbines, displacement due to disturbance, habitat loss due to the footprint of the wind farm mortalities due to collision with associated power line infrastructure impacts to Low. However, this can only be verified in the longer term by implementing an integrated pre- and post construction monitoring programme.</p>
Bats	<ul style="list-style-type: none"> Two species of bat were confirmed on site Egyptian free-tailed bats (<i>Tadarida aegyptiaca</i>) and Cape serotine bats (<i>Neoromicia capensis</i>) but more species are considered to be common here. Although neither confirmed species are of conservation concern, they likely provide important agri- and ecosystem services. 	<p>The sensitive areas indicated are to be treated as such. No wind turbines are to be placed within these sensitive areas to avoid excessive bat fatalities.</p>
Surface water	<ul style="list-style-type: none"> Although the development site exists in an arid area, there are a number of surface water features on the site. These differ in characteristics from drainage lines in rocky terrain to narrow valley bottom wetlands and well-defined streams. In the context of the study area's arid characteristics these surface water features are environmentally and socio-economically important, and are sensitive to disturbance, being especially prone to erosion. These surface water areas have been designated as sensitive features of the environment, and as such they 	<p>A number of general and site-specific mitigation measures have been recommended to ameliorate the potential impacts. The most important of these is the avoidance of surface water features by infrastructure as far as possible. Where this is not possible (e.g. where access roads have to cross surface water features), the design and construction of the infrastructure must be planned to take into account the sensitivity of the feature and to ensure the implementation of the relevant mitigation measures. Should these be adhered to, the</p>

	<p>have been delimited as no-go areas with a buffer to be maintained around them. This report has found that the proposed development could cause direct and indirect impacts on the surface water features on the site. This is especially related to the associated (linear) infrastructure associated with the proposed wind farm, in particular roads and underground cabling. The construction of this infrastructure could be associated with the physical destruction of wetland habitat, as well as possible hydrological and hydromorphological modification of the surface water feature and introduce possible pollutants into the surface water drainage feature. Without the implementation of mitigation measures, the impact of the proposed development on surface water features could be significant.</p>	<p>development will be able to be constructed and developed without causing significant impacts on the surface water features on the site.</p>
<p>Soils and Agricultural Potential</p>	<ul style="list-style-type: none"> ▪ The study area is dominated by unimproved veld which is predominantly utilized as grazing land for cattle and sheep. Cultivation, in terms of Lucerne, is possible in valley bottoms where the soils tended to be deeper with higher soil moisture contents due to topographic position. ▪ The study area is almost completely framed by steeper slopes, valley lines and / or ridges while the central areas are characterised by flat and gently sloping topography with an average gradient of less than 10%. The soils identified are predominantly shallow and rocky with a low agricultural potential. Lithic soils (Mispah and Glenrosa Forms) cover 87% of the surveyed area. Virtually all the 	<p>Normal grazing (the dominant agricultural activity) can be permitted around the turbines. The active Lucerne subsistence fields have been delineated as No-Go Areas in terms of agriculture. These active fields only constitute 0.1% of the assessment area. Even though disrupting these fields would not constitute a fatal flaw it is recommended that these cultivated fields are precluded from the site layout.</p> <p>Other than these fields and the limited subsistence agricultural fields tended by Sipila Nongunzenzela Trust the Noupoort site is dominated by grazing land and this activity is considered non-sensitive when</p>

	<p>soils encountered had a layer that was limiting to plant growth and the effective soil depth rarely extended below 50 cm.</p> <ul style="list-style-type: none"> ▪ The site is not classified as high potential nor is it a unique dry land agricultural resource. The study area has been classified as having an extremely low potential for crop production due to severe climatic limitations, steep topography and restrictive soil characteristics but are considered to have a moderate when utilised as grazing land, its current use. 	<p>assessed within the context of the proposed development. Consequently, the impact of the proposed development on the study area's agricultural potential will be extremely low, with the loss of agricultural land being attributed to the creation of the service roads and around the turbine foundations</p>
Noise	<ul style="list-style-type: none"> ▪ With the input data as used, the noise impact assessment indicated that the proposed project will have a noise impact of a low significance on all NSD in the area during the construction phase, but of a medium significance on NSD06 during the operational phase. As the wind turbine to be selected is not confirmed, modelling made use of the Nordex H90 2500HS wind turbine. Mitigation measures are proposed that will reduce the potential noise impact to a more acceptable low significance. 	<p>Where potentially sensitive receptors are nearby, care must be taken to ensure that the operations at the wind farm do not cause undue annoyance or otherwise interfere with the quality of life of the receptors.</p> <p>It should be noted that this does not suggest that the sound from the wind turbines should not be audible under all circumstances - this is an unrealistic expectation that is not required or expected from any other agricultural, commercial, industrial or transportation related noise source – but rather that the sound due to the wind turbines should be at a reasonable level in relation to the ambient sound levels.</p>
Visual	<ul style="list-style-type: none"> ▪ The visual assessment was undertaken based on the final draft layout for the wind farm that was made available for 	<p>The identified potentially impacted areas can be effectively ameliorated by further altering the turbine</p>

	<p>assessment in the final stages of the EIA. It is a critical factor that this layout was designed based on a consideration of a number of visual sensitivity factors, in particular areas on which turbines would be most visible to surrounding areas in which sensitive receptors are present. Although not all 'exclusion areas' were avoided, certain critical areas were not developed, and as such it is very important to note that this new layout represents a scenario under which visual mitigation measures have been applied.</p> <ul style="list-style-type: none"> ▪ In spite of the changes to the layout to avoid certain parts of the site, the assessment has identified that certain key observation locations will be subject to a visual contrast and thus potential visual intrusion that is inconsistent with the current visual environment. These locations are those receptor locations in natural contexts located to the west of the site (away from the town of Noupoort which has been assessed to be subject to an acceptable level of change) and a farmstead to the south of the site. 	<p>layout by removing turbines from the parts of the two buffer zones (that to the east of the 'escarpment edge' and that to the north of the Oorlogspoort Road) in which turbines have been placed. It is thus recommended that consideration be given to removing turbines from these locations, as this would result in an acceptable degree of visual change and intrusion associated with the wind farm at all locations (Note – this recommendation is subject to technical constraints and other environmental factors that may override visual impact considerations. The current layout already represents the implementation of mitigation measures in terms of restricting turbines from visually sensitive areas. The above recommendations would be favourable to reducing the visual impact however the locations of these turbines are not considered to be a fatal flaw.)</p>
Heritage	<ul style="list-style-type: none"> ▪ Several heritage resources have been identified on site which can be classed as having high significance. 	<p>Sensitive heritage resource areas are to be excluded as no-go areas. Suggested buffer zones must be implemented.</p> <p>All suggested mitigation measures must be implemented and included in the EMPr for the proposed development.</p>
Socio-economic	<p>A summary of the construction impacts are shown in the table below:</p>	<p>Though all of the identified social impacts can be mitigated or enhanced successfully, this can only be</p>

Change Process	Issue	Pre-Mitigation	Post-Mitigation
Economic	Employment and output creation	+18	+30
Socio-Cultural	Social mobilisation	-20	-7
	Health and safety	-60	-28
Average	Overall construction impacts	-20	-1.6

Apart from the possibility of temporary employment, overall (i.e. based on the average significant ratings of impacts as reflected in the table above) the construction phase is characterised by negative low social impacts.

In certain instances the implementation of mitigation measures can bring about positive changes. One such case would be the implementation of an effective HIV/AIDS prevention programme that extends to the local communities where construction workers will spend their free time, as this can also serve to inform and empower local people to make better and more informed decisions regarding their future (sexual) behaviour. Where Mainstream has the opportunity to bring about positive change to local communities they should pursue such opportunities where possible.

The majority of impacts that would occur during the construction phase would affect people's sense of wellbeing and security within their social environment. A number of changes to the socio-economic environment would lead to economic impacts, but for the

done if Mainstream, or its appointed contractor(s), commit to the responsibility of ensuring that the level of disturbance brought about to the social environment by the more negative aspects of the project, is minimised as far as possible.

It is therefore recommended that:

- Social issues identified during the EIA phase are addressed. This could be done by engaging social specialists where necessary or by ensuring that ECOs used during construction have the necessary knowledge and skills to identify social problems and address these when necessary. Guidelines on managing possible social changes and impacts could be developed for this purpose.
- Neighbouring landowners are informed beforehand of any construction activity that is going to take place in close proximity to their property. Prepare them on the number of people that will be on site and on the activities they will engage in.
- Employees are aware of their responsibility in terms of Mainstream's relationship with landowners and communities surrounding the site. Implement an awareness drive to relevant parts of the construction team to focus on respect, adequate communication

most part these impacts would be restricted to individuals or individual households and would not extend to the community at large.

A summary of the operations and maintenance impacts are shown in the table below.

Change Process	Issue	Pre-Mitigation	Post-Mitigation
Economic	Employment and output creation	+18	+33
	Tax income	+14	+14
	Corporate Social Investment	+27	+48
	Agricultural output	-11	-11
	Tourism	-10	-10
	Property prices	-10	-10
Socio-cultural	Sense of place	-24	-20
Average	Overall operations and maintenance impacts	+0.6	+6.3

The presence of the wind farm during the operation and maintenance phase overall will have a low positive impact, although certain elements will yield medium positive impacts whereas other elements are expected to have a more negative connotation. Most positive impacts are of an economic nature, most significantly Mainstream's corporate social investment in the area, which in turn could lead to an array of other positive social

and the 'good neighbour principle.'

All mitigation measures in the SIA are incorporated in the EMP to ensure that Mainstream and the contractor adhere to these

	<p>upliftment projects (outside the scope of this study). Negative impacts are expected to be on the low side and would in all probability be over-shadowed by the more positive contributions that Mainstream will make to the area through their CSI.</p>	
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These specialist studies were conducted to address the potential impacts relating to the proposed development that were identified during the scoping phase. An impact assessment was conducted to ascertain the level of significance each identified impact, and to identify mitigation measures which may be required. The potential positive and negative impacts associated within these studies have been evaluated and rated accordingly. The results of the specialist studies have indicated that no fatal flaws were identified by the specialists.

Based on the findings of the specialist studies, the following layout was chosen as the preferred layout.

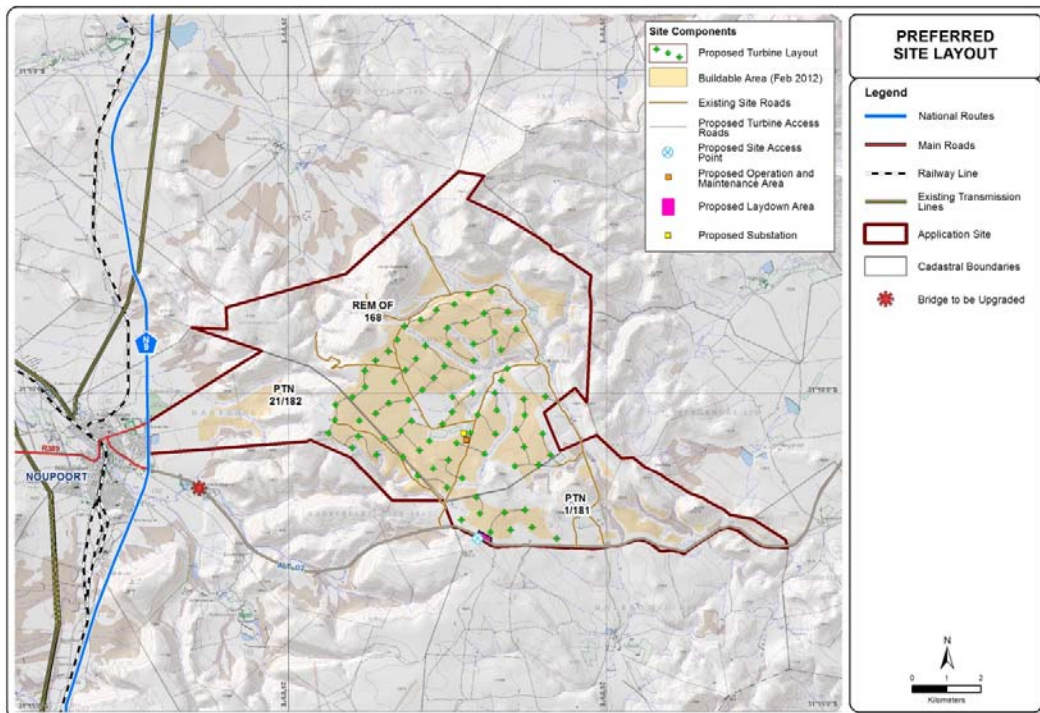


Figure iii: Preferred site layout

It is the opinion of the EAP that the proposed project be allowed to proceed provided that the recommended mitigation measures are implemented.