



MAINSTREAM
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SOUTH AFRICA

A joint venture with Genesis Eco-Energy



MAINSTREAM RENEWABLE POWER SOUTH AFRICA

Proposed Construction of a Wind Farm and Photovoltaic (PV) Facility near Loeriesfontein, Northern Cape Province, South Africa

Draft Scoping Report:

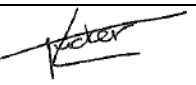
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KEY PROJECT INFORMATION

FARM DESCRIPTION	21 DIGIT SURVEYOR GENERAL CODE
Remainder of the Farm No. 226, Calvinia Road, Northern Cape	C01500000000022600000
Portion 1 of the Farm No. 213, Calvinia Road, Northern Cape	C01500000000021300001
Portion 2 of the Farm No. 213, Calvinia Road, Northern Cape	C01500000000021300002

TITLE DEEDS: Attached as Appendix 7

PHOTOGRAPHS OF SITE:



General Characteristics of the study area



General Characteristics of the study area

SENSITIVE VISUAL RECEPTORS: Potentially sensitive areas with sensitive receptors have been identified but sensitive visual receptors will be assessed in detail during the EIA phase of the project.

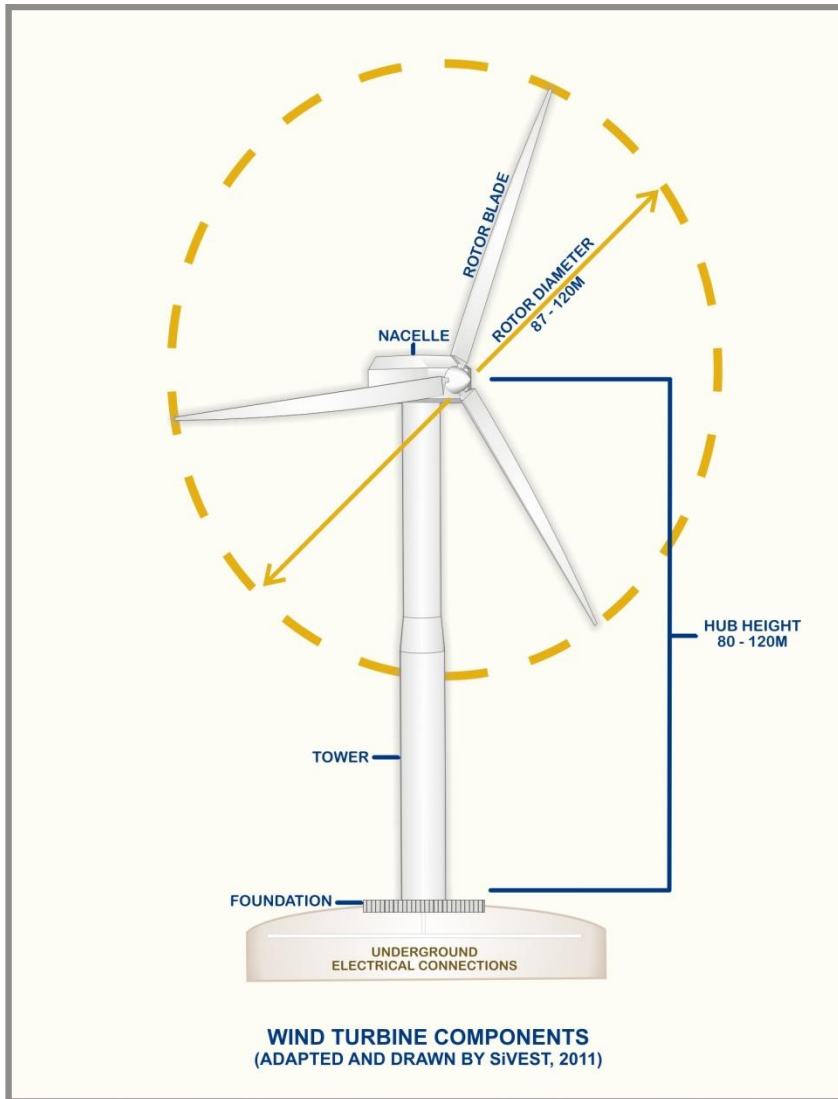
TYPE OF TECHNOLOGY: Wind Energy - turbines and Solar Energy – Photovoltaic (PV) panels

STRUCTURE HEIGHT: Wind Turbine - 80-120m; PV - 5-10m

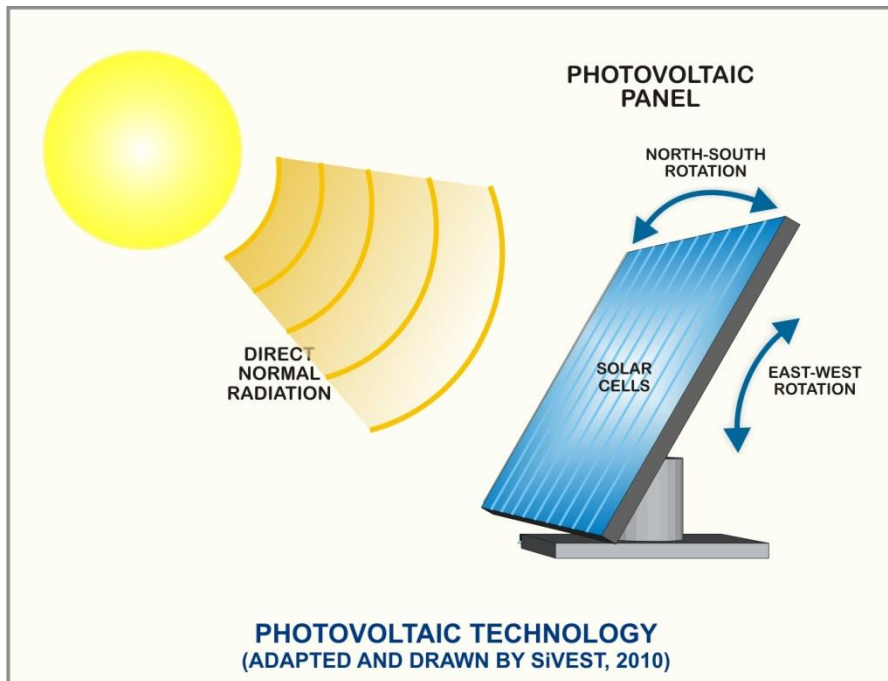
SURFACE AREA TO BE COVERED: 546 800m² (0.54km²).

STRUCTURE ORIENTATION: Wind Turbines - The structures will not be fixed and will be able to rotate in order to catch the prevailing winds. PV - Structure will be oriented in a north-east/north-west orientation.

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



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



FOUNDATION DIMENSIONS: Total footprint for each wind turbine and the associated hard standing area is approximately 2 800m². Total footprint for each PV panel and the associated hard standing area is approximately 200 m².

BLADE ROTATION DIRECTION: This will be provided during the EIA phase of the project.

PV STRUCTURE ORIENTATION: PV - Structure will be oriented in a northeast/northwest orientation.

LAYDOWN AREA DIMENSIONS: Wind Turbines and PV - 100m X 100m (10 000m²) during construction.

GENERATION CAPACITY: Wind energy - 45MW feeding into the 66kV line and 420MW feeding into the 400kV line. Solar energy – 50MW

ONSITE MEASURED WIND PARAMETERS: Data is confidential. Mainstream has measured wind at sufficient height since September 2010. The data gathered indicates that there is enough wind resource to construct a viable wind farm.

MAINSTREAM RENEWABLE POWER SOUTH AFRICA

CONSTRUCTION OF A WIND FARM AND SOLAR PHOTOVOLTAIC FACILITY NEAR LOERIESFONTEIN

DRAFT SCOPING REPORT

Executive Summary

Mainstream Renewable Power South Africa (Mainstream) intends to develop a wind farm and solar photovoltaic (PV) facility near Loeriesfontein 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 a PV plant as well as 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) will be consulted during the EIA process and will be complied with at all times.

The following assessments were conducted during the Scoping phase to identify the issues associated with the proposed development. These assessments will also inform the impact assessment to take place in the Impact phase of the project:

- Biodiversity (including fauna and flora) Assessment
- Avifaunal Assessment
- Bat Assessment
- Surface Water Impact Assessment
- Soils and Agricultural Potential Assessment
- Noise Impact Assessment
- Visual Impact Assessment
- Geotechnical Assessment
- Heritage Assessment
- Palaeontological Assessment
- Social Impact Assessment

Based on the Scoping studies which were conducted, a few potentially sensitive sites have been identified within the study area. These will be assessed in more detail during the Environmental Impact Report (EIR) phase so as to choose the best possible location for the proposed development with the project site. The table below summarises the specialist findings of the Scoping Report.

<p>Biodiversity (Flora and Fauna, including Avifauna)</p>	<p>Flora:</p> <ul style="list-style-type: none"> ▪ The vegetation type on the site is described as Bushmanland Basin Shrubland. This vegetation type is characterised by low shrubs species. ▪ The vegetation type is considered to be Least Threatened and none of it is conserved in statutory conservation areas (Mucina, <i>et al</i>, (2006). At this stage, the entire site will be investigated during the EIA phase to identify a suitable site for the proposed development. <p>Fauna:</p> <ul style="list-style-type: none"> ▪ Mammals – species such as the Honey Badger (<i>Mellivora capensis</i>) and the Litledale's Whistling Rat (<i>Parotomys littedalei</i>) both listed as Near Threatened are likely to occur in the study area. ▪ Amphibians - All amphibian species previously recorded in the study area are Not Threatened. The study area is extremely dry with very little rainfall and amphibian numbers are expected to be very low. ▪ Reptiles - Several reptile species are likely to be present and these are listed below. Several reptile species are present in the study area but none of these species are currently Red Listed (McLachlan, 1978). ▪ Invertebrates - These species are mobile in nature and are not likely to be affected by the construction of the wind farm. No unique larval habitat is present on the site which could impact on invertebrate species. ▪ Avifauna - The study area is characterised by a range of bird species which could potentially be affected by the proposed wind farm. ▪ At this stage, the entire site will be investigated during the EIA phase to identify a suitable site for the proposed development. <p>Sensitive areas:</p> <ul style="list-style-type: none"> ▪ The site in question is extremely uniform in nature and no specific sensitive areas could be identified at this stage. ▪ The entire study area will be investigated in more detail in the EIA phase to determine if there are areas which are more sensitive than others.
<p>Bats</p>	<ul style="list-style-type: none"> ▪ A total of 7 bat species may occur on the site, with 3 of them having a

	<p>chance of being severely impacted by wind turbines (high aerial foragers).</p> <ul style="list-style-type: none"> Areas where natural bat roosting space may be available include the mountainous terrain in the south west of the site. A buffer of 100 meter around inland water bodies and 200 meter around rivers is appropriate. The areas designated as sensitive must be treated as sensitive, implicating that no turbines are allowed to be placed in this zone due to the elevated impacts it can have on bat mortalities.
Surface water	<ul style="list-style-type: none"> Two priority river systems distanced approximately 5km apart from one another flow across the south of the Loeriesfontein study site. The river system located to the western most area of the site can be identified as the Leeuberg River. This particular river is classed as a largely natural river system (Class B) according to the Present Ecological State assessment conducted in 1999. Equally, the river system located in the central southern region of the study site is classed as a largely natural river system (Class B) according to the Present Ecological State assessment conducted in 1999. This river is identified as the Klein-Rooiberg River (Reach number E61). Numerous associated drainage lines can be evidenced in addition to these systems. Pans are relatively prominent and scattered throughout the site despite the prevailing climate. These are assumed to be seasonal or temporary in nature. The two priority river systems and associated drainage lines will affect the developable area of the proposed development, but do not constitute a fatal flaw for the study site provided that the site specific location of the wind turbines and PV plant be situated outside of any surface water resources and their associated buffer zones.
Agricultural Potential	<ul style="list-style-type: none"> According to the ENPAT agricultural dataset the study area is dominated by soils which are not suited for arable agriculture but which can still be used as grazing land. The highly restrictive soil and climate characteristics contribute to an extremely low agricultural potential in terms of crop production. The majority of the site consists of vast grazing land which can be seen as a non-sensitive land use in terms of agricultural production when assessed within the context of the proposed development.
Noise	<ul style="list-style-type: none"> This assessment indicated that the proposed project could have an impact potentially ranging from a low to high significance on the noise climate in the surrounding area in the unmanaged situation, as there are a number of potentially noise-sensitive developments within the

	<p>area of influence such as farmhouses.</p> <ul style="list-style-type: none"> ▪ The results of the scenarios indicated that the following information is critical in order to estimate the impact on potential receptors during the EIA phase: <ul style="list-style-type: none"> ○ For any modeling the total number of wind turbines proposed for the area should be considered (cumulative impact); ○ The noise emission characteristics of the proposed wind turbine (in octave sound power levels) is of critical importance; ○ The total area over which the turbines are developed is important; ○ The number and location of receptors is critical (distance between the receptor and closest turbines); ○ Prevailing wind direction(s) and speed(s) are critical; ○ Topographical layout of the terrain; and ○ Existing ambient sound levels must be considered. This is because background ambient noise levels have been measured during previous field work ranging between 16 dBA (no wind) to more than 70 dBA (wind blowing at 17 m/s). With wind energy facilities only operating during windy periods, the SANS 10103:2008 guideline is not strictly applicable. ○ The exact status of the two identified noise-sensitive developments.
Visual	<ul style="list-style-type: none"> ▪ The majority of the study area has a natural untransformed rural visual character; with a low capacity to absorb the development due to its natural character and the absence of shielding factors in the form of bushy vegetation or hilly topography. ▪ There are a few scattered farmsteads / homesteads in the area on and surrounding the site which may be sensitive receptor locations, depending on the sensitivity of the people that inhabit them to visual impacts and the value placed by these people in the natural characteristics of the area. ▪ Due to the sparse inhabitation of the wider area and low level of human activity on the site there are potentially very few visual receptor locations that were identified in the study area. A preliminary assessment of the study area seems to indicate that the receptor locations are unlikely to be highly sensitive to visual impacts associated with the potential wind and solar plant development, however this will need to be confirmed through further assessment in the EIA phase of the study. Despite the low density of potential visual receptors, the nature of visual impacts that are associated with a wind farm and PV development of this size entail that a visual impact exerted on a receptor in the study area could be significant. ▪ Further assessment will be required in the EIA-phase to investigate

	the sensitivity of receptor locations to visual impacts.
Geotech	<ul style="list-style-type: none"> From a geotechnical perspective no fatal flaws have been identified that would prevent development of a wind farm and PV facility on the Loeriesfontein site. However, certain geotechnical constraints are likely to be encountered in small sections of the site and these must be taken into account during development planning as they may influence the site layout and foundation design for the wind turbines, PV plant as well as and associated infrastructure.
Heritage	<ul style="list-style-type: none"> A limited variety of heritage resources are known to occur in the larger region and therefore there is a likelihood that similar resources would be located in the study area. Based on current knowledge, the site, features and objects known to exist or that are expected to exist in the study area are judged to have Grade III significance (other heritage resources worthy of conservation on a local authority level) and therefore would not prevent the project from continuing.
Palaeontology	<ul style="list-style-type: none"> The site near Loeriesfontein is largely underlain by marine to freshwater sediments of the Ecca Group (Karoo Supergroup) that are of Early to Mid Permian age. Important fossil material of aquatic vertebrates (mesosaurid reptiles, fish), invertebrates (e.g. crustaceans) and petrified wood is known from the Whitehill Formation and to a lesser extent from the Prince Albert and Tierberg Formations. However fossils other than trace assemblages are generally sparse and most of the Ecca sediments are of low overall palaeontological sensitivity. Their palaeontological potential may well have been locally compromised by chemical weathering and dolerite intrusion. Futhermore, a substantial portion of the Ecca Group outcrop area is mantled by superficial sediments (downwasted gravels, alluvium etc.) of low palaeontological sensitivity. It is concluded that the proposed Loeriesfontein wind farm and PV development is unlikely to pose a substantial threat to local fossil heritage. The impact significance of this project as far as palaeontological heritage is concerned is rated as LOW (negative).
Tourism	<ul style="list-style-type: none"> The wind farm study site is not located in close proximity to any tourist hotspots. Furthermore, most farmsteads in and around the area of the proposed development are uninhabited. The closest town is Loeriesfontein, where a few tourist facilities and the Namaqualand Flower Route are found, is sufficiently distanced away from the proposed development for any significant impact to occur. Negative impacts that may potentially affect the surrounding area include visual impacts and land-use change impacts. Positive impacts

	<p>associated with the proposed development pivots on increasing corporate demand, which could potentially bring in additional tourism to the vicinity thereby increasing the area's contribution to the provincial Gross Domestic Product (GDP).</p> <ul style="list-style-type: none"> ▪ Given that area of the proposed wind farm and PV facility is not a popular tourist destination, and that there are no current or planned sensitive tourism features in close proximity, no EIA phase study is required.
Social	<ul style="list-style-type: none"> ▪ The proposed project is located in an area that is in transition away from established mining industries (as can be found in Northern Cape in general) to a more diversified local economy. The transition has resulted in higher unemployment and has probably negatively affected local economic opportunities. As such, the economic effects are likely to be an important feature associated with the project.

The Scoping Report has identified several aspects that warrant further investigation in the EIR Phase. These are as follows:

- Biodiversity (flora and fauna, including Avifauna and bats)
- Surface Water
- Noise Environment
- Visual Environment
- Soil and Agricultural potential
- Geotechnical Environment
- Heritage Environment
- Socio-economic Environment

A full comparative assessment of layout alternatives will be undertaken during the EIA phase.

MAINSTREAM RENEWABLE POWER SOUTH AFRICA

CONSTRUCTION OF A WIND FARM NEAR LOERIESFONTEIN

DRAFT SCOPING REPORT

Contents	Page
1 INTRODUCTION	23
1.1 Objectives of the Scoping Phase	23
1.2 Applicable Documentation	24
1.3 Specialist Studies.....	25
1.4 Authority Consultation	25
1.5 Expertise of Environmental Assessment Practitioner	26
1.6 Draft Scoping Report Structure	27
2 TECHNICAL PROJECT DESCRIPTION	28
2.1 Project Description	28
2.1.1 Turbines	28
2.1.2 Photovoltaic Cells	30
2.1.3 Electrical Connections	30
2.1.4 Substations	32
2.1.5 Roads.....	32
2.1.6 Temporary construction area.....	33
2.1.7 Other infrastructure.....	33
2.1.8 Alternatives	33
3 LEGAL REQUIREMENTS AND GUIDELINES.....	37
3.1 Key Legal and Administrative Requirements Relating to the Proposed Development.....	37
3.1.1 National Environmental Management Act (Act No 107 of 1998) – NEMA EIA Requirements.....	37
3.1.2 NEMA EIA Requirements	37
3.1.3 National Heritage Resources Act (Act No 25 of 1999)	41
3.1.4 National Water Act (Act No 36 of 1998).....	41
3.1.5 Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009)	43
3.1.6 National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)	43
3.1.7 National Forest Act No 84 of 1998)	44
3.1.8 Conservation of Agricultural Resources Act No. 43 of 1983	45
3.1.9 Subdivision of Agricultural Land Act No. 70 of 1970, as amended	45
3.1.10 National Road Traffic Act No. 93 of 1996, as amended.....	46
3.1.11 Civil Aviation Act No. 13 of 2009	46
3.1.12 Astronomy Geographic Advantage Act No. 21 of 2007	47
3.1.13 Additional Relevant Legislation	47
3.2 Key Development Strategies and Guidelines.....	47
3.2.1 Integrated Development Plans	47
3.2.2 Integrated Energy Plan for the Republic of South Africa, 2003.....	48

3.2.3	Independent Power Producer Process	49
4	PROJECT NEED AND DESIRABILITY	51
4.1	Research Supporting Wind Energy	53
4.2	Security of Power Supply	54
4.3	Local Employment	54
4.4	Regional and Local Income Profile	55
4.5	Further Facts Justifying Wind Energy	55
5	DESCRIPTION OF THE RECEIVING ENVIRONMENT	56
5.1	Regional Locality	57
5.2	Study Area Description	58
5.3	Climate	59
5.4	Geology	60
5.5	Biodiversity (Flora, Fauna and Avifauna)	61
5.5.1	Flora and Fauna in the study area	61
5.5.2	Faunal assemblages	63
5.5.3	Sensitive areas	68
5.5.4	Bats	69
o	Species probability of occurrence	69
o	Larger area around site	70
o	Surface rock, topography, climate, surface water and vegetation	71
o	Desktop based fatal flaws map/sensitivity map	71
5.6	Surface Water	73
5.6.1	Drainage Context	73
5.6.2	Surface Water Resource Occurrence in the Study Area	74
5.7	Agricultural Potential	75
5.7.1	Soil Characteristics and Soil Potential	75
5.7.2	Desktop Agricultural Assessment: Result Summary	78
5.7.3	Field Verification	78
5.8	Noise	81
5.8.1	Potential Noise-Sensitive Developments	81
5.8.2	Baseline situation - Current Noise Sources	82
5.8.3	Baseline situation - Measurement Procedure	83
5.8.4	Baseline situation - On-Site Measurements	83
5.8.5	Environmental Issues and Potential Impacts - Construction Phase	85
5.8.6	Environmental Issues and Potential Impacts - Operational Phase	85
5.9	Visual	86
5.9.1	Physical Landscape Characteristics	86
5.9.2	Presence of Potential Sensitive Receptors	87
5.10	Geotechnical Aspect	88
5.10.1	Bedrock Geology	88
5.10.2	Preliminary Geotechnical Assessment	89
5.11	Heritage	89
5.11.1	Regional overview	90
5.11.2	Heritage potential	90
5.12	Palaeontology	90
5.12.1	Geological Background	90
5.12.2	Palaeontological Heritage	92
5.12.3	Conclusions and Recommendations	93
5.13	Tourism	94
5.13.1	Tourism in the Northern Cape	94
5.13.2	Tourism in and Around the Proposed Wind Farm and PV Facility	94

5.14	Social Environment	97
5.14.1	<i>Geographical Processes</i>	97
6	ENVIRONMENTAL ISSUES, POTENTIAL AND CULUMATIVE IMPACTS	102
6.1	Identification of potential impacts	102
6.1.1	<i>Floral impacts</i>	102
6.1.2	<i>Faunal impacts</i>	103
6.1.3	<i>Surface water Impacts</i>	106
6.1.4	<i>Agricultural Potential Impacts</i>	109
6.1.5	<i>Noise Impacts</i>	110
6.1.6	<i>Visual Impacts</i>	113
6.1.7	<i>Geotechnical Impacts</i>	114
6.1.8	<i>Heritage Impacts</i>	116
6.1.9	<i>Palaeontological Impacts</i>	117
6.1.10	<i>Tourism</i>	118
6.1.11	<i>Socio-economic</i>	119
7	PUBLIC PARTICIPATION PROCESS	125
7.1	Objectives of Public Participation	126
7.2	Overview of the Public Participation Process to date	127
7.3	Consultation and Public Involvement	129
7.4	Stakeholders and I&APs	129
7.5	Announcing the Opportunity to Participate	130
7.6	Notification of the Potential Interested and Affected Parties	130
7.6.1	<i>Summary of comments received</i>	131
7.7	Proof of Notification	132
7.8	Focus Group Meetings	132
7.9	Key Stakeholder Workshop	133
7.10	Public Meetings / Open Days	133
7.11	One-on-One Consultation	134
7.12	Issues and response report	134
7.13	Public comments on Draft Scoping Report	135
8	ASSESSMENT IN TERMS OF EQUATOR PRINCIPLES	136
8.1	Assessment Results	138
9	CONCLUSIONS AND RECOMMENDATIONS	142
9.1	Conclusions	142
9.1.1	<i>Layout Alternatives</i>	142
9.1.2	<i>Summary of Findings</i>	143
9.2	Recommendations	149
10	PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT	154
10.1	Aim of the EIA Phase	154
10.2	Authority Consultation	155
10.3	Proposed Method of Assessing Environmental Issues	155
10.3.1	<i>Biodiversity Assessment (including avifauna and bats)</i>	156
10.3.2	<i>Surface Water Impact Assessment</i>	157
10.3.3	<i>Agricultural Potential Assessment</i>	157
10.3.4	<i>Noise Impact Assessment</i>	158
10.3.5	<i>Visual Impact Assessment</i>	158
10.3.6	<i>Heritage Assessment</i>	159
10.3.7	<i>Socio-economic Impact Assessment</i>	160

10.4	Determination of Significance of Impacts	160
10.5	Impact Rating System.....	161
10.5.1	Rating System Used To Classify Impacts	161
10.6	Recommendations	166
10.7	Public Participation.....	167
10.8	Proposed Project Schedule going forward	168
11	REFERENCES	169

List of Tables

Table 1: Project Team	26
Table 2: Buffer zones applications to sensitive areas	35
Table 3: Listed activities in terms of the NEMA Regulations.....	38
Table 4: Government Energy Plans up until 2030 in terms of the IRP	50
Table 5: Mean monthly rainfall for Loeriesfontein (Source: South Africa's Rain Atlas).....	59
Table 6: Mean monthly and annual temperature for Loeriesfontein (Source: http://www.saexplorer.co.za)	60
Table 7: Amphibian species in the study area.....	64
Table 8: Reptiles in the study area	64
Table 9: Bird Species in the study area.....	66
Table 10: Red Data Bird Species (Barnes 1998)	67
Table 11: Table of species that may be roosting on the study area, the possible site specific roosts, and their probability of occurrence LC = Least Concern; NT = Near Threatened; V = Vulnerable; DD = Data Deficient (Monadjem <i>et al.</i> , 2010).	69
Table 12: Locations of the identified Noise Sensitive Developments (Datum type: WGS 84 – Hartbeeshoek)	82
Table 13: Equipment used to gather data	83
Table 14: Results of ambient sound level monitoring.....	84
Table 15: Summary of Social Findings.....	99
Table 16: Impact of the Loss of Natural Vegetation	102
Table 17: Fragmentation in Natural Systems	103
Table 18: Impact on Sensitive Vegetation.....	103
Table 19: Impact on the loss of habitat	103
Table 20: Impact of bird collisions with wind turbines	104
Table 21: Impact of bat mortalities due to blade collisions and barotrauma during foraging.	104
Table 22: Impact of bat mortalities due to blade collisions and barotrauma during migration. ...	105
Table 23: Impact of bat mortalities due to destruction of bat foraging habitat.	105

Table 24: Impact of bat mortalities due to destruction of roosts.....	105
Table 25: Impact of the foundations of the wind turbines on surface water resources	106
Table 26: Impact of the foundation of the operation maintenance building and the substation on surface water resources	107
Table 27: Impact of the clearing of vegetation for wind turbines, PV cells, substation area, operation maintenance building and internal roads on surface water resources.....	107
Table 28: Impact of abnormal/heavy vehicle access into wetlands	107
Table 29: Impacts associated with general access into wetlands.....	108
Table 30: Impacts of storm water run-off associated with the internal roads, substation and operation maintenance building construction into nearby surface water resources.	108
Table 31: Agricultural potential impacts	109
Table 32: Impact Assessment Criteria	110
Table 33: Assessment Criteria: Ranking Scales	112
Table 34: Preliminary Impact Estimation: Operational Phase	113
Table 35: Visual Impacts	113
Table 36: Impact of the wind turbines and associated infrastructure the ground conditions of the Loeriesfontein Site.	115
Table 37: Impact of the proposed development on heritage resources in the Loeriesfontein study site	116
Table 38: Impact of the adverse impacts on paleontological resources	117
Table 39: Tourism Impacts	118
Table 40: Geographical Change Processes and Expected Impacts.....	119
Table 41: Demographical Change Processes and Expected Impacts	120
Table 42: Economic Change Processes and Expected Impacts	121
Table 43: Institutional and Legal Change Processes and Expected Impacts	123
Table 44: Socio-Cultural Change Processes and Expected Impacts.....	124
Table 45: Focus Group meetings	132
Table 46: Key Stakeholder Workshop.....	133
Table 47: Public Meetings / Open Days	134
Table 48: Venue where Scoping Report will be publically available	135
Table 49: Wind farm and PV facility Compliance Level in terms of Equator Principles and Related Performance Standards.....	138
Table 50: Summary of environmental issues identified in Specialist Studies	143
Table 51: Conclusions of Specialist Studies.	145
Table 52: Outcomes and recommendations of Specialist Studies.....	149
Table 53: Description of terms.....	161

Table 54: Rating of impacts.....	165
Table 55: Public Participation activities still to take place	167
Table 56 Proposed Project Schedule	168

List of Figures

Figure 1: Typical Components of a wind turbine.	29
Figure 2: Illustration of how a CPV panel operates	30
Figure 3: Conceptual wind farm electricity generation process showing electrical connections... 31	
Figure 4: CPV/PV process.....	32
Figure 5: Wind Potential Map (Source: Environomics and MetroGIS, 2011).....	52
Figure 6: National Solar Resource Map (Source: Solar Vision, 2010)	53
Figure 7: Loeriesfontein Regional Study Area.....	57
Figure 8: Loeriesfontein Site Locality Map	58
Figure 9: Mean Monthly Rainfall Graph for Loeriesfontein.....	60
Figure 10: Vegetation of the study area	62
Figure 11: Vegetation units of the larger study area (Mucina & Rutherford, 2006).....	70
Figure 12: Bat Sensitivity map.....	72
Figure 13: Surface water Features for the Loeriesfontein site.	75
Figure 14: Soil Map of the Loeriesfontein Site.	76
Figure 15: Soil Depth Map of the Loeriesfontein Site.....	77
Figure 16: Soil Potential Map of the Loeriesfontein Site.	78
Figure 17: Typical topography encountered on the Loeriesfontein Site.....	79
Figure 18: Typical land use associated with the study area.....	80
Figure 19: Rocky shallow soils dominate the study area	81
Figure 20: Potential Noise-sensitive Developments identified near Loeriesfontein	82
Figure 21: Monitoring points selected near the proposed facility (marked as blue squares)	85
Figure 22: Map showing potential visual receptors within the study area	88
Figure 23: Extract from the draft 1: 250 000 geology sheet 3018 Loeriesfontein (Council for Geoscience, Pretoria, unpublished data) showing the approximate outline of the study area (yellow polygon). Please note that this early draft of the geological map incorporates an incorrect overlay of the road network.	91
Figure 24: Tourism infrastructure around the study area (within a 60km radius).....	96
Figure 25: Preliminary social sensitivity map of the Loeriesfontein site	98
Figure 40: Public Participation Process.....	128

List of Appendices

Appendix 1: Expertise of the EAP and Project Team

Appendix 2: Specialist Studies

- Appendix 2A: Biodiversity Assessment
- Appendix 2B: Bat Assessment
- Appendix 2C: Agricultural Assessment
- Appendix 2D: Noise Assessment
- Appendix 2E: Visual Assessment
- Appendix 2F: Geotechnical Assessment
- Appendix 2G: Heritage Assessment
- Appendix 2H: Palaeontology Assessment
- Appendix 2I: Tourism Assessment
- Appendix 2J: Socio-economic Assessment

Appendix 3: Authority Consultation

Appendix 4: Public Participation

- Appendix 4A: Proof of site notices
- Appendix 4B: Background Information Document
- Appendix 4C: Proof of advertisements
- Appendix 4D: Correspondence
- Appendix 4E: Issues and Response Report
- Appendix 4F: I&AP Database

Appendix 5: Maps

Appendix 6: Constraints Analysis Report

Glossary of terms

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

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

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

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

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

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

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

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

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

Heritage Significance Grades:

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

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

Hyrdomorphic / hydric soil: Soil that in its undrained condition is saturated or flooded long enough during the growing season to develop anaerobic conditions favouring growth and regeneration of hydrophytic vegetation. These soils are found in and associated with wetlands.

Iron Age: Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and they herded cattle as well as sheep and goats. These people, according to archaeological evidence, spoke early variations of the Bantu Language. Because they produced their own iron tools, archaeologists call this the Iron Age.

Early Iron Age AD 200 - AD 900

Middle Iron Age AD 900 - AD 1300

Late Iron Age AD 1300 - AD 1830

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

Macro-geomorphological: Related to / on the scale of geomorphic provinces. A geomorphic province is a spatial entity with common geomorphic attributes.

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

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

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

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

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

Early Stone Age 2 000 000 - 150 000 Before Present

Middle Stone Age 150 000 - 30 000 BP

Late Stone Age 30 000 - until c. AD 200

List of Abbreviations

AP	- Action Plan
BID	- Background Information Document
CRM	- Cost Recovery Mechanism
DEA	- Department of Environmental Affairs
DoE	- Department of Energy
DSR	- Draft Scoping Report
DWA	- Department of Water Affairs
EAPs	- Environmental Assessment Practitioner
EHS	- Environmental, Health, and Safety
EIA	- Environmental Impact Assessment
EIR	- Environmental Impact Report
EMPr	- Environmental Management Programme
ENPAT	- Environmental Potential Atlas
ECA	- Environmental Conservation Act No 73 of 1989
EP	- Equator Principles
EPFI	- Equator Principles Financial Institutions
FGM	- Focus Group Meeting
FSR	- Final Scoping Report
GDP	- Gross Domestic Product
GIIP	- Good International Industry Practice
GIS	- Geographic Information System
GPS	- Global Positioning System
GW	- Gigawatts
HIA	- Heritage Impact Assessment
I&AP(s)	- Interested and Affected Parties
IBA(s)	- Important Bird Area(s)
IDP	- Integrated Development Plan
IEP	- Integrated Energy Plan
IPP(s)	- Independent Power Producers
IUCN	- International Union for the Conservation of Nature and Natural Resources
KSW	- Key Stakeholder Workshop
kV	- Kilo Volt
LGMSA	- Local Government: Municipal Systems Act No. 32 of 2000
MSA	- Middle Stone Age
MYPD2	- Multi Year Price Determination 2
MW	- Megawatt
MSBL	- Multi-Site base load (MSBL)
NCDTEC	- Northern Cape Department of Tourism, Environment and Conservation

NEA - The National Energy Act No. 34 of 2008
NERSA - National Energy Regulator of South Africa
ERA - The Electricity Regulation Act No. 4 of 2006
IRP - Integrated Resource Plan
ISMO - Independent System and Market Operator
NEMA - National Environmental Management Act No. 107 of 1998
NEMBA - National Environmental Management: Biodiversity Act No. 10 of 2004
NFEPA - National Freshwater Ecological Priority Areas
NHRA - National Heritage Resources Act No. 25 of 1999
NSBA - National Spatial Biodiversity Assessment
NWA - National Water Act No. 36 of 1998
NEMAA - National Environmental Management: Air Quality Act of 2004
OCGT - Open Cycle Gas Turbine
OHS Act - Occupational Health and Safety Act No. 85 of 1993
PFA - Project Facilitation Act No. 67 of 1995
PoS - Plan of Study
PM - Public Meeting
PPA - Power Purchase Agreement
PPP - Public Participation Process
PV - Photovoltaic
REFIT - Renewable Feed-In Tariff Programme
RFP - Request for Proposals
RFQ - Request for Qualifications
SA - South Africa
SABAP 2 - Southern African Bird Atlas Project 2
SAHRA - South African Heritage Resources Agency
SANBI - South African National Biodiversity Institute
SAWS - South African Weather Service
SBO - Single Buyer Office
SDF - Spatial Development Framework
VAC - Visual Absorption Capacity

MAINSTREAM RENEWABLE POWER SOUTH AFRICA

CONSTRUCTION OF A WIND FARM AND SOLAR PHOTOVOLTAIC FACILITY NEAR LOERIESFONTEIN, NORTHERN CAPE PROVINCE OF SOUTH AFRICA

DRAFT SCOPING REPORT

1 INTRODUCTION

South Africa Mainstream Renewable Power Developments Loeriesfontein (Pty) Ltd (hereafter referred to as Mainstream) has appointed SiVEST to undertake the EIA process for the proposed construction of a wind farm and solar photovoltaic (PV) facility near Loeriesfontein, Northern Cape Province, South Africa. The site is approximately 60km to the north of Loeriesfontein. The objective of the project is to develop a wind farm and PV facility in order to generate electricity to feed into the national grid. The project is also in line with the government's commitment to provide renewable energy as an alternative energy source to those currently utilized.

This Scoping Report is compiled in accordance with the Equator Principles (EP), which is a financial industry benchmark for determining, assessing and managing social and environmental risk in project financing (Equator Principles, 2006).

This wind farm and PV project is considered a Category B project, which are those with potential limited adverse social or environmental impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures (Equator Principles, 2006). The project will also comply with the International Finance Corporation's Social and Environmental Performance Standards (2006).

1.1 Objectives of the Scoping Phase

The NEMA EIA Regulations (GN. R. 543) state that the objectives of a Scoping study are to identify:

- 27 (e) (i): issues that will be relevant for consideration of the application;
- 27 (e) (ii): the potential environmental impact of the proposed activity; and
- 27 (e) (iii): alternatives to the proposed activity that are feasible and reasonable.

The primary purpose of the Scoping phase is to establish baseline information with regards to the environment within which the project is proposed to take place and to determine feasible and reasonable alternatives associated with the activities. In this context the environment is taken to include the natural, cultural, social and economic environments, with baseline information being the current conditions of the various environments. Various specialists have undertaken studies to ascertain the current conditions in the study area in their specific field, all of which is done within the framework of the project description.

Having established the baseline information, specialists are then required to identify possible impacts of the proposed development on the specific environment that their field encompasses. These potential impacts are set out in several tables below. Note that the impacts detailed in the tables are provisional and additional impacts may be identified during the Environmental Assessment Phase, while other identified impacts may fall away.

An additional objective of the Scoping phase is to provide Interested and Affected Parties (I&APs) with information regarding the project and also the opportunity to raise issues regarding the project, submit comments and ask questions. The Public Participation Process (PPP) undertaken during the Scoping Phase is also reported on below. The PPP section provides details on the greater process as well as listing the comments and concerns raised by I&APs.

1.2 Applicable Documentation

The following documentation should be read in conjunction with this Scoping Report:

- “Equator Principles” 2006
- International Finance Corporations Performance Standards on Social and Environment, April 2006; namely:
 - Performance Standard 1: Social and Environmental Assessment and Management Systems
 - Performance Standard 2: Labor and Working Conditions
 - Performance Standard 3: Pollution Prevention and Abatement
 - Performance Standard 4: Community Health, Safety and Security
 - Performance Standard 5: Land Acquisition and Involuntary Resettlement
 - Performance Standard 6: Biodiversity Conservation and Sustainable Natural Resource Management
 - Performance Standard 7: Indigenous Peoples
 - Performance Standard 8: Cultural Heritage

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

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

1.3 Specialist Studies

Specialist studies have been conducted in terms of the stipulations contained within Section 28 (1) of the NEMA EIA regulations.

The following specialist studies have been conducted for the area:

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

These studies have been used to identify issues at a Scoping level and will be supplemented with more site specific studies during the EIA phase of the project. Key issues relating to the proposed site are discussed below.

1.4 Authority Consultation

The National Department of Environmental Affairs (DEA) is the competent authority for this project. As such initial application was submitted to DEA on the 4th of July 2011 and

acknowledged on the 13th July 2011. Following amendments to this original application, the project application was acknowledged on the 6th of September 2011. Two reference numbers were allocated to the proposed development.

These include the following (Appendix 3):

- Wind farm reference numbers
 - DEA reference number 12/12/20/2321/1
 - NEAS reference number DEA/EIA/0000381/2011

- PV Plant reference numbers
 - DEA reference number 12/12/20/2321/2
 - NEAS reference number DEA/EIA/0000381/2011

Authorisation was thus granted to undertake a Scoping study and submit a Scoping Report for the proposed project. A Landowner notification form formed part of the application form and was accordingly submitted on the same date.

1.5 Expertise of Environmental Assessment Practitioner

SiVEST has considerable experience in the undertaking of EIAs. Staff and specialists who have worked on this project and contributed to the compilation of this Scoping Report are detailed in Table 1 below.

Table 1: Project Team

Name and Organisation	Role
Kelly Tucker SiVEST	Project Leader
Liesl Koch SiVEST	Biodiversity (Flora and Fauna)
Paul da Cruz SiVEST	Avifauna, Visual, Surface water
Shaun Taylor SiVEST	Surface water
Faith Kalibbala SiVEST	Tourism
Andrea Gibb SiVEST	Visual
Kurt Barichievy SiVEST	Agricultural Potential
Kerry Schwartz, SiVEST	GIS and Mapping
Morne de Jager – M ² Environmental Connections	Noise
Johnny Van Schalkwyk	Heritage
Nonka Byker – MasterQ	Social
Werner Marais – Animalia	Bats
John Almond	Palaeontology
Cecilia Canahai	Geotech

Name and Organisation	Role
Nicolene Venter SiVEST	Public participation
Mabel Qinsile	

Please refer to attached CV's for more information (Appendix 1).

1.6 Draft Scoping Report Structure

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

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

2 TECHNICAL PROJECT DESCRIPTION

2.1 Project Description

At this stage, it is estimated that the wind farm proposed project will encompass the installation of a number of wind turbine generators and solar photovoltaic generators and their associated components in order to generate electricity that is to be fed into the existing Eskom distribution and / or transmission lines that cross or are located near the proposed sites. The total power generation capacity limit and the number of wind turbines and PVs to be accommodated will ultimately depend on the size of the developable area. The project is proposed on the following farm portions:

- Remainder of the Farm No. 226, Calvinia Road, Northern Cape
- Portion 1 of the Farm No. 213, Calvinia Road, Northern Cape
- Portion 2 of the Farm No. 213, Calvinia Road, Northern Cape

A total of approximately 180 turbines might be required. The project will involve the construction of a wind farm with an ultimate capacity of 460MW across the three land portions. The project is likely to comprise of the following components:

- Phase 1 - 45MW to connect to the 66kV busbar of the Eskom 400kV Helios Substation;
- Phase 2 - 420MW connecting to Eskom's 400kV Helios Substation.

As part of Phase 2 of the proposed project it is likely that a 50MW solar photovoltaic (PV) facility would be to be located on approximately 200ha of the site, including:

- PV Power Plant
- Associated infrastructure

The area required for the PV facility does not need to be cleared or graded however no tall vegetation can remain on the site. The site is free of tall vegetation.

The key components of the project are:

2.1.1 Turbines

The size of the wind turbines will depend on the developable area and the total generation capacity that can be produced as a result. The wind turbines will therefore have a hub height of between 80 to 120m and a rotor diameter of 87 to 120m (Figure 1). The blade rotation direction

will depend on wind measurement information received later in the process. The rotation will range from 6 to 20 rpm. The foundation of each wind turbine will be approximately 20m x 20m. The footprint for each wind turbine will therefore be approximately 400m². A hard standing area of approximately 2 400m² for crane usage will accompany each wind turbine. Hence, the total footprint for each wind turbine and the associated hard standing area will be 2 800m². The foundation will be up to 2.5m deep. As already mentioned, it is anticipated at this stage that 180 wind turbines will be constructed. The total area for all the wind turbines for the Loeriesfontein study site will therefore be approximately 546 800m² (including the hard standing areas). The electrical generation capacity for each turbine will range from 1 – 3 MW depending on the final wind turbine selected for the proposed development. The total generation capacity for the Loeriesfontein study site is envisaged to be 460 MW as stated earlier.

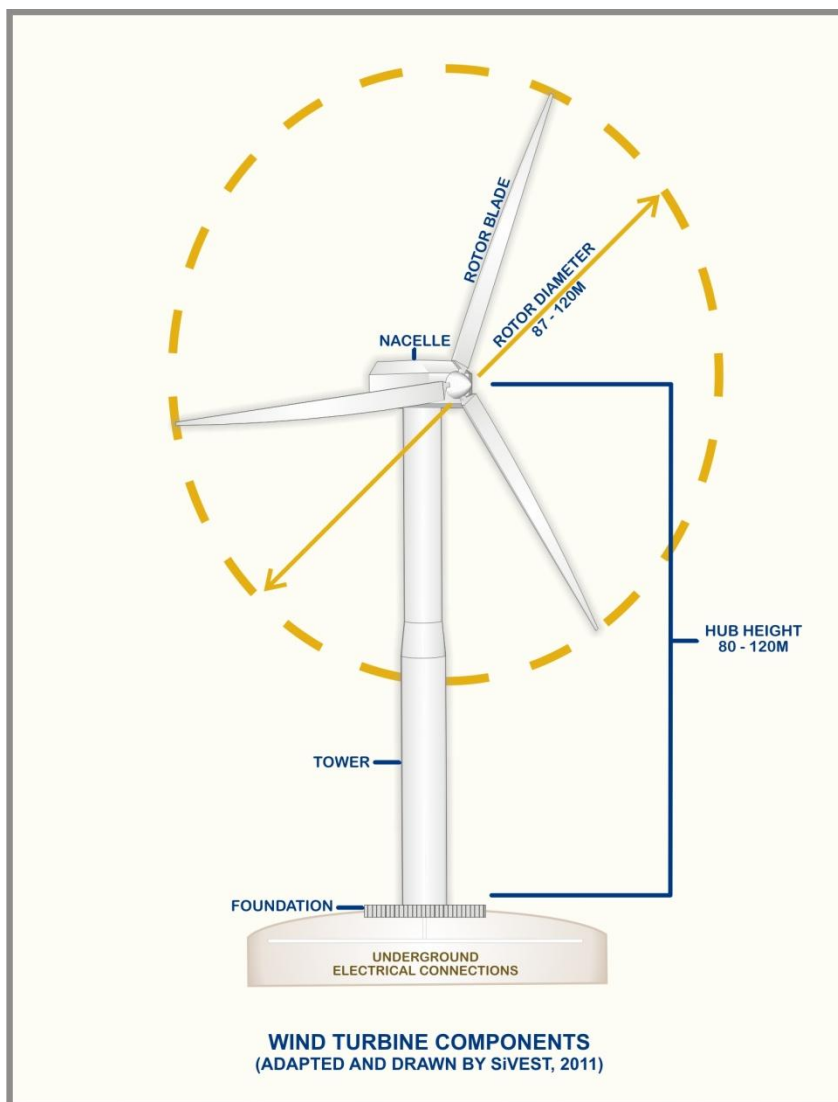


Figure 1: Typical Components of a wind turbine.

2.1.2 Photovoltaic Cells

The panel arrays are approximately 15m x 4m in area. These are mounted into metal frames which are usually aluminium. Concrete or screw pile foundations are used to support the panel arrays. The arrays are either fixed on a tracking system or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun (Figure 2Error! Reference source not found.). Arrays usually reach up to between 5m and 10m above ground level.

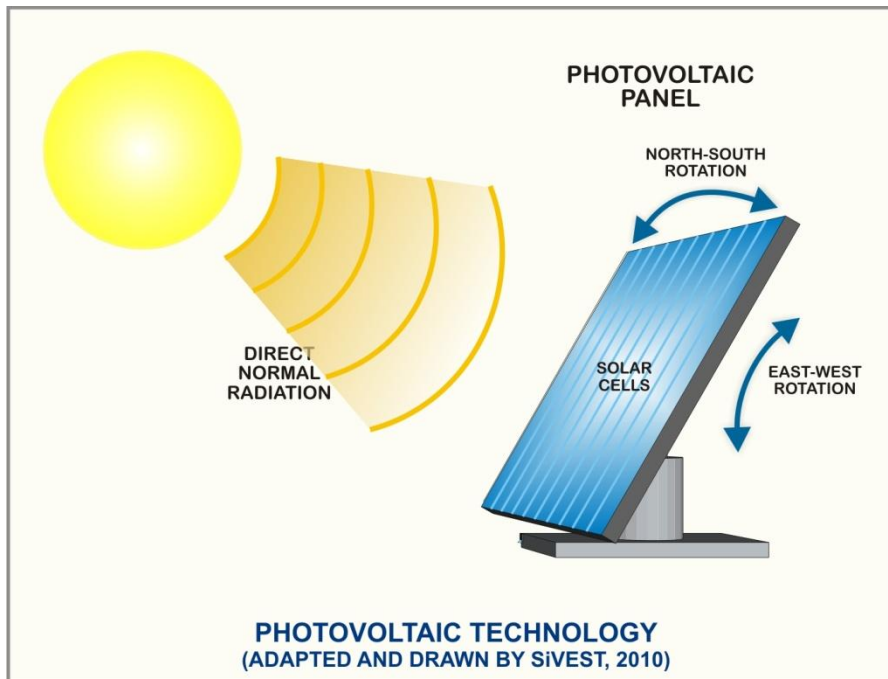


Figure 2: Illustration of how a CPV panel operates

2.1.3 Electrical Connections

The wind turbines will be connected to each other and to the substation using buried (up to a 1m depth) medium voltage cables (Figure 3) except where a technical assessment of the proposed design suggests that overhead lines are appropriate such as over rivers and gullies. Where overhead power lines are to be constructed, monopole tower structures will be used. The dimensions of the monopole structures will depend on grid safety requirements and the grid operator. No servitudes will be associated with the wind farm infrastructure although servitudes for Eskom infrastructure may be required on site. As previously mentioned, the electrical connection to the grid will be dependent on the total generation capacity and the actual available

connection as determined by Eskom. The power lines could therefore have a voltage of 66kV to 132kV.

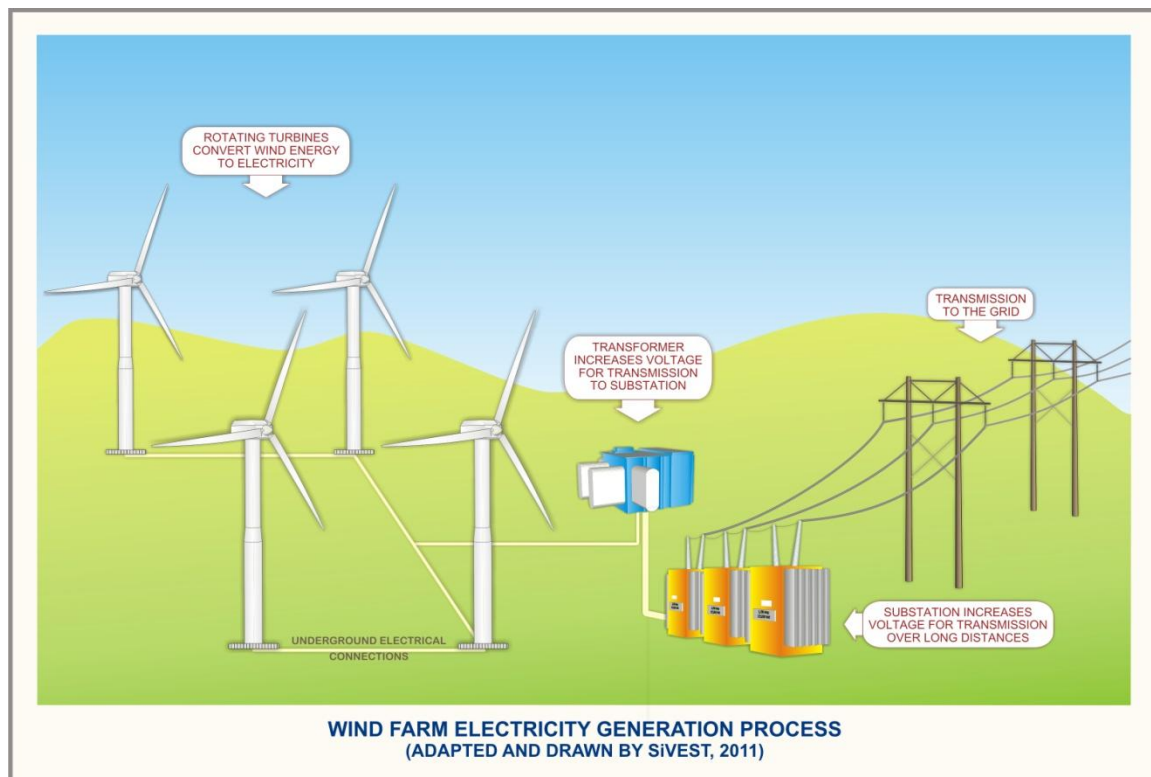


Figure 3: Conceptual wind farm electricity generation process showing electrical connections

The PV arrays are typically connected to each other in strings and the strings connected to DC to AC inverters (Figure 4). The DC to AC inverters may be mounted on the back of the panels support substructures / frames or alternatively in a central inverter station. The strings are connected to the inverters by low voltage DC cables. Power from the inverters is collected in medium voltage transformers through AC cables. Cables may be buried or pole mounted depending on voltage level and site conditions.

The medium voltage transformers can be compact transformers distributed throughout the solar field or alternatively located in a central sub-station. It is likely to be a central substation in this instance.

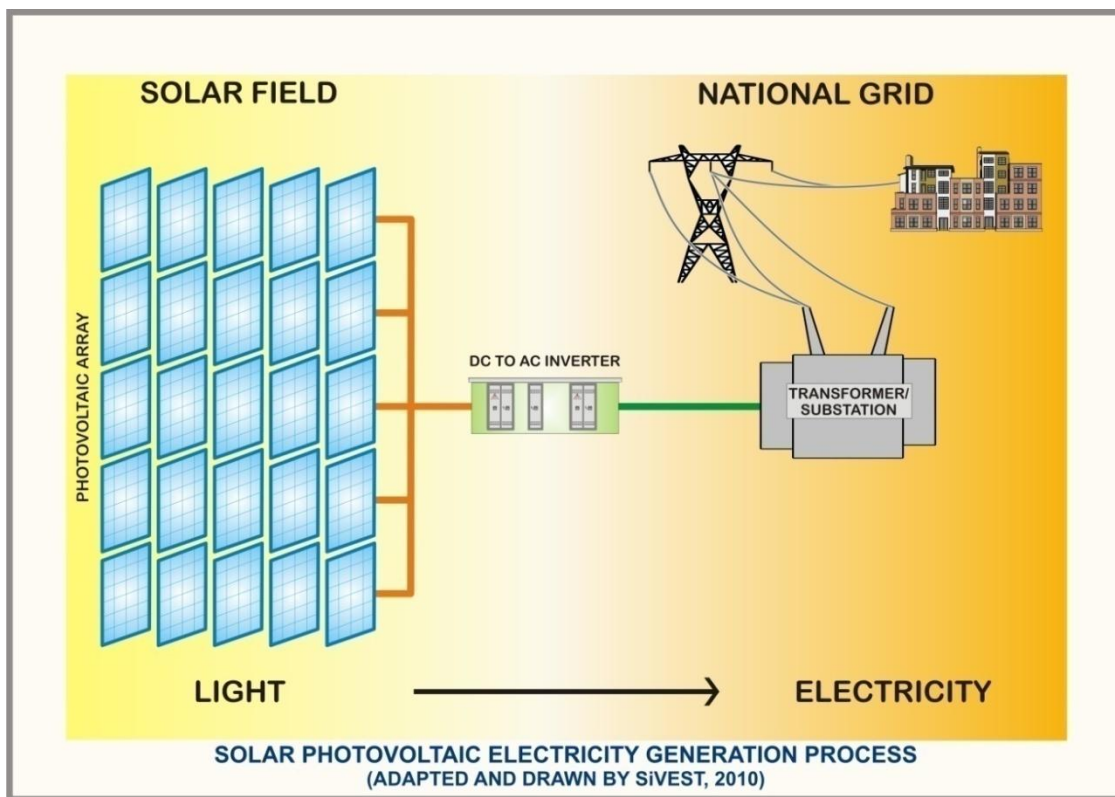


Figure 4: CPV/PV process

2.1.4 Substations

A new substation (approx. 90 x 120m) and associated transformers will be developed which will supply the generated electricity to the Eskom grid. The transformers' operating voltage may range from 22 to 132kV. The footprint of the substation site will be approximately 10 800m². The Substation will be built preferably close to existing transmission line(s). The connection from the substation to the Eskom grid line will be an overhead line and pole. This will be dependent on the location of the substation relative to the existing line(s). Eskom grid line and access servitudes will be required, the sizes of which depend on the voltage connection.

2.1.5 Roads

The access roads are proposed to be 6-10m wide. The roads will be gravel roads from the site on to the public road. An internal road network to the turbines and other infrastructure will include;

- Turning circles for large trucks.
- Passing points and culverts over gullies and rivers.

- Existing roads will be upgraded.

2.1.6 Temporary construction area

A maximum 10 000m² temporary lay down area will be constructed for the proposed development. Components that will comprise the temporary lay down area include an access route and a contractor's site offices of up to 5 000m².

2.1.7 Other infrastructure

Other infrastructure includes the following:

- Administration and warehouse buildings: A single storey building with a maximum area of 5 000 m² with a warehouse/workshop space and access, office, telecoms space, security and ablution facilities are to be developed. The buildings will most likely be situated preferably close to the substation. Security will be required.
- Borrow pits (if required).
- Fencing (if required).
- Panel Maintenance - The panels will require cleaning and dust will accumulate on them affecting their productivity. Cleaning will take place once every quarter (providing job creation). Municipal water will be utilised for this exercise.

2.1.8 Alternatives

In terms of the EIA regulations, feasible alternatives are required to be considered during the Scoping phase. The assessment of the alternatives from an environmental as well as economic feasibility point of view entails:

- The design or layout of the activity
 - i. Green design implementation
 - ii. Layout alternatives
- Design alternatives
 - i. Technology to be used in the activity
 - ii. Labour intensive construction
 - iii. Stormwater management alternatives

The 'no-go' alternative will also be assessed during the Scoping phase to determine whether the negative impacts associated with the development would be too severe in the long term to allow the proposed development to proceed.

Alternatives assessment will take place in more detail during the EIA phase of the project. No site alternatives are available as the property on which the wind farm and PV facility is to be located has been negotiated with the landowners in question.

During the EIA phase of the project, various layout alternatives will be investigated. These will include:

- Substation locations
- Overhead power line routes
- Laydown area locations
- Operations and Maintenance building locations
- Turbine locations (based on specialist feedback)

- No-go Alternative

The 'no-go' alternative is the option of not establishing the proposed wind farm and PV facility. South Africa is currently under immense pressure to provide electricity generating capacity to accommodate for the pressures which have been identified in this regard. With the current global focus on climate change, the government are under severe pressure to explore alternative energy sources in addition to coal fired power stations. Although wind power and solar power are not the only solution to solving the energy crisis in South Africa, not establishing the proposed wind farm and PV facility would be detrimental to the mandate that the government has set to promote the implementation of renewable power. It is a suitable sustainable solution to the energy crisis and this project would contribute to this solution. This project will aid in achieving South Africa's goals in terms of sustainability, energy security, mitigating energy cost risks, local economic development and national job creation.

- Location alternatives

From the outset of the proposed development, Mainstream advanced the following criteria when considering sites for a wind farm and PV facility:

- Estimation of wind energy resource (which is derived from Mainstream's propriety information based on national available wind data and advanced theoretical modelling developed in-house and by consultants);
- Proximity to residential areas;
- Proximity to environmentally (social and biophysical environments) and heritage sensitive areas (in consultation with appropriate specialists);
- Potential impacts on fauna and flora (in consultation with appropriate specialists).

- Availability of national wind farm development sensitivity maps such as those currently being prepared by Birdlife SA and being finalised by the Western Cape Government for the west coast region. **(Note these maps were not yet developed during the selection process);**
- International best practice in the siting of wind farms and PV facilities.
- Potential visual impact;
- Potential impact on aviation;
- Presence of obstacles on the site such as rivers, dams, roads, existing gridlines and current land use;
- Need for grid stabilization in the area;
- Need for energy security in the area;
- Need for rural development through job creation in the area;
- Accessibility of the area as a result of the topography;
- Grid connection options – is connection affordable and in national interest?
- Willingness of land owners to participate;
- Possibility to support land reform objectives.

After the potentially appropriate sites were selected, the affected land owners were contacted and options to develop, including long term lease agreements, were negotiated. Once the specific land portions were identified, Mainstream developed a map of the potentially available area on the specific farm/farms that could be earmarked for possible development. This area is referred to as the 'buildable' area. The following applicable buffer zones were additionally applied to the sensitive areas identified in the table below so as to identify the undevelopable areas.

Table 2: Buffer zones applications to sensitive areas

SENSITIVE AREA	BUFFER
Airports and Military Facilities	15-30km
Privately owned and managed run ways	5km including consultation with the SACAA
Public Roads/railway	200m
Houses	800m
Residential Areas	800m
Rivers/Floodplains/Wetland/Lakes	100m - 200m
Forestry (away from the prevailing wind)	500m
Forestry (non-prevailing wind direction)	200m
Forestry (when turbine is keyholed ¹)	500m
Protected and archaeological areas	100 – 200m

¹ Placing the turbine in a forest

Communication corridors/radar/Microwave towers	200m
Existing Generation/Wind farms	> 1km
Existing Servitudes	As per servitude + (1.5 x Tip height)
Site Boundary	200m
Electrical grid distribution/transmission lines	200m – 300m
Substation	500m

With further consultation with the affected land owners, Mainstream was also able to preliminarily identify specific areas (areas where extensive farming is practised or future farming is expected to be practised) on their land which was excluded from the proposed development.

- Constraints Analysis

A constraints analysis was conducted on the site in question to determine if any environmental constraints are present on the site (Appendix 6). No detailed impact studies were conducted however desktop assessments of all the environmental parameters included in this report were assessed. The study concluded that the site was feasible to continue into an impact assessment and that no environmental constraints were present.

Results of the constraints analysis show that the site is acceptable. The site is not considered to be sensitive from a biodiversity perspective as clearing will not take place on a large scale. The majority of vegetation will remain in place. Bird diversity is considered to be low. However, there is roosting habitat available for bats which indicate probable occurrence. The alluvial deposits that are expected to occur along the larger drainage lines are likely to consist of loose, unconsolidated sands and gravels which provide a poor founding medium for wind turbines. Surface water bodies and drainage systems can also be found in and across the site affecting the developable area of the wind turbines.

Overall, the analysis found that the majority of the environmental aspects would not be affected and most impacts can easily be mitigated.. This may impact on the number of wind turbines that the portion can accommodate. Nonetheless, at this stage, exclusion areas have been identified at a high level and on-site in-depth studies would be needed in order to confirm findings before areas are totally excluded.

The study concluded that the site was feasible to continue into an impact assessment and that no environmental constraints were present.

3 LEGAL REQUIREMENTS AND GUIDELINES

3.1 Key Legal and Administrative Requirements Relating to the Proposed Development

3.1.1 *National Environmental Management Act (Act No 107 of 1998) – NEMA EIA Requirements*

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

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

NEMA now governs the EIA process with the recent promulgation of the new EIA regulations in June 2010 (Government Gazette No. 33306 of 18th June 2010).

Activities that may significantly affect the environment must be considered, investigated and assessed prior to implementation.

In terms of the newly released EIA Regulations promulgated in terms of Chapter 5 NEMA (National Environmental Management Act), which came into effect on 2nd August 2010, a full EIA is required for the proposed project.

3.1.2 *NEMA EIA Requirements*

In terms of the new Regulations, which have been released on the 18th of June 2010 and placed into full effect on the 2nd of August 2010, a full Environmental Impact Assessment is required for the proposed development based on triggered activities. However, several activities which trigger

a basic assessment were also identified and need also be specified. Ultimately, these activities will not form a separate assessment, but will fall into the greater EIA.

The following Schedules of the Government Notice No. R. 544 - 545 of the 18th June 2010 are of relevance to the project in question. All of the Listed Activities identified in terms of Sections 24(2) and 24D include:

Table 3: Listed activities in terms of the NEMA Regulations

Number and date of the relevant notice:	Activity No (s)	Description of listed activity
Government Notice R544 (18 June 2010)	Activity 1	The construction of facilities or infrastructure, including associated structures or infrastructure, for the generation of electricity where- <ul style="list-style-type: none"> i. The electricity output is more than 10 megawatts but less than 20 megawatts or ii. The output is 10 megawatts or less but the total extent of the facility covers an area in excess of one hectare.
	Activity 10	The construction of facilities or infrastructure for the transmission and distribution of electricity- <ul style="list-style-type: none"> i. outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.
	Activity 22	The construction of a road outside urban areas <ul style="list-style-type: none"> i) with a reserve wider than 13.5 metres ii) where no reserve exists where the road is wider than 8 metres
	Activity 23	The transformation of undeveloped, vacant or derelict land to- <ul style="list-style-type: none"> i) residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares, or ii) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area, and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares except where such transformation takes place for linear activities
	Activity 24	The transformation of land bigger than 1000 square metres in size, to residential, retail, commercial, industrial or institutional use, where, at the time of the coming into effect of this schedule such land was zoned open space, conservation or had an equivalent zoning.
Government	Activity	The construction of facilities or infrastructure, including

Notice R545 (18 June 2010)	1	associated structures or infrastructure, for the generation of electricity where the electricity output is 20 megawatts or more.
	Activity 15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for i) Linear development activities; or ii) Agriculture or afforestation where the activity 16 in this schedule will apply
Government Notice R546 (18 June 2010)	Activity 4	The construction of a road wider than 4 metres with a reserve less than 13,5 metres - (a) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga and Northern Cape provinces: ii) Outside urban areas, in: a) A protected area identified in terms of NEMPAA, excluding conservancies; b) National Protected Area Expansion Strategy Focus areas; c) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; d) Sites or areas identified in terms of an International Convention; e) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; f) Core areas in biosphere reserves; g) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve; h) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined.
	Activity 12	The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation

		<ul style="list-style-type: none"> a) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; b) Within critical biodiversity areas identified in bioregional plans;
	Activity 13	<p>The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:</p> <ul style="list-style-type: none"> 1) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list; 2) The undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1. <ul style="list-style-type: none"> a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority. b) National Protected Area Expansion Strategy Focus areas. c) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape and Western Cape: <ul style="list-style-type: none"> i) In an estuary; ii) Outside urban areas, the following: <ul style="list-style-type: none"> (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (dd) Sites or areas identified in terms of an International Convention; (ee) Core areas in biosphere reserves; (ff) Areas within 10 kilometres from national parks or

		<p>world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</p> <p>(gg) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined.</p>
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3.1.3 *National Heritage Resources Act (Act No 25 of 1999)*

This Act requires all developers to undertake archaeological impact studies whenever any type of development activity is undertaken. Preliminary archaeological impact studies will consequently become a common procedure for all development activities, even if such development may be exempted in terms of the National Environmental Management Act (Act No 107 of 1998).

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

Heritage authorities will assist and co-operate with individuals and organisations concerned with the study, the conservation, promotion and utilisation of national heritage resources. A newly established National Heritage Resources Fund will provide financial assistance for heritage projects.

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

3.1.4 *National Water Act (Act No 36 of 1998)*

The National Water Act, No 36 of 1998 (NWA) was promulgated on the 20th August 1998. This Act is important in that it provides a framework to protect water resources against over exploitation and to ensure that there is water for social and economic development, human needs and to meet the needs of the aquatic environment. The Act also recognises that water belongs to the whole nation for the benefit of all people.

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

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

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

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

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

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

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

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

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

A Water Use License (WUL) will be applied for with the Department of Water Affairs (DWA), if necessary.

In terms of the National Water Act, 1998 (Act No. 36 of 1998) the proponent will require a WUL for the following activities (more may become of relevance after consultation with DWA):

Form Number	Application form	Description
DW758	Registration	Registration of Water Use
DW760	Section 21a	Taking water from a water resource

Consultation will be undertaken with the Department of Water Affairs (DWA) prior to submission of the Integrated Water Use License Application (IWULA). Once the Environmental Impact Assessment has been completed and should the proponent receive authorisation to proceed, an application for the WUL will be made to the DWA. DWA will only consider applications once an Environmental Authorisation is granted to the Applicant. A technical report will accompany this document. All registered Interested and Affected Parties will be afforded an opportunity to review this document. The WUL will be included in adverts in the EIA process and was included in the EIA Newsletter.

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

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

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

3.1.6 National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)

The overarching aim of the National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA), within the framework of NEMA, is to provide for:

- The management and conservation of biological diversity within South Africa, and of the components of such biological diversity;
- The use of indigenous biological resources in a sustainable manner; and
- The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources.

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

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

It is also appropriate to undertake a Faunal and Botanical Impact Assessment where proposed developments, in an area that is considered ecologically sensitive, require an environmental authorisation in terms of NEMA, with such Assessment taking place during the basic assessment or EIA. These two studies will be undertaken during the Mainstream project.

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

3.1.7 National Forest Act No 84 of 1998)

The National Forest Act, 1998 (Act 84 of 1998) (NFA) was enacted to:

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

The NFA enforces the necessity for a license to be obtained prior to destroying any indigenous tree in a natural forest and, subject to certain exemptions, cutting, disturbing, damaging,

destroying or removing any protected tree. The list of protected trees is currently contained in GN 32731 of the 27th November 2009. Licenses are issued by the Minister and are subject to periods and conditions as may be stipulated.

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

3.1.8 Conservation of Agricultural Resources Act No. 43 of 1983

The Conservation of Agricultural Resources Act (CARA) No. 43 of 1983 controls the utilization of natural agricultural resources in South Africa. The Act promotes the conservation of soil, water sources and vegetation as well as the combating weeds and invader plants. The Act has been amended in part by the Abolition of Racially Based Land Measures Act, No. 108 of 1991.

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

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

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

An agricultural potential assessment has been conducted to explore how the proposed development may impact on the agricultural production potential of the proposed site.

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

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

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

The Act is of relevance to the proposed development as any land within the study area that is zoned for agricultural purposes will be regulated by this Act.

Although the whole of this Act has been repealed by section 1 of the Subdivision of Agricultural Land Act Repeal Act 64 of 1998, this Repeal Act has not been implemented and no date of coming into operation has been proclaimed.

It is important to note that the implementation of this act is problematic as the Act defines 'Agricultural Land' as being any land, except land situated in the area of jurisdiction of a municipality or town council, and subsequent to the promulgation of this Act uninterrupted Municipalities have been established throughout South Africa.

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

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

All the requirements stipulated in the NRTA will need to be complied with during the construction and operational phases of the proposed wind farm and photovoltaic plant.

3.1.11 Civil Aviation Act No. 13 of 2009

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

Although the Act is not directly relevant to the proposed development, it should be considered as the establishment of a wind farm or photovoltaic plant may impact on aviation and air traffic safety if located directly within aircraft flight paths.

All relevant project information was submitted to ATNS (Air Traffic and Navigation Services Company Limited), who in turn evaluated the proposed development in respect of aviation. The Civil Aviation Authority have also been consulted about the project.

3.1.12 Astronomy Geographic Advantage Act No. 21 of 2007

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

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

The Act applies to the exclusive economic zone and continental shelf referred to in section 7 and 8 of the Maritime Zone Act No. 15 of 1994. The application site falls outside of this area and therefore the Astronomy Geographic Advantage Act will not apply to the proposed development.

3.1.13 Additional Relevant Legislation

- Occupational Health and Safety Act No. 85 of 1993
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
- Development Facilitation Act No. 67 of 1995
- Northern Cape Planning and Development Act, 1998 (Act No. 7 of 1998)

3.2 Key Development Strategies and Guidelines

3.2.1 Integrated Development Plans

An Integrated Development Plan (IDP) is defined in the Local Government: Municipal Systems Act, 2000 (Act 32 of 2000), as an inclusive and strategic plan that:

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

The main purpose of the IDP is considered the enhancement of service delivery and fighting poverty through an integrated and aligned approach between different role-players and stakeholders.

Each municipality is required to produce an IDP which would address pertinent issues relevant to their municipality. However, common concerns include municipal transformation and development, and service delivery and infrastructural development.

The site near Loeriesfontein falls within the Hantam Local Municipality, which is within the greater Namakwa District Municipality. Electricity, amongst other municipal services, is highlighted as a priority issue warranting attention, in particular the provision of access to electricity to affected communities and the improvement of the electricity infrastructure (mini-sub, cables). These objectives are anticipated to be achieved through the following strategies (Hantam Local Municipality 2009-2010):

- Upgrade the electricity networks
- Building of 150 houses which will therefore require the provision of electricity
- Electricity installations at SAPS offices
- Upgrading of Grootmaat electricity provision
- Developing a Master and Maintenance plan for electricity

In 2008, the Namakwa District Municipality planned to conduct viability studies on the possibility of creating green energy in the Namakwa District for exporting purposes. Studies were to be done on wind, solar and ocean energy.

It is therefore evident that the proposed development is aligned with the goals of the municipal IDPs and SDFs in the study area.

3.2.2 Integrated Energy Plan for the Republic of South Africa, 2003

The Integrated Energy Plan (IEP), developed by the former DME (now DMR), was formulated to address the energy demand of the country balanced with energy supply, transformation, economics and environmental considerations in concourse with available resources. One of the main objectives of the plan is to promote universal access to clean and affordable energy, with emphasis on household energy supply being co-ordinated with provincial and local integrated development programmes. Another objective is to ensure that environmental considerations in energy supply, transformation and end use are made. This project is thus a goal in order to implement this plan.

3.2.3 Independent Power Producer Process

(The following information was extracted from the Eskom website: Guide to Independent Power Producer (IPP) processes in South Africa and Eskom, June 2010

http://www.eskom.co.za/live/content.php?Item_ID=14324)

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

- Country Process

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

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

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

- Formal Programmes

In terms of the New Generation Regulations, the Integrated Resource Plan (IRP) developed by the DoE sets out the new generation capacity requirement per technology, taking energy efficiency and the demand-side management projects into account. This required, new generation capacity must be met through the technologies and projects listed in the IRP and all IPP procurement programmes will be executed in accordance with the specified capacities and technologies listed in the IRP. The table below highlights the energy plan that has been proposed until 2030.

Table 4: Government Energy Plans up until 2030 in terms of the IRP

New Build Options								
	Coal	Nuclear	Import Hydro	Gas - CCGT	Peak - OCGT	Wind	CSP	Solar PV
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	300
2013	0	0	0	0	0	0	0	300
2014	500	0	0	0	0	400	0	300
2015	500	0	0	0	0	400	0	300
2016	0	0	0	0	0	400	100	300
2017	0	0	0	0	0	400	100	300
2018	0	0	0	0	0	400	100	300
2019	250	0	0	237	0	400	100	300
2020	250	0	0	237	0	400	100	300
2021	250	0	0	237	0	400	100	300
2022	250	0	1143	0	805	400	100	300
2023	250	1600	1183	0	805	400	100	300
2024	250	1600	283	0	0	800	100	300
2025	250	1600	0	0	805	1600	100	1000
2026	1000	1600	0	0	0	400	0	500
2027	250	0	0	0	0	1600	0	500
2028	1000	1600	0	474	690	0	0	500
2029	250	1600	0	237	805	0	0	1000
2030	1000	0	0	948	0	0	0	1000
	6250	9600	2609	2370	3910	8400	1000	8400

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

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

- i. Request for Qualifications (RFQ)
- ii. Request for Proposals (RFP)
- iii. Negotiation with the preferred bidder(s).

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

To start renewable energy procurement in order to achieve targets as in the IRP the DOE has launched a call for renewable energy projects issued on the 3rd of August 2011. The request for qualification and proposals for new generation capacity under the IPP procurement programme,

will have a continuous roll out and milestones till the end of 2013. DoE have allowed for 1850MW of wind energy capacity to be allocated in the next two years.

4 PROJECT NEED AND DESIRABILITY

According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fueled by increasing economic growth and social development within Southern Africa, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmental impact, climate change and the need for sustainable development. The use of renewable energy technologies, as one of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of Eskom's long-term strategic planning and research process.

As the demand for electricity grows, there is need to establish new generation capacity in South Africa within the next several years. The technologies may differ in their generation costs, state of commercial development and most importantly, suitability to the South African Environment.

The Government of South Africa has also committed to supporting the development of renewable (both solar and wind) electricity generation in order to satisfy sustainable and short term solutions to the current energy crisis.

As one of its strategies to meet future energy consumption requirements, the country is opting for the use of renewable energy technologies. This technology is therefore fast becoming an important energy option. In addition to providing ideal locations for solar energy plants, the Northern Cape Province also provides good opportunities for wind generation projects hence the selection of the Loeriesfontein site.

According to the wind potential layer, developed by Environomics and MetroGIS (2011) for the Strategic Environmental Framework for the Optimal Location of Wind Farms in the Coastal Provinces of South Africa (Phase 1 for REFIT 1) (Figure 5), large parts of the Northern Cape region of South Africa have the highest suitability for the selection of wind farm sites. Hence, the Northern Cape can in general be seen as ideal for the establishment of wind farms. It must be remembered that wind energy is plentiful, renewable, widely distributed, clean and reduces greenhouse gas emissions when it displaces fossil-fuel derived from electricity. In this light, renewable wind energy can be seen as desirable.

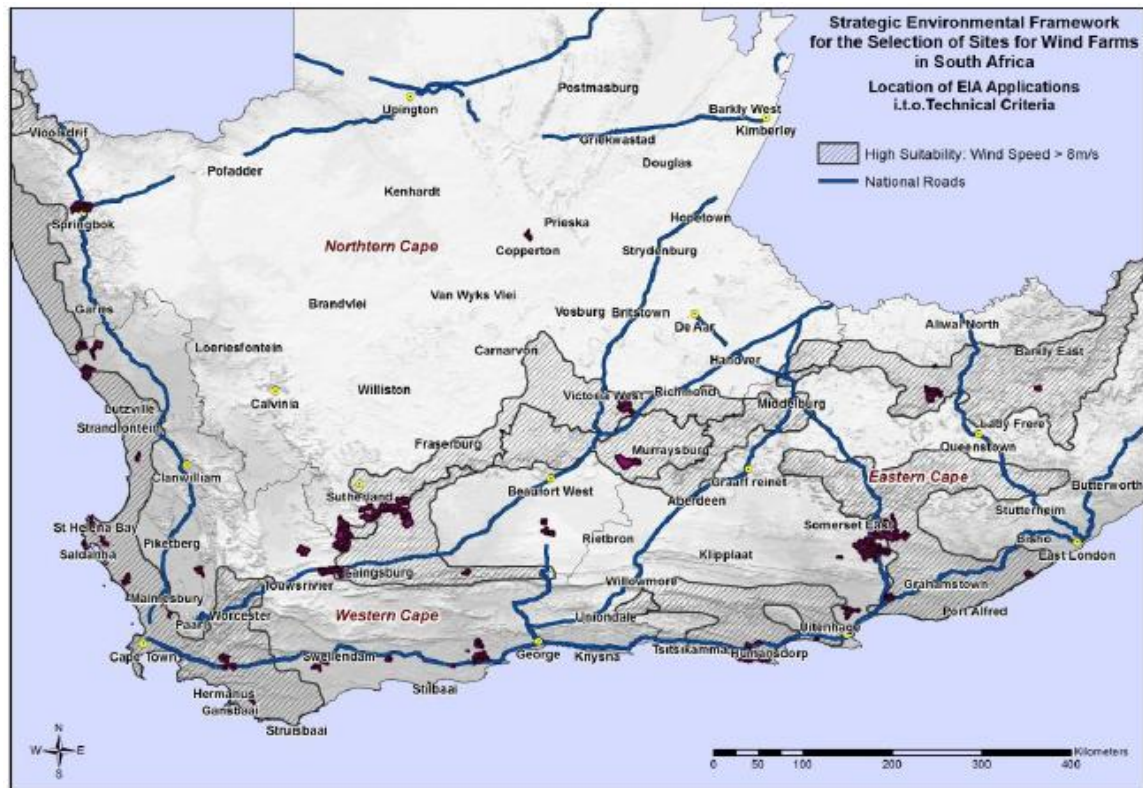


Figure 5: Wind Potential Map (Source: Environomics and MetroGIS, 2011).

According to the solar map (Figure 6) the Northern Cape region of South Africa has the highest concentration of solar energy in the world hence; ideal for the establishment of solar plants. Solar energy is an abundant renewable energy resource which cannot be depleted. Furthermore it has been identified as predictable, clean and cost free fuel.

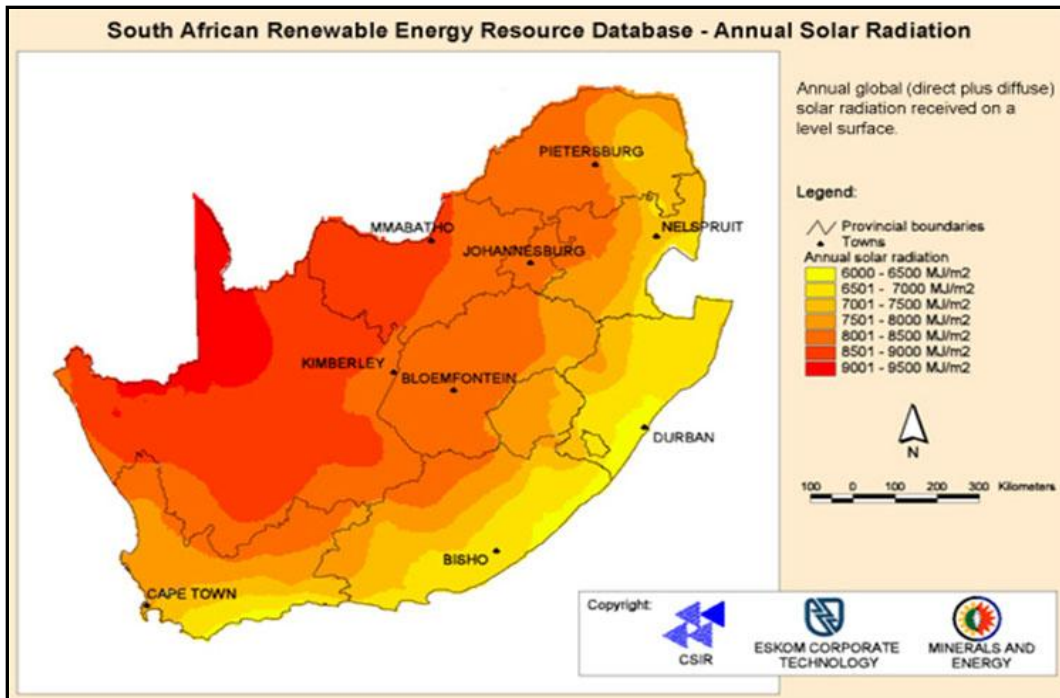


Figure 6: National Solar Resource Map (Source: Solar Vision, 2010)

In addition, PV plants have been identified as potentially being viable and capable of being employed on a large scale. This project will therefore have the potential to make significant contribution to the electricity stabilization and reduce load shedding.

It is important to note that the current PV market in South Africa is relatively small (about 12 MWp installed). In 2002, the overall sales volume (including exports) was estimated at 3 to 3.5 MW, with a market turnover of approximately R200 million to R225 million (Cawood & Morris, 2002). At that time, a manufacturer indicated expected production of 8 MWp for 2003. Therefore the opportunity for investment into these facilities, given the overall increasing demand both locally and internationally, needs to be further stimulated.

4.1 Research Supporting Wind Energy

South Africa has abundant reserves of wind and solar energy resources. Electricity generated by means of wind power can provide the country with secure, reliable and clean sources of power while stimulating economic growth and job creation. A recent technical study carried out by Mainstream's Energy Analysis Group confirms SA has potential to generate over 70,000MWs of wind energy or 42% of the country's forecast total electricity demand for 2025. This research also showed that if 30GW of wind energy were installed, the industry would be able to provide 9GW of

power (at a conservative 30% capacity factor) and of this 6GW would be base load, supplied at exactly the times when the country needed it most.

South Africa has a growing energy intensive economy, highly reliant on fossil fuels. 93% from coal fired power plants. SA currently has 44,157MWs of power generation capacity installed, with 248 Terawatt hours of electricity consumed annually. Current forecasts by 2025 indicate that SA will need almost twice today's electricity demand, doubling to approximately 80,000MWs. The generation of electricity from wind energy can contribute substantially to meeting this demand.

4.2 Security of Power Supply

In the period immediately after the supply shortage and 2007/2008 power blackouts, Eskom announced a number of new power generation facilities including new coal-fired power stations, refurbishment of mothballed stations and oil, diesel or gas powered turbines in order to ensure appropriate supply and the needed reserve margin. In the intervening period several of these projects have experienced delays as the economic recession has lead to reductions in demand pressure. However, with possible recovery looming, the situation may change in 2010/2011 and demand growth may resume. Short to medium term electricity supply security is instrumental in securing economic growth and investor confidence (HIS Global Insight, 2009)

The project has the potential of “securing” economic activity by assisting in removing supply constraints if Eskom generation activities result in a supply shortfall. When supply is constrained it represents a limitation to economic growth. When a supply reserve is available, it represents an opportunity for economic growth.

The project will contribute to local economic progress by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the Northern Cape. The project will likely encounter widespread support from government, civil society and businesses, all of whom see potential opportunities for revenues, employment and business opportunities locally.

4.3 Local Employment

Employment statistics, intrinsically considered to be related to skill levels, income levels and education levels are low in this district, but more alarming is the dependency ratios. The proportion of those who were formally employed increased between 2001 and 2007 by a small

number while the number of those who were unemployed decreased during this period with the proportion of economically inactive persons increasing.

Overall, the municipality does compare well, with a higher average employment rate than the district or provincial averages. It has an unemployment rate which is slightly higher than the district but lower than the province but, importantly, it has a lower economically inactive population. Taking all variables into account it would appear that Hantam Local Municipality (HLM) is perhaps better off than both the province and the district in which it resides regarding employment statuses.

Local development in Loeriesfontein may help to raise employment rates especially during the construction phase providing income to the largely unemployed local community.

4.4 Regional and Local Income Profile

Overall, HLM does not appear badly in context as it has fewer non-earners than the District and Province. Other than this it closely follows the monthly income profile of the Namakwa District, while the HLM displays a relatively low income across the board. By 'low incomes' it is meant that, in relation to RDP standards, the LM does not present well with a full 76.4% of people being below the acceptable RDP income grade of R1 600 per month.

4.5 Further Facts Justifying Wind Energy

Wind is an internationally tried and tested highly reliable form of power generation. It is also the fastest growing form of power generation in the world with 150,000+ MWs installed globally and this is forecast to increase by more than 30,000 MWs each year over the next decade. In 2008, more wind energy capacity was installed in Europe and the US than any other form of power.

- Renewable energy reduces electricity generation costs

SA has some of the most highly subsidised electricity in the world. Diversifying a country's portfolio of generation plants leads to lower overall generation cost. Everywhere wind power has been introduced it has reduced the long term price of electricity and has helped stabilise the price volatility of fossil fuels. It is seen as the cornerstone of German, British, Danish, and Spanish generation.

- Renewable energy reduces fossil fuel prices

Increased levels of renewable energy generation on an electricity system lowers the demand for coal, oil & gas, reducing the price of these commodities and ultimately the cost of electricity.

- Renewable energy decreases greenhouse gas emissions

SA is currently the 12th largest polluter in the world and the largest in Africa. Renewable energy reduces carbon emissions, resulting in avoidable costs to the economy in terms of global obligations and the domestic social and economic impacts of such emissions.

- Renewable energy increases water availability

Agricultural & economic yield is increased due to an increased availability of water resources that would have alternatively been used for coal-fired power generation. Eskom currently uses 1400 Litres of water per 1000 kWh of energy produced.

- Renewable energy creates jobs

Large-scale renewable energy deployment creates significant employment in the development, construction and operation of the wind farms, significantly contributing to rural development, transferring skills and knowledge from abroad and enhancing a domestic manufacturing supply chain.

- Renewable energy aids grid stability

In certain areas, particularly in the south of the country renewable energy aids grid stability

5 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The Northern Cape Province is considered to be one of the most suitable regions for the establishment of wind farms and PV facilities. Accordingly, land portions located outside of Loeriesfontein have been identified as a potential site. A general description of the study area is outlined in the sections below. The receiving environment in relation to each specialists study is also provided. A site visit was undertaken at the end of March 2011 by selected members of the SiVEST specialist team.

5.1 Regional Locality

Loeriesfontein is a small town in the Northern Cape of South Africa. It falls within the Hantam Local Municipality, which is within the greater Namakwa District Municipality, Northern Cape province. The town of Loeriesfontein is within a basin surrounded by mountains, and it is accessed from the N7 highway (north out of Cape Town), turning off on the R27 at Van Rhynsdorp to Nieuwoudtville, then following the R357 to Loeriesfontein (a further 65km north).

The proposed site is located on the farms Sous and Aan De Karree Doorn Pan approximately 49km north of Loeriesfontein. The site near Loeriesfontein, falls within the boundaries of the Hantam Local Municipality. The site is approximately 10 400Ha in size of which a smaller area will be required for the establishment of the proposed wind farm.

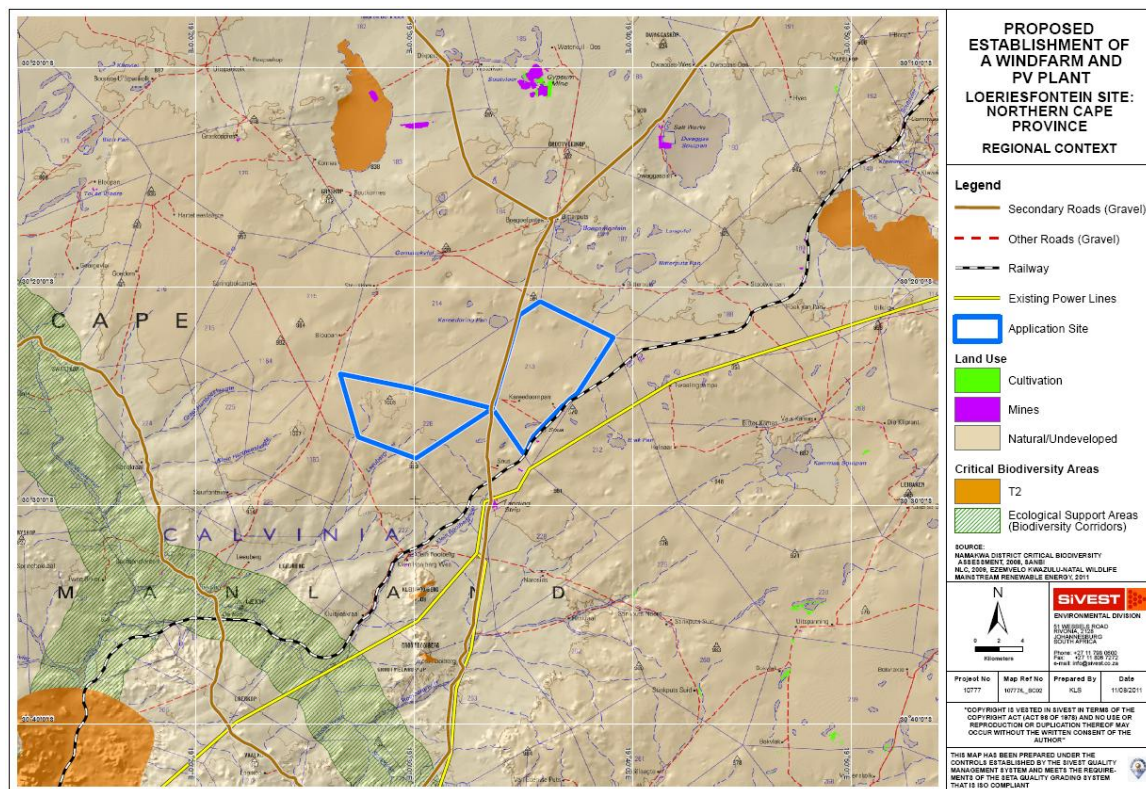


Figure 7: Loeriesfontein Regional Study Area.

5.2 Study Area Description

The sites that are proposed for the wind farm and PV facility near Loeriesfontein are located on the following farms (Figure 8):

- Remainder of the Farm No. 226, Calvinia Road, Northern Cape
- Portion 1 of the Farm No. 213, Calvinia Road, Northern Cape
- Portion 2 of the Farm No. 213, Calvinia Road, Northern Cape

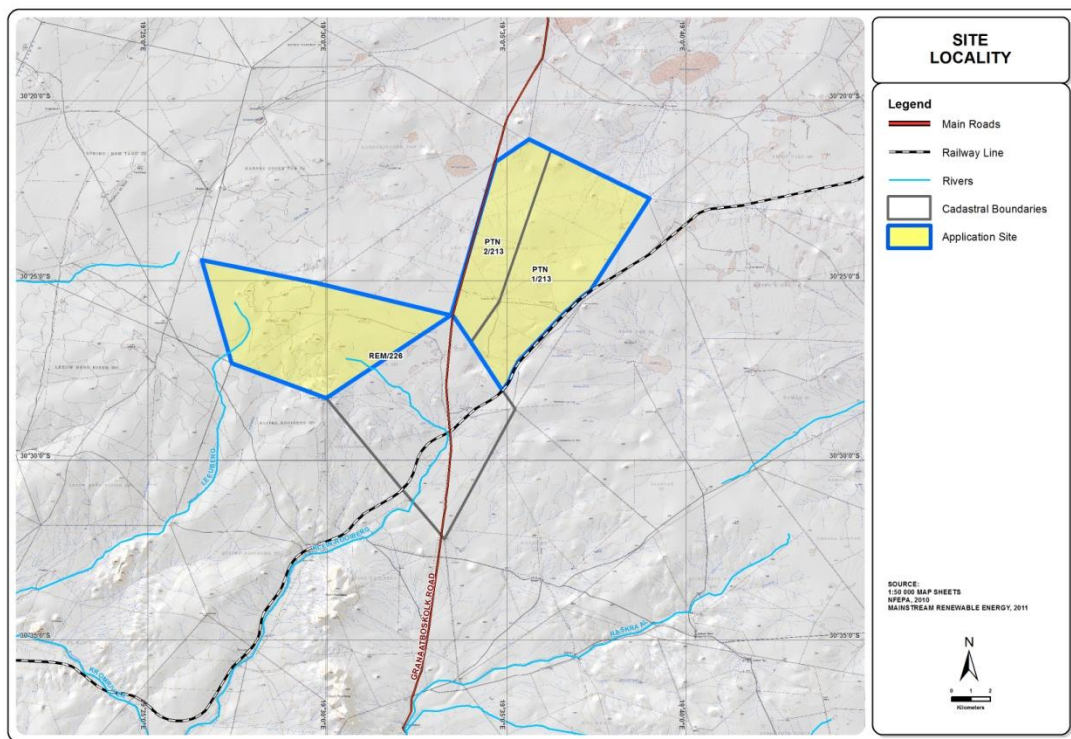


Figure 8: Loeriesfontein Site Locality Map

The study area is considered to be fairly natural karoo shrubland with low intensity sheep grazing on the site. The study area is classified as natural / vacant and is used as general grazing land for sheep and wildlife. As such the human footprint in most of the area is considered to be relatively low. Vast grazing land is interspersed with seasonal pans and non-perennial streams. The non-perennial streams are located to the southwest of the site.

The southern end of the study area contains an existing substation which will be the link between the proposed development and the national electricity grid. Stocking rate for the area is approximately at a low stocking rate of around 1 SSM (small stock unit) per 6 hectares.

The site is traversed by a railway line and a district road (Granaatboskolk Road).

It is characterised by flat and gently sloping topography. The flat topography makes this area ideal for the proposed development. The drainage systems situated in the southwest of the site are not anticipated to be impacted upon

5.3 Climate

The study area has an arid Mediterranean type climate with winter rainfall regime i.e. most of the rainfall is confined to early autumn and winter. Mean Annual Precipitation (MAP) is approximately 179 mm per year and without some form of supplementary irrigation natural rainfall is insufficient to produce sustainable harvests (Table 5 and Figure 9). This is reflected in the lack of dry land crop production within the study area. Average daily temperatures range from 30°C in summer to 17 °C in winter. Average night time temperatures drop to around 2.4 °C during winter (Table 2).

Table 5: Mean monthly rainfall for Loeriesfontein (Source: South Africa's Rain Atlas)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
Rainfall (mm)	8.7	11.3	17	20.8	23.3	21.1	18.3	14.3	11.1	9	7	7	14.1

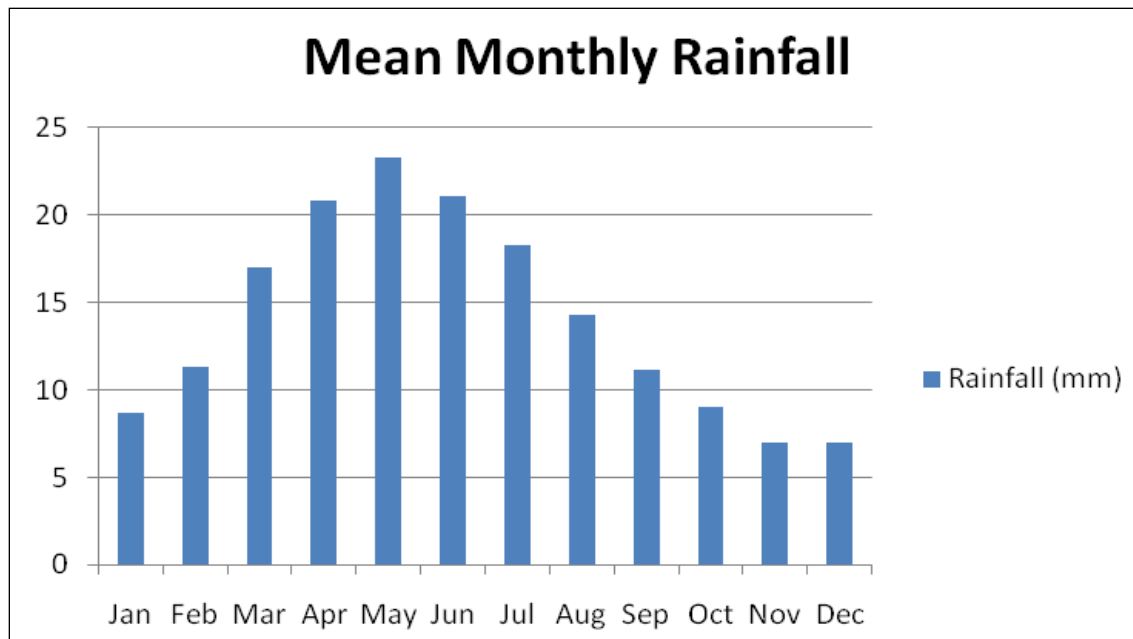


Figure 9: Mean Monthly Rainfall Graph for Loeriesfontein

Table 6: Mean monthly and annual temperature for Loeriesfontein (Source: <http://www.saexplorer.co.za>)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Avg
Midday Temp (°C)	21	32	29	25	21	17	17	19	22	25	28	30	24
Night Temp (°C)	31	14	13	9	6	4	2	3	5	8	10	12	8

5.4 Geology

Virtually the entire study area is underlain by a Shale parent material. Shale is a clastic sedimentary rock and is formed by the settling and accumulation of clay rich minerals and other sediments. Due to the settling process this parent material usually takes the form parallel rock layers which lithifies over time. Non-descript sedimentary geologic materials are located along the western border of the study area derived from pre-existing rock and sediments.

5.5 Biodiversity (Flora, Fauna and Avifauna)

The Biodiversity Assessment was conducted by SiVEST (Appendix 2A). The environmental baseline from a biodiversity perspective is presented below.

5.5.1 Flora and Fauna in the study area

- Flora

A list of plant species including Red Data species are presented in Appendix 1.

According to the Namakwa Bioregional Plan, the Hantam Local Municipality has 59 threatened, 9 near threatened and 25 data deficient plant species. The majority of the Municipality is not conserved in any way, including the study area in question. The vegetation type in question has more than 10 endemic species.

The vegetation type on the site is described as Bushmanland Basin Shrubland (Figure 10).

This vegetation type is characterised by low shrubs species which include: *Aptosimum spinescens*, *Hermannia spinosa*, *Pentzia spinescens*, *Zygophyllum microphyllum* and *Aptosimum elongatum*.

The vegetation type is considered to be Least Threatened and none of it is conserved in statutory conservation areas (Mucina, *et al*, (2006).

The study area is transformed after good winter rains into a large expanse of wild flowers. This is however heavily dependent on the amount of rainfall.

Species in the study area are not as striking as those found near Nieuwoudtville. The site is however in an ecological support area which needs to be taken into consideration in light of the proposed development.

The study area does not fall into a Critical Biodiversity Area as defined by the Namakwa Bioregional Plan.

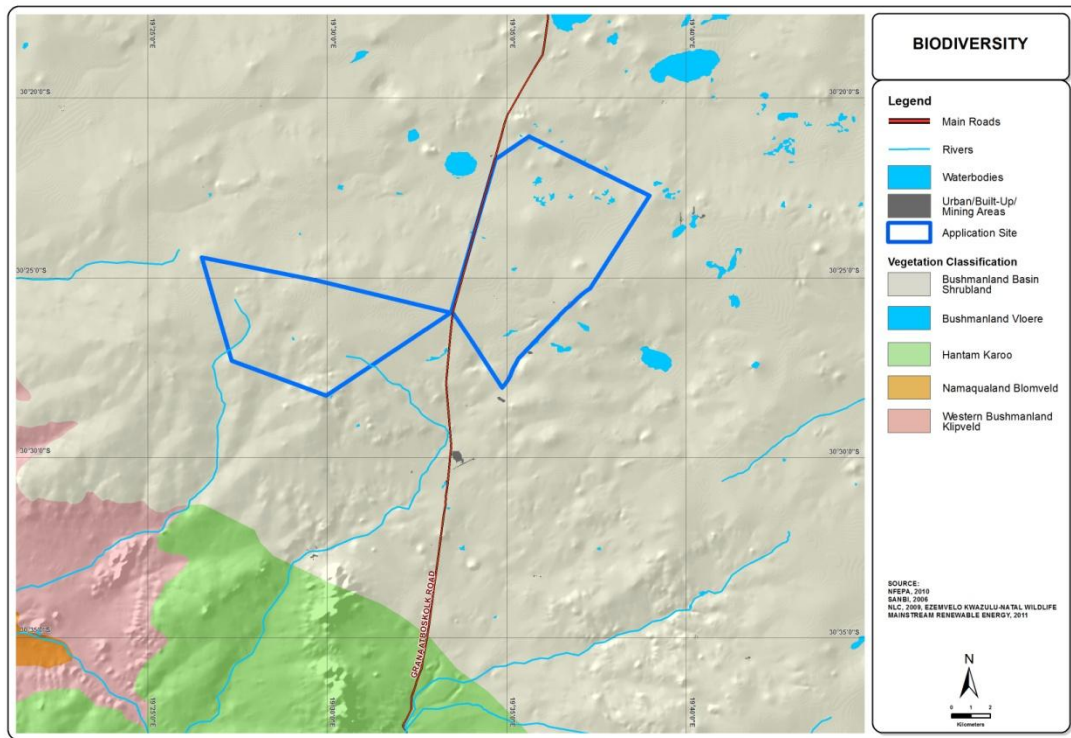


Figure 10: Vegetation of the study area

- Potential impacts

A number of potential impacts could be associated with the proposed wind farm. The clearing for the wind farm and associated infrastructure is likely to result in loss of vegetation and more importantly natural vegetation. This can also result in habitat fragmentation due to loss of ecological linkages which may be present across the site. The clearing of vegetation could also result in the introduction of exotic species into the study area.

- Fauna

Friedman and Daly, (2004) list several red data mammal species that could potentially occur in the study area. The Honey Badger (*Mellivora capensis*) and the Litledale's Whistling Rat (*Parotomys littedalei*) both listed as Near Threatened are likely to occur in the study area. On the other hand, the Black Rhinoceros (*Diceros bicornis bicornis*) which is listed as Critically Endangered along with several other recorded mammal species are not likely to occur in the study area due to the anthropogenic activities such as fencing etc that have taken place.

No Important Bird Areas are on or near the site in question and very little bird data is available for the area. Red Data species have however been recorded.

Amphibians have been recorded for the study area however these are likely to be present near water courses. The study area is extremely dry and the presence of amphibians is unlikely.

Several reptile species are likely to be present and these are listed below.

Invertebrate information for the study area is limited although several species are anticipated to be present. The Namakwa Bioregional Plan indicates a high diversity of invertebrate species associated with the pollination systems associated with all the flowers.

5.5.2 Faunal assemblages

- Mammals

Various mammal species are likely to occur within the study area. According to Friedman & Daly, (2004), the majority of species within the study area are listed as species of least concern. As mentioned above, the Honey Badger (*Mellivora capensis*) and the Littledale's Whistling Rat (*Parotomys littledalei*) which are both listed as Near Threatened are likely to occur in the study area. On the other hand, the Black Rhinoceros (*Diceros bicornis bicornis*) which is listed as Critically Endangered along with several other recorded mammal species are not likely to occur in the study area due to the anthropogenic activities such as fencing etc that have taken place.

- Potential impacts

The proposed wind farm could potentially result in the destruction of the habitat available for these species.

- Amphibians

All amphibian species previously recorded in the study area are Not Threatened (Du Preez and Carruthers, 2009). The study area is extremely dry with very little rainfall and amphibian numbers are expected to be very low. The table below indicates the species that have been previously recorded.

Table 7: Amphibian species in the study area

Scientific	Common	Category
<i>Vandijkophrynus garipeensis</i>	Karoo Toad	Not threatened
<i>Vandijkophrynus robinsoni</i>	Paradise Toad	Not threatened
<i>Cacosternum boettgeri</i>	Boettger's Caco	Not threatened
<i>Amietia fuscigula</i>	Cape River Frog	Not threatened
<i>Xenopus laevis</i>	Common Platanna	Not threatened

- Potential impacts

The construction of the proposed wind farm could result in habitat destruction for amphibian species.

- Reptiles

Several reptile species are present in the study area. Table 8 highlights these species (Branch 1998). According to the current Red Data information, none of these species are currently Red Listed (McLachlan, 1978). The Red Data book is currently being updated.

Habitat for these species is currently available.

Table 8: Reptiles in the study area

Common name	Scientific name
Tent tortoise	<i>Psammobates tentorius</i>
Delalande's Beaked Blind Snake	<i>Rhinotyphlops lalandei</i>
Schinz's Beaked Blind Snake	<i>Rhinotyphlops schinzi</i>
Brown House Snake	<i>Lamprophis fuliginosis</i>
Mole snake	<i>Pseudoaspis cana</i>
Sundevall's shovel -snout	<i>Prosymna sundevallii</i>
Dwarf Beaked Snake	<i>Dipsina multimaculata</i>
Karoo Sand Snake or Whip Snake	<i>Psammophis notostictus</i>
Namib Sand Snake	<i>Psammophis leightoni</i>
Common or Rhombic Egg Eater	<i>Dasypeltis scabra</i>
Beetz's Tiger Snake	<i>Telescopus beetzii</i>
Coral Snake	<i>Aspidelaps lubricus</i>
Cape Cobra	<i>Naja nivea</i>
Black-necked Spitting Cobra	<i>Naga nigricollis</i>
Puff adder	<i>Bitisarietansarietans</i>
Horned adder	<i>Bitis caudalis</i>

Common name	Scientific name
Striped legless skink	<i>Acontiasl ineatus</i>
Cape skink	<i>Mabuya capensis</i>
Western Three-striped Skink	<i>Mabuya occidentalis</i>
Western Rock Skink	<i>Mabuya sulcata</i>
Variegated skink	<i>Mabuya variegata</i>
Spotted Desert Lizard	<i>Meroles suborbitalis</i>
Western Sandveld Lizard	<i>Nucras tessellata</i>
Cape Sand Lizard	<i>Pedioplanis laticeps</i>
Spotted sand lizard	<i>Pedioplanis lineoocellata pulchella</i>
Namaqua Sand Lizard	<i>Pedioplanis namaquensis</i>
Armadillo Girdled Lizard	<i>Cordyluscataphractus</i>
Karoo girdled lizard	<i>Cordylus polyzonus</i>
Southern Rock Agama	<i>Agama atra</i>
Southern Spiny Agama	<i>Agama hispida</i>
Namaqua Chameleon	<i>Chamaeleo namaquensis</i>
Giant Ground Gecko	<i>Chondrodactylus angulifer</i>
Striped Dwarf Leaf-toed Gecko	<i>Goggia lineata</i>
Bibron's Thick-toed Gecko	<i>Pachydactylus bibronii</i>
Marico Thick-toed Gecko	<i>Pachydactylus mariquensis mariquensis</i>
Rough Thick-toed Gecko	<i>Pachydactylus rugosus formosus</i>
Common Barking Gecko	<i>Ptenopus garrulus</i>
Weber's Thick-toed Gecko	<i>Pachydactylus weberi</i>

- Potential impacts

The proposed wind farm could potentially result in habitat destruction for these reptile species.

- Invertebrates

No detailed assessment of invertebrates species has been undertaken. These species are mobile in nature and are not likely to be affected by the construction of the wind farm. No unique larval habitat is present on the site which could impact on invertebrate species. Mitigation measures to reduce habitat destruction will aid in the preservation of habitat for invertebrate species.

- Avifauna

The Avifauna assessment complies with the guidelines for avian monitoring at wind energy developments produced by the Wildlife and Energy Programme of the Endangered Wildlife Trust and BirdLife South Africa (2011).

The study area is characterised by a wide range of bird species which could potentially be affected by the proposed wind farm. The impacts of wind farms on birds are well known and well documented. These relate to collision, displacement due to disturbance, barrier effects as well as habitat loss. These impacts will be addressed in more detail during the EIA phase of this study. A list of some bird species that occur in the study area is presented in Table 9 below. Further lists will be obtained from the Southern African Bird Atlas Project 2 (SABAP 2) website and through field surveys during the EIA phase.

However, detailed field surveys which will involve recording bird species occurring in the study area will be undertaken for a 12 month period prior to construction commencing. These monitoring studies have already begun.

Table 9: Bird Species in the study area

Roberts Bird Number	Common Name	Scientific name
866	Yellow Canary	<i>Crithagra flaviventris</i>
865	White-throated Canary	<i>Crithagra albogularis</i>
474	Spike-heeled Lark	<i>Chersomanes albofasciata</i>
311	Speckled Pigeon	<i>Columba guinea</i>
572	Sickle-winged Chat	<i>Cercomela sinuata</i>
619	Rufous-eared Warbler	<i>Malcorus pectoralis</i>
488	Red-capped Lark	<i>Calandrella cinerea</i>
479	Red Lark	<i>Calendulauda burra</i>
522	Pied Crow	<i>Corvus albus</i>
871	Lark-like Bunting	<i>Emberiza impetuari</i>
218	Ludwig's Bustard	<i>Neotis ludwigii</i>
583	Karoo Scrub-Robin	<i>Cercotrichas coryphoeus</i>
220	Karoo Korhaan	<i>Eupodotis vigorsii</i>
566	Karoo Chat	<i>Cercomela schlegelii</i>
122	Greater Kestrel	<i>Falco rupicoloides</i>
570	Familiar Chat	<i>Cercomela familiaris</i>
786	Cape Sparrow	<i>Passer melanurus</i>
523	Cape Crow	<i>Corvus capensis</i>
861	Black-headed Canary	<i>Serinus alario</i>
575	Ant-eating Chat	<i>Myrmecocichla formicivora</i>

According to Barnes 1998, the following Red Data bird species occur within the study area.

Table 10: Red Data Bird Species (Barnes 1998)

Common name	Scientific name	Status
Martial Eagle	<i>Polemaetua bellicosus</i>	Vulnerable
Kori Bustard	<i>Ardeotis kori</i>	Vulnerable
Ludwig's Bustard	<i>Neotis Ludwiggi</i>	Vulnerable
Red Lark	<i>Certhilauda burra</i>	Vulnerable
Lesser Kestrel	<i>Falco naumanni</i>	Vulnerable
Blue Crane	<i>Anthropoides paradiseus</i>	Vulnerable

- Potential impacts

Impacts of any given wind farm on bird species vary tremendously and depend on a number of factors such as the development specification, nearby topography, affected habitats as well as the number and type of bird species that occur in a study area. Although, Red Data species are a major concern, the impact on the more common species must not be overlooked. Various impacts are possible with regards to the proposed infrastructure and these are listed below.

The proposed wind farm could potentially result in impacts such as collision, displacement due to disturbance, barrier effects and habitat loss for bird species. These are elaborated below:

- Collisions

A number of factors namely bird species, numbers and behavior; weather conditions and topography as well as the nature of the wind farm and the use of lighting, determine collision risk pertaining to wind turbines (Drewitt and Langston 2006). This risk is perhaps greater in areas which are frequently utilized by large numbers of feeding or roosting birds, or on migratory flyways or local flight paths. In terms of weather conditions, various studies (e.g. Karlsson (1983), Erickson *et al.* (2001)) have indicated that due to poor visibility as a result of fog or rain majority of birds collide with structures. Moreover most birds fly at low levels during such weather conditions (Drewitt and Langston 2006). Furthermore, strong headwinds increase collision risks yet migrating birds have a tendency of flying at low when flying into the wind (Drewitt and Langston 2006).

Large birds such as cranes and bustards manoeuvre poorly. Therefore the risk of collision of these large birds with structures is great. In addition, species such as cranes arriving at a roost site after sunset are not likely to detect and avoid wind turbines (Drewitt and Langston 2006).

- Displacement due to disturbance

The presence of the turbines through visual, noise and vibration impacts as well as vehicle and personnel movements related to site maintenance may cause displacement. The level of disturbance resulting from introduction of wind farms in an area varies depending on a variety of factors such as seasonal and diurnal patterns of use by bird species, proximity to important habitats, alternative habitats availability as well as possibly turbine and wind farm specifications (Drewitt and Langston 2006).

Displacement also occurs when birds alter their migration flyways or local flight paths in order to avoid a wind farm. Alteration of migration flyways or local flight paths leads to increased energy expenditure as birds normally fly further as well as disruption of linkages between distant feeding, roosting, moulting and breeding areas (Drewitt and Langston 2006).

- Habitat loss

According to Fox *et al.* 2006, actual habitat loss typically amounts 2-5% of the total development area. Although, the scale of direct loss of habitat due to construction of a wind farm depends on the size of the project, it is likely to be small per turbine base (Fox *et al.* 2006).

The significance of the above potential impacts will be discussed in more details during the EIA phase

5.5.3 Sensitive areas

It is always a recommendation that new infrastructure, where possible, follows existing infrastructure such as roads and existing electrical servitudes in order to consolidate impacts. Technically this is not always possible but it is the best option from a biodiversity perspective.

Detailed site layout information is not available at this stage but will be available during the EIA phase. However it is possible to identify areas within the study area which are not preferable for development. These areas will form the focus of the EIA studies.

The site in question is extremely uniform in nature and no specific sensitive areas could be identified at this stage. The entire study area will be investigated in more detail in the EIA phase to determine if there are areas which are more sensitive than others.

There are small drainage lines in the south western portion of the site and these will potentially be considered no go zones from a biodiversity perspective.

5.5.4 Bats

The Bat Assessment was conducted by Werner Marais of Animalia and is included in Appendix 2B.

- Species probability of occurrence

Table 11: Table of species that may be roosting on the study area, the possible site specific roosts, and their probability of occurrence LC = Least Concern; NT = Near Threatened; V = Vulnerable; DD = Data Deficient (Monadjem *et al.*, 2010).

Species	Common name	Probability of occurrence	Conservation status	Possible roosting habitat to be utilised on study area
<i>Rhinolophus capensis</i>	Cape horseshoe bat	Low	NT	Roosts gregariously in caves, no known caves close to the study site.
<i>Rhinolophus clivosus</i>	Geoffroy's horseshoe bat	Low	LC	Roosts gregariously in caves, no known caves close to the study site.
<i>Nycteris thebaica</i>	Egyptian slit-faced bat	High	LC	Cavities, aardvark burrows, and culverts under roads. Any suitable hollows
<i>Tadarida aegyptiaca</i>	Egyptian free-tailed bat	High	LC	Crevices, buildings, rock crevices. Very common and adaptable.
<i>Cistugo seabrae</i>	Angolan wing-gland bat	Medium - High	NT	Endemic to West Coast, restricted to arid climates (semi-desert), netted in dry river beds.
<i>Miniopterus natalensis</i>	Natal long-fingered bat	Low	NT	Roosts gregariously in caves, no known caves close to the study site.
<i>Neoromicia capensis</i>	Cape serotine	Medium	LC	Under bark of trees and roofs of buildings.

Species	Common name	Probability of occurrence	Conservation status	Possible roosting habitat to be utilised on study area
				Common and adaptable

- Larger area around site

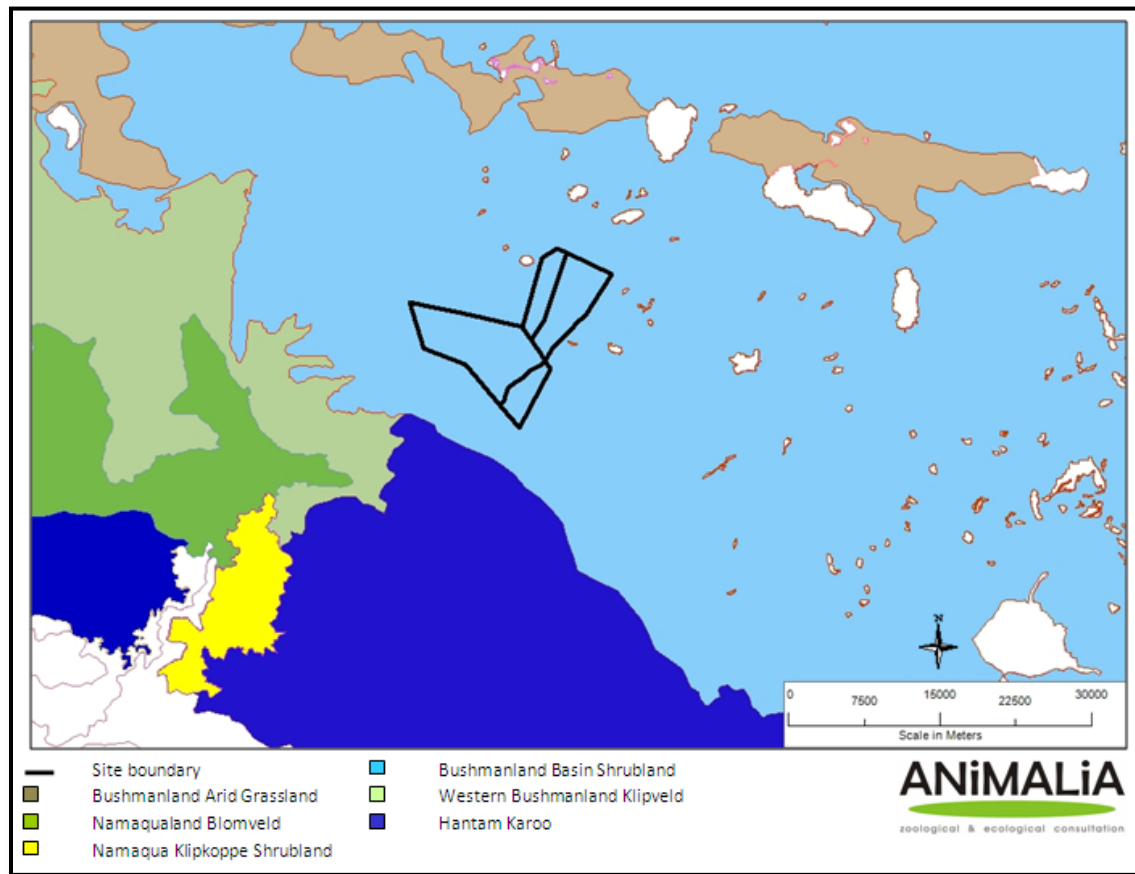


Figure 11: Vegetation units of the larger study area (Mucina & Rutherford, 2006).

In general the larger area around the site (approximately 30km radius) is dominated by vegetation units with relatively similar characteristics as the unit present on the site. Although the Namaqualand Klipkoppe Shrubland can offer some bat roosts, this unit is almost 30km away from the site.

- *Surface rock, topography, climate, surface water and vegetation*

The Loeriesfontein site is overall very flat with some mountainous terrain in the far south western part, and the mean annual precipitation is very low. Some pans are present in the north eastern part and dry stream beds in the south western. These streams are seasonal and can only provide limited surface water for bats.

The mountainous terrain in the south west can offer bat roosting space (Figure 12). From a vegetation point of view the natural vegetation of the site does not offer any roosting space, and no farm buildings are visible on the site.

- *Desktop based fatal flaws map/sensitivity map*



Figure 12: Bat Sensitivity map

In Figure 12 the areas where natural bat roosting space may be available have been marked as sensitive (red shading), and includes the mountainous terrain in the south west. For the purpose of this study a buffer of 100 meter around inland water bodies and 200 meter around rivers is appropriate, this is the same buffers used for determining the buildable area of the site and is therefore not indicated in Figure 12.

Although there are no South African guidelines for the consideration of bats in relation to wind farm developments, however, international guidelines such as the Eurobats Guidance and the Natural England Technical Note (Mitchell-Jones & Carlin 2009) give some indication of buffer zones which may be applicable. The Eurobats Guidance (Rodrigues *et al.* 2008) proposes a minimum distance of 200m to forest edges where tree felling is necessary to establish a wind

farm. The Natural England Interim Guidance suggests a 50 meter buffer from blade tip to the nearest feature important to bats.

It is important to note that this sensitivity map is not intended to govern the ideal locations of wind turbines and PV cell placement with regards to bat sensitivity, but rather to highlight areas that will require special attention during the full detail phase assessment, although the areas not marked with a high sensitivity should still be monitored.

5.6 Surface Water

The Surface Water Assessment was conducted by SiVEST

5.6.1 Drainage Context

Loeriesfontein has a low rainfall with a mean annual precipitation of about 143mm per year (<http://www.saexplorer.co.za/south-africa/climate/loeriesfontein>). Loeriesfontein primarily receives rainfall in the winter months producing a Mediterranean climate. The average midday temperatures for Loeriesfontein range from 17°C in July to 31.8°C in February (<http://www.saexplorer.co.za/south-africa/climate/loeriesfontein>). The region is the coldest during July when the mercury drops to 2.4°C on average during the night (<http://www.saexplorer.co.za/south-africa/climate/loeriesfontein>). Loeriesfontein falls within the Bushmanland Basin Shrubland bioregion (Mucina & Rutherford, 2006). The soils originate from the mudstones and shales of the Ecca Group and Dwyka tillites with approximately 20% of rock outcrops formed by Jurassic intrusive dolerite sheets and dykes (Mucina & Rutherford, 2006). The soils for this bioregion are shallow with Mispah and Glenrosa forms and to a lesser extent red-yellow apedal, freely drained soils with a high base status, high lime and high salt content (Mucina & Rutherford, 2006).

Given the climate and the type of substrate of the greater study area, the region is not particularly susceptible to surface water occurrence in the greater region. Low rainfall in the winter, coupled with high temperatures and lower rainfall in the summer indicate that the climate is not conducive to surface water permanency but rather seasonal or temporary water bodies where local conditions permit. The drainage characteristics of the soils will also contribute to the lack of surface water occurrence. High salt content in the soils may additionally reflect the high evaporation rates experienced in the region which limits the presence of surface water resources. Other hydrological sources which may contribute to surface water resources in the region however, include rivers which stem from higher rainfall regions as well as ephemeral or seasonal streams which stem from local sources forming tributaries to the larger perennial systems.

5.6.2 Surface Water Resource Occurrence in the Study Area

Two priority river systems (NFEPA 2011) distanced approximately 5km apart from one another flow to the south of the Loeriesfontein study site. The river system located to the western most area of the site can be identified as the Leeuberg River (Reach number E81). This particular river is classed as a largely natural river system (Class B) according to the Present Ecological State assessment conducted in 1999 (NFEPA 2011). Equally, the river system located in the central southern region of the study site is classed as a largely natural river system (Class B) according to the Present Ecological State assessment conducted in 1999 (NFEPA 2011). This river is identified as the Klein-Rooiberg River (Reach number E61). Numerous associated drainage lines can be evidenced in addition to these systems.

Wetlands are relatively prominent and scattered throughout the site despite the prevailing climate. These are assumed to be seasonal or temporary in nature. A total of 45 wetlands can be identified from the NFEPA (2011) database, 10 of which are flat\pan wetlands, 26 are depression wetlands and 9 are classed as hillslope seep wetlands. The number and density of pans (particularly in the central and northern areas of the study site) in addition to the two priority river systems and associated drainage lines will affect the developable area of the wind farms, but do not constitute a fatal flaw for the study site provided that the site specific location of the wind turbines be situated outside of any surface water resources and their associated buffer zones. Special mitigation measures will be needed given the state of the priority rivers identified on the study site should development commence nearby these hydrological systems.

Some turbines may be located in close proximity to surface water features and hence a WUL may be required in this instance.

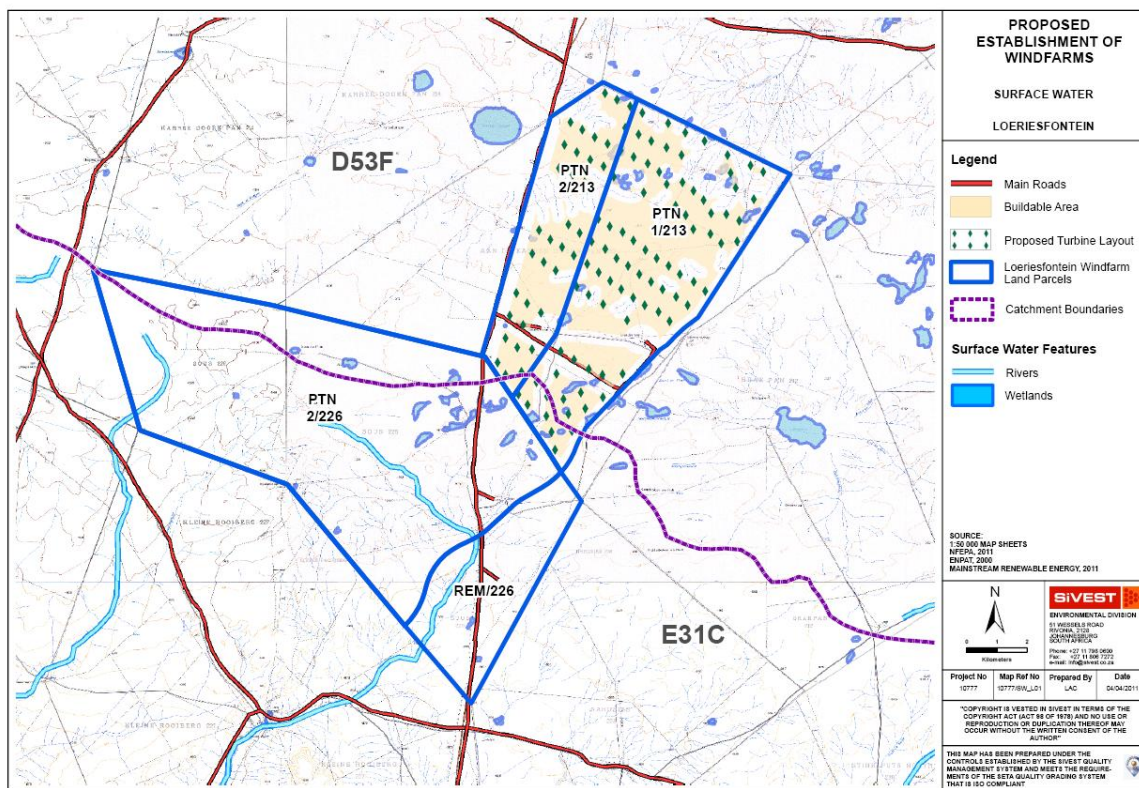


Figure 13: Surface water Features for the Loeriesfontein site.

5.7 Agricultural Potential

The Agricultural Potential Assessment was conducted by SiVEST and is included in Appendix 2C.

5.7.1 Soil Characteristics and Soil Potential

According to the ENPAT database the site is dominated by mix of Glenrosa and Mispah soil forms (Figure 14). These soils develop where bands of weathering rock are found close to the soil surface. Glenrosa and Mispah soils generally have an inherently low agricultural potential due to a distinct lack of rooting depth (<0.45 m) (Figure 15) and also exhibit moderately high soil erosion hazard ratings; thus soil conservation practices such as minimum tillage and trash blankets should be employed. A mix of red and yellow apedal soil forms are found near the western border of the site are also associated with a shallow effective soil depth of less than 0.45 m.

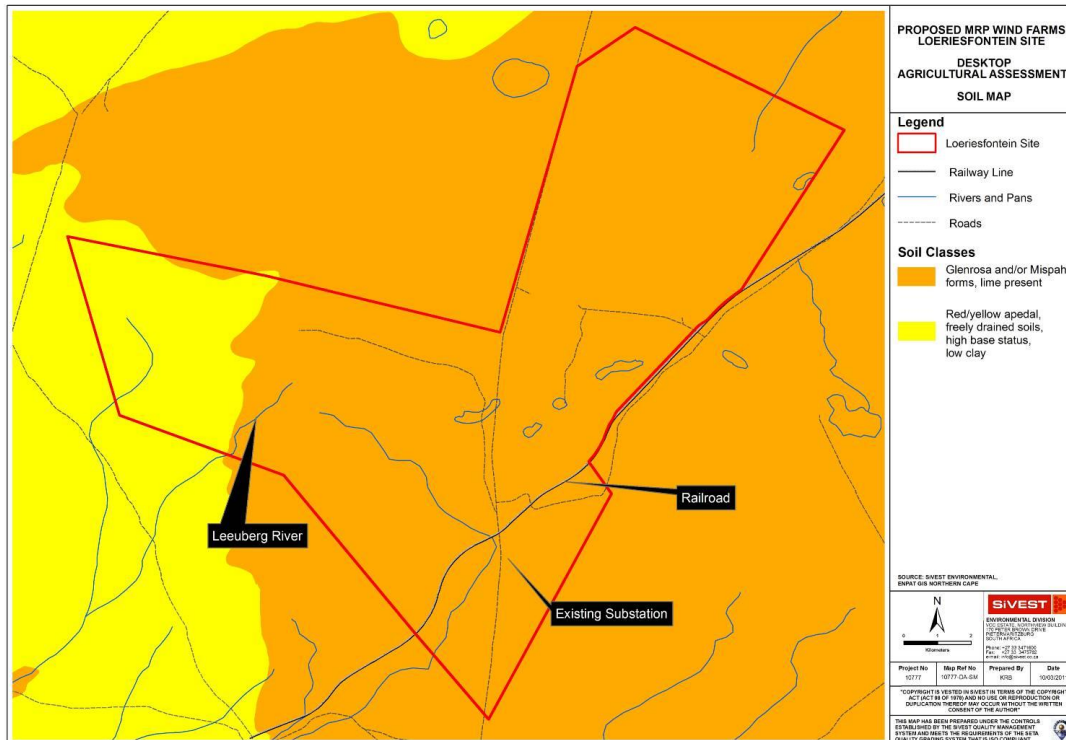


Figure 14: Soil Map of the Loeriesfontein Site.

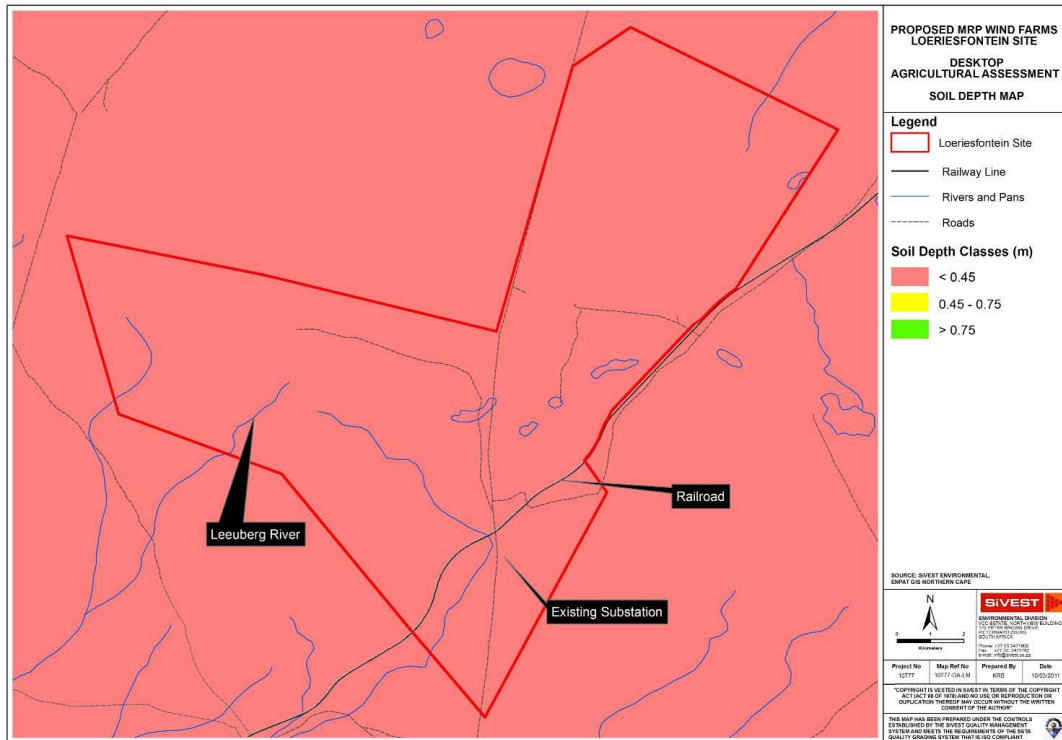


Figure 15: Soil Depth Map of the Loeriesfontein Site.

The ENPAT Database also provides an overview of the study area's agricultural potential based on its soil characteristics, it should be noted that this spatial dataset does not take prevailing climate into account. Restrictive climate characteristics, due to heat and / or moisture stress will further reduce the agricultural potential of the area under assessment. The study area is dominated by soils which are not suited for arable agriculture (Figure 16) but which can still be used as grazing land.

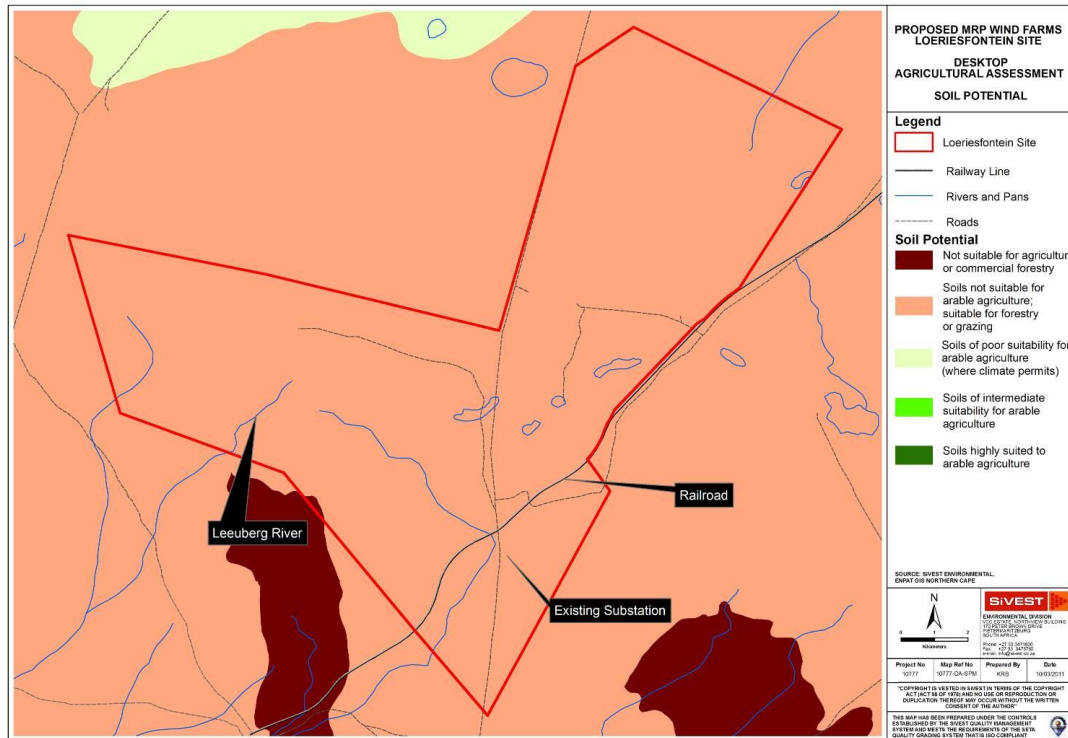


Figure 16: Soil Potential Map of the Loeriesfontein Site.

5.7.2 Desktop Agricultural Assessment: Result Summary

By taking all the site characteristics (climate, geology, land use, slope and soils) into account the agricultural potential for the majority of the study area is classified as being extremely low for crop production while moderately low for grazing. This classification is primarily due to climatic and soil depth limitations. According to the Agricultural GIS data the typical GDP per hectare for the area is R150 which can be compared against the much larger financial benefit of the proposed development.

5.7.3 Field Verification

The site visit confirmed the results from the desktop assessment. The characteristics that were noted during the field verification exercise are summarized below:

- Slope

According to the ENPAT slope datasets the study area is characterised by flat and gently sloping topography with an average gradient of less than 10%. During the site visits it was noted that this terrain description matched the actual topography of the study area. The area is flat and thus the topography is not a limiting factor for either agricultural or the proposed development (Figure 17).



Figure 17: Typical topography encountered on the Loeriesfontein Site

- Land Use

According to ENPAT the study area is classified as natural / vacant which is used as general grazing land. These results were confirmed during the site visits. Vast unimproved grazing land dominates the site which is used to feed sheep and general wildlife (Figure 18). Vast grazing land is interspersed with seasonal pans and non-perennial streams



Figure 18: Typical land use associated with the study area

- Soil Characteristics

The results from the desktop assessment above indicate that the study area is dominated by mix of Glenrosa and Mispah soil forms. These soils develop where weathering rock is found close to the soil surface. Glenrosa and Mispah soils generally have an inherently low agricultural potential due to a distinct lack of rooting depth (<0.45 m). These results were confirmed during the site visit. The soils encountered during the field verification were shallow and rocky which are limiting to crop production (Figure 19).



Figure 19: Rocky shallow soils dominate the study area

- Verified Agricultural Potential

According to the ENPAT agricultural dataset the study area is dominated by soils which are not suited for arable agriculture but which can still be used as grazing land. These results were confirmed during the site visits where the highly restrictive soil and climate characteristics contributed to an extremely low agricultural potential in terms of crop production. The majority of the site consists of vast grazing land which can be seen as a non-sensitive land use in terms of agricultural production when assessed within the context of the proposed development.

5.8 Noise

The Noise Assessment was conducted by Morne de Jager from M² Environmental Connections and is included in Appendix 2D.

5.8.1 Potential Noise-Sensitive Developments

An assessment of the area was done using available topographical maps, GoogleEarth® and a site visit. Two Potential Noise-sensitive Developments (NSDs) were identified, with those within 2,000 meters of the boundary of the proposed facility indicated in Figure 20. Unfortunately there

was no-one at either of the dwellings during the site visit, although there was livestock on both the properties potentially indicating the presence of residents.

Table 12: Locations of the identified Noise Sensitive Developments (Datum type: WGS 84 – Hartbeeshoek)

Noise-sensitive development	Description	Location Latitude	Location Longitude	Distance to closest Wind Turbine
NSD01	Residential	-30.475701°	19.564488°	1,300 m
NSD02	Residential	-30.427893°	19.605356°	1,073 m
D1	Derelict	-30.424920°	19.577818°	Not relevant

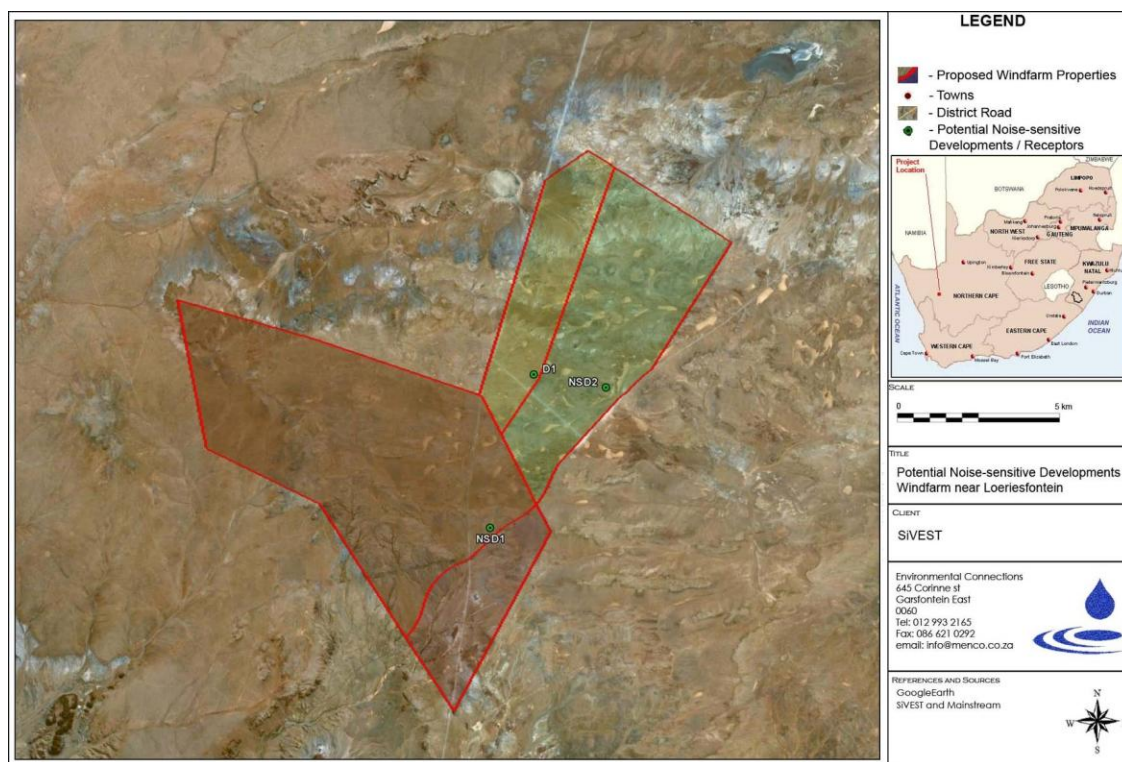


Figure 20: Potential Noise-sensitive Developments identified near Loeriesfontein

5.8.2 Baseline situation - Current Noise Sources

There are no existing noise sources in the area of the proposed wind farm.

5.8.3 Baseline situation - Measurement Procedure

Ambient (background) noise levels were measured at appropriate times in accordance with the South African National Standard SANS 10103:2008 "***The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication***". The standard specifies the acceptable techniques for sound measurements including:

- type of equipment;
- minimum duration of measurement;
- microphone positions;
- calibration procedures and instrument checks; and
- weather conditions.

The equipment defined in Table 13 was used for gathering data.

Table 13: Equipment used to gather data

Equipment	Model	Serial no	Calibration
SLM	Rion NL-32	01182945	17 June 2010
Microphone*	Rion UC-53A	315479	17 June 2010
Preamplifier	Rion NH-21	28879	17 June 2010
Calibrator	Rion NC-74	34494286	27 January 2011
Wind meter	Kestrel 4000	587391	Calibrated

*Microphone fitted with the appropriate windshield.

5.8.4 Baseline situation - On-Site Measurements

Measurements were taken during the day and night of 13 June 2011. The sound level meter was referenced at 1,000 Hz directly before and directly after the measurement was taken. In all cases drift was less than 0.2 dBA.

The locations used to measure ambient (background) sound levels are presented in Figure 21. These points are considered sufficient to determine the ambient (background) sound levels in the area. The results are presented in Table 14.

Table 14: Results of ambient sound level monitoring

Point name	Location, Latitude	Location, Longitude	LAeq,T (dBA)	LA, max (dBA)	LA, min (dBA)	LA, 90 (dBA)	Temp (oC)	Hum (%)	Wind speed Ave. (m/s)
LBN01 (N)	- 30.336740°	19.584582°	25.7	32.1	16.3	18.8	7.2	98.3	1.1
LBN02 (N)	- 30.420516°	19.561455°	23.6	36.6	16.1	16.9	8.8	95.4	0.9
LBN03 (N)	- 30.485515°	19.557087°	29.7	43.1	17	19.4	8.9	93.2	0.9
LBN04 (D)	- 30.497410°	19.557970°	54.3	64.2	48.9	50.8	10.2	85.7	4.2
LBN05 (D)	- 30.498541°	19.559391°	74.1	74.5	72.7	73.5	11	81.7	3.2
LBN06 (D)	- 30.476170°	19.563890°	30.6	38.9	18.3	23.3	7.6	95.6	0.4
LBN07 (D)	- 30.428747°	19.605808°	42.2	55.7	25.4	33.5	16	59.5	3.4
LBN07 (D)(T)	- 30.428747°	19.605808°	51.3	61.2	28.4	33.1	16.1	56	3.2

Notes:

- The Sound Level Meter was fitted with the WS-03 all-weather windshield during times when the average wind speed exceeded 3 m/s
- (D) = Day, (N) = Night, (R) = Road, (T) = Train moving slowly through station
- The Rion Sound Level Meter NL 32 minimum limit is at 18 dBA.
- LBN05 taken approximately 1 meter from Transformer inside the substation perimeter.

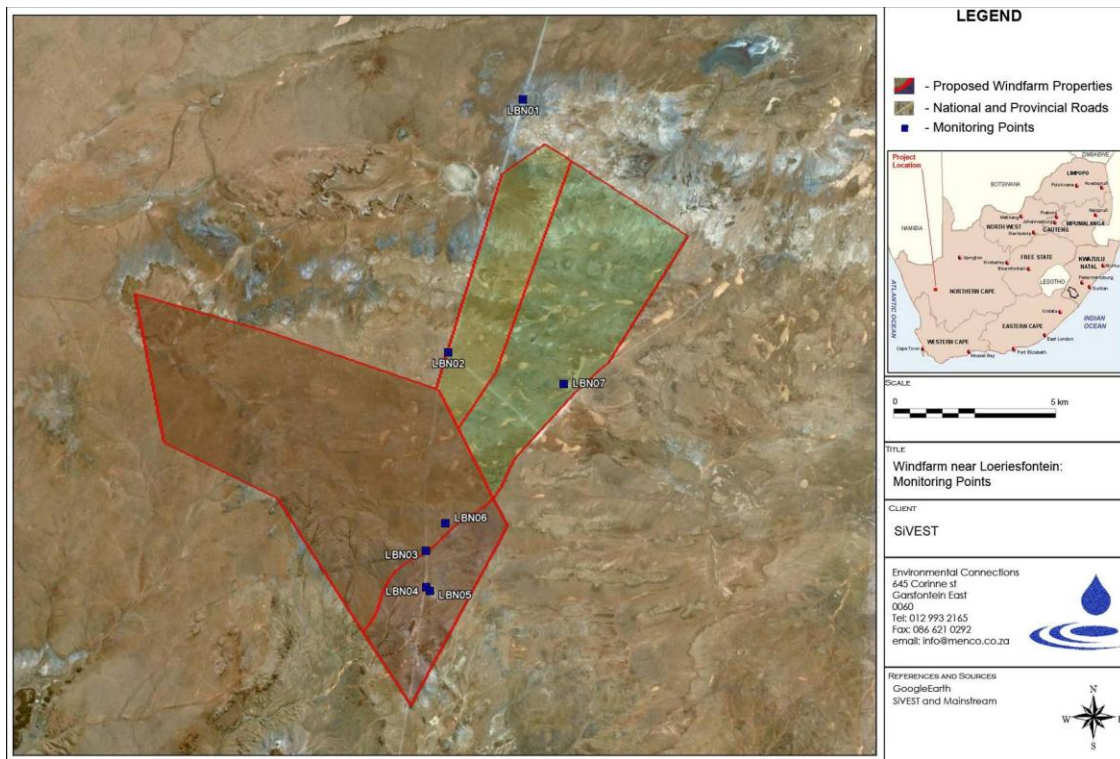


Figure 21: Monitoring points selected near the proposed facility (marked as blue squares)

5.8.5 Environmental Issues and Potential Impacts - Construction Phase

Projected impacts from the construction phase can only be estimated once more information regarding the duration of construction and equipment used are known. Therefore the construction phase will only be dealt with in detail during the Environmental Impact Assessment phase. Construction activities such as the (potential) borrow pit, concrete batching/delivery, foundation preparation, the digging of trenches and increased traffic (deliveries and movement onsite) will be considered.

5.8.6 Environmental Issues and Potential Impacts - Operational Phase

For the purpose of the Scoping phase, the impact that traffic may have on the surrounding noise environment are excluded, only to be considered during the EIA phase. A preliminary layout was available for evaluation however. The potential impact of the preliminary layout of the wind turbines and PV cells on potential nearby receptors is considered.

5.9 Visual

The Visual Assessment was conducted by SiVEST is included in Appendix 2E. The findings are presented below.

5.9.1 Physical Landscape Characteristics

The study area is characterised by a relatively flat landscape; the topography is flat to gently undulating in the immediate vicinity of the site proposed for the wind farm and PV plant. In the wider area, isolated areas of relief constrain the immediate viewshed. The Klein and Groot Rooiberg and Leeuberg koppies form an area of localised hilly topography which occurs to the south and south-west of the site. To the immediate north of the site the presence of a number of large pans signals that the topography is very flat and thus very poorly drained.

The wider area is very sparsely populated, and thus little human-related infrastructure exists. Some infrastructure exists in the vicinity of the site in the form of a railway that runs along a part of the eastern boundary of the site (the railway linking Sishen with Saldanha Bay), and associated railway works warehousing and offices. An electricity transmission substation exists to the south of the site, as well as power lines that run to and from this. A very tall microwave tower also exists on the site of the proposed wind farm and PV plant.

Except for two farmhouses the site of the proposed development is mostly vacant. The surrounding area is largely uninhabited and the closest built up area is the small town of Loeriesfontein approximately 60km to the south of the site.

The flat terrain that occurs over most of the site and short vegetation entail that there are wide-ranging vistas over the wider area. The topography and vegetation cover offer no visual screening, except the range of hills located to the south and south-west, which would screen the area to the south and south-west of them from the site. Bearing in mind that the wind turbines are very large structures (over 120m in height when the rotor blades are taken into account), these could be visible from a very wide radius around the site, except from areas to the south and south-west of the site which would be visibly shielded from the area of the proposed development by the hills. There would be very little shielding to lessen the impact of the wind turbines for any locally-occurring receptor locations.

Most of the study area is considered to have a natural visual character as natural shrubland prevails throughout the site and there is minimal human habitation and associated infrastructural footprint. In addition the predominant landuse, sheep farming, has not transformed the natural landscape and the area has thus largely retained its natural character. As mentioned above, built

infrastructure within the proposed site is limited to isolated farmhouses, gravel farm roads and boundary fences as well as a microwave (telecommunications) tower.

5.9.2 Presence of Potential Sensitive Receptors

A sensitive receptor is defined as a receptor which would potentially be adversely impacted by the proposed development. Potentially exposed sensitive receptors are shown in Figure 22. There are a few scattered farmsteads / homesteads in the area on and surrounding the site. These farmsteads may be sensitive receptor locations, depending on the sensitivity of the people that inhabit them to visual impacts and the value placed by these people in the natural characteristics of the area.

A district road that connects the town of Loeriesfontein with Granaatboskolk to the north bisects the site. This road is used mainly as a local access road for local farmers, as well as for people working on the gypsum mine to the north and on the railway. The road thus is expected to carry a fair amount of traffic.

The proximity of these farmsteads as well as the district road which bisects the site entail that the wind farm and PV plant is likely to be visible from these locations. Although at a preliminary level, none of these receptor locations are expected to display a particularly high degree of sensitivity or adversity to the visual impacts associated with the renewable energy facility.

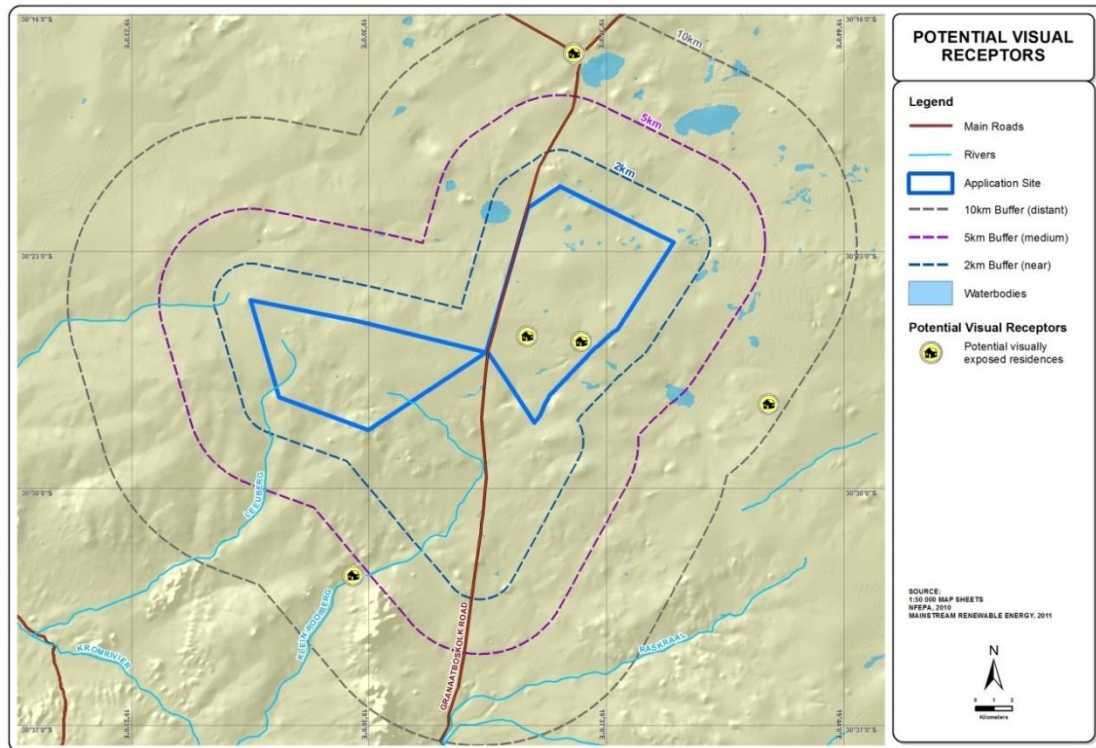


Figure 22: Map showing potential visual receptors within the study area

5.10 Geotechnical Aspect

The Geotechnical Assessment was conducted by Dr. Cecilia Canahai and is included in Appendix 2F. The environmental baseline from a geotechnical perspective is presented below.

5.10.1 Bedrock Geology

The site is underlain by sedimentary rock units of the Ecca Group, Karoo Supergroup and igneous dolerite. The Ecca Group is represented by the Whitehill Formation and the Tierberg Formation. The Whitehill Formation comprises carbonaceous shale that weathers white on surface. The Tierberg Formation comprises well laminated, dark shale.

Dolerite in the form of sub-horizontal sills underlie areas in the central, western and north eastern sections of the site.

Although not indicated on the 1:1000 000 scale geological map, a review of aerial photography indicates the presence of alluvial deposits along the larger drainage features and small, isolates

patches of windblown sands. The windblown sands appear to be more prevalent on the central and north eastern portions of the site.

5.10.2 Preliminary Geotechnical Assessment

From a geotechnical perspective no fatal flaws have been identified that would prevent development of a wind farm and PV facility on the Loeriesfontein site. However, certain geotechnical constraints are likely to be encountered in small sections of the site these must be taken into account during development planning as they may influence the site layout and foundation design for the wind turbines and PV facility and associated infrastructure. The alluvial deposits that are expected to occur along the larger drainage lines are likely to consist of loose, unconsolidated sands and gravels. These materials will provide a poor founding medium for wind turbines and PV cells. Depending on the thickness of the alluvial deposits, deep foundations or specialised foundation preparation may be required.

Aeolian sands are known to exhibit a collapsible grain structure. Specialised foundation preparation or the use of deep foundation methods may be required where collapsible soils are encountered. Further geotechnical investigations must focus on identifying and quantifying the collapse potential of these soils. Should collapsible soils be encountered to significant depths, then a revised turbine layout may be recommended to avoid the problematic founding conditions.

Shale and dolerite bedrock exhibiting various degrees of weathering is expected to be encountered at relatively shallow depth over the majority of the site. This material should provide an adequate founding medium for the construction of shallow foundations for wind turbines and PV cells.

Intermediate excavation conditions are expected at relatively shallow depth in areas underlain by shale. Intermediate to hard excavation conditions are expected in areas underlain by dolerite. The difficult excavation conditions are inferred from the apparent shallow depth of borrow pit excavations observed on aerial photographs of the site.

5.11 Heritage

The Heritage Assessment was conducted by Dr. Johnny Van Schalkwyk and is included in Appendix 2G. The environmental baseline from a heritage perspective is presented below.

5.11.1 Regional overview

- Stone Age

Occupation by early humans would probably date to the Middle Stone Age and would consist of open sites in the vicinity of stream beds or hills and outcrops. Population density might have increased during the Later Stone Age and people would have occupied rock shelters where available as well as open sites. During this later period they also produced rock engravings, although none are known from the immediate region.

- Historic period

The town of Loeriesfontein attained municipal status in 1958. It serves a largely farming community.

5.11.2 Heritage potential

Based on the above sources and experience in the region, the following heritage sites, features and objects are expected to occur in the proposed development area:

- Stone Age sites located near the foot of hills, with an increased likelihood if there are rock shelters in the vicinity.

Historic period

- Houses and other structures older than 60 years;
- Farming infrastructure such as irrigation channels;
- Graves and cemeteries, both formal and informal.

5.12 Palaeontology

The Palaeontological Assessment was conducted by Dr. John Almond and is included in Appendix 2H.

The environmental baseline from a palaeontological perspective is presented below.

5.12.1 Geological Background

The greater part of the study area is underlain by Early to Middle Permian basinal mudrocks of the lower part of the Eccu Group (Karoo Supergroup) that were laid down within the marine to

5.12.2 Palaeontological Heritage

The fossil heritage within each of the major rock units that are represented within the Loeriesfontein wind farm and PV facility study area outlined here. Much of the data has been abstracted from the unpublished report on the fossil heritage of the Loeriesfontein 1: 250 000 sheet area by Almond (2008a).

- Fossil heritage within the Prince Albert Formation

The only fossils recorded from the Prince Albert Formation in the Loeriesfontein sheet area are various types of trace fossils, some of which have apparently been misinterpreted as plant remains by earlier authors (Almond 2008a). Diagenetic nodules containing the remains of palaeoniscoids (primitive bony fish), sharks, spiral bromalites (coprolites, spiral gut infills etc attributable to sharks or temnospondyl amphibians) and petrified wood have been found in the Ceres Karoo (Almond 2008b and refs. therein). Rare shark remains (*Dwykaselachus*) are recorded near Prince Albert on the southern margin of the Great Karoo (Oelofsen 1986).

- Fossil heritage within the Whitehill Formation

In palaeontological terms the Whitehill Formation is one of the richest and most interesting stratigraphic units within the Ecca Group. The overall palaeontological sensitivity of this formation has accordingly been rated as very high (Almond & Pether 2008). The rich fossil record of the Whitehill formation in the Loeriesfontein sheet area has been reviewed by Almond (2008a). The biostratigraphic distribution of the most prominent fossil groups – mesosaurid reptiles, palaeoniscoid fishes and notocarid crustaceans – within the Whitehill Formation has been documented by several authors, including Oelofsen (1987), Visser (1992) and Evans (2005).

In brief, the main groups of Early Permian fossils found within the Whitehill Formation include:

- aquatic mesosaurid reptiles (the earliest known sea-going reptiles);
- rare cephalochordates (ancient relatives of the living lancets);
- a variety of palaeoniscoid fish (primitive bony fish);
- highly abundant small eocarid crustaceans (bottom-living shrimp-like forms);
- insects (mainly preserved as isolated wings, but some intact specimens also found);
- a low diversity of trace fossils (e.g. king crab trackways, possible shark coprolites / faeces);
- palynomorphs (organic-walled spores and pollens);
- petrified wood (mainly of primitive gymnosperms, silicified or calcified); and
- other sparse vascular plant remains (*Glossopteris* leaves, lycopods etc).

- Fossil heritage within the Tierberg Formation

The fossil record of the Tierberg Formation in the Loeriesfontein sheet area and elsewhere within the Main Karoo Basin has been reviewed in detail by Almond (2008a). Rare body fossil records include disarticulated microvertebrates (e.g. fish teeth and scales) from calcareous concretions in the Koffiefontein sheet area (Zawada 1992) and allochthonous plant remains (leaves, petrified wood). The latter become more abundant in the upper, more proximal (prodeltaic) facies of the Tierberg (e.g. Wickens 1984). Prinsloo (1989) records numerous plant impressions and unspecified “fragmentary vertebrate fossils” within fine-grained sandstones in the Britstown sheet area. Dark carbonaceous Eccca mudrocks are likely to contain palynomorphs (e.g. pollens, spores, acritarchs).

- Fossil heritage within the Karoo Dolerite Suite

The dolerite outcrops in the Loeriesfontein study area are in themselves of no palaeontological significance. These are high temperature igneous rocks emplaced at depth within the Earth's crust so they do not contain fossils. However, as a consequence of their proximity to large dolerite intrusions, some of the Eccca Group sediments will have been thermally metamorphosed or “baked” (ie. recrystallised, impregnated with secondary minerals). Embedded fossil material of phosphatic composition, such as bones and teeth, is frequently altered by baking – bones may become blackened, for example - and can be very difficult to extract from the hard matrix by mechanical preparation (Smith & Keyser 1995). In some cases – such as fossil moulds of mesosaurid reptiles and palaeoniscoid fish - baking may enhance the quality of preservation of Eccca fossils while other fossil groups (e.g. carbonaceous remains of plants, organic-walled palynomorphs) are more likely to be compromised.

- Fossil heritage within the Late Caenozoic superficial deposits (‘drift’)

The central Karoo “drift deposits” have been comparatively neglected in palaeontological terms. However, they may occasionally contain important fossil biotas, notably the bones, teeth and horn cores of mammals as well as remains of reptiles like tortoises. In Quaternary deposits, fossil remains may be associated with human artefacts such as stone tools and are also of archaeological interest (e.g. Smith 1999 and refs. therein). Stone artefacts of Pleistocene and younger age may additionally prove useful in constraining the age of superficial deposits such as gravelly alluvium within which they are occasionally embedded.

5.12.3 Conclusions and Recommendations

The Mainstream wind farm and PV facility study area north of Loeriesfontein is largely underlain by marine to freshwater sediments of the Eccca Group (Karoo Supergroup) that are of Early to Mid

Permian age. Important fossil material of aquatic vertebrates (mesosaurid reptiles, fish), invertebrates (e.g. crustaceans) and petrified wood is known from the Whitehill Formation and to a lesser extent from the Prince Albert and Tierberg Formations. However fossils other than trace assemblages are generally sparse and most of the Ecca sediments are of low overall palaeontological sensitivity. Their palaeontological potential may well have been locally compromised by chemical weathering and dolerite intrusion. Furthermore, a substantial portion of the Ecca Group outcrop area is mantled by superficial sediments (downwasted gravels, alluvium etc) of low palaeontological sensitivity. It is concluded that the proposed Loeriesfontein wind farm and PV facility is unlikely to pose a substantial threat to local fossil heritage. The impact significance of this project as far as palaeontological heritage is concerned is rated as LOW (negative). Therefore, pending the discovery of significant new fossil material here, no further specialist studies are considered to be necessary.

5.13 Tourism

The Tourism Assessment was conducted by SiVEST and is included in Appendix 2I. The environmental baseline from a tourism perspective is presented below.

5.13.1 Tourism in the Northern Cape

Apart from business travel, transient travel and visiting friends and relatives, tourists visit the Northern Cape for ecotourism purposes due to its unique variety of natural, historical and cultural attributes. In addition, the annual floral display in the Namaqualand region is a famous characteristic of the province. The concentration of historical sites around the Kimberley area and the Kgalagadi Transfrontier conservation area are also renowned provincial tourist attractions.

Nonetheless, based on several reports by South African Tourism Strategic Research Unit, the Northern Cape is the least visited Province in South Africa in terms of both domestic and foreign tourism. This is perhaps due to the fact that the province has not capitalised on its full potential as a tourist destination and hence is largely undiscovered by both domestic and international markets.

5.13.2 Tourism in and Around the Proposed Wind Farm and PV Facility

Where information could not be obtained at a local scale, provincial data is represented in this section. Statistics South Africa classifies tourism regions within provinces i.e. the “Rest of Northern Cape” region which comprises of towns such as Loeriesfontein, Daniëlskuil, Upington,

Van Zylsrus, Kakamas, Augrabies, Kuruman, Olifantshoek, Postmasburg, Askham, Nieuwoudtville and Prieska among others. Most important of these is the town of Loeriesfontein, which is closest to the proposed wind farm site (approximately 60km away).

Loeriesfontein is a small town mainly characterised by land uses such as residential. It is located within a basin surrounded by mountains (Discover South Africa, 2009 – 2011). The town is known as the capital of Bushmanland and is characterised by a few tourist attractions which include:

- i. Fred Turner Windmill Museum;
- ii. Quiver Tree Forests; and
- iii. Spring wild flowers are another tourist attraction in Loeriesfontein.

The supply of accommodation facilities is extremely low. Most accommodation facilities are concentrated mainly in and around Nieuwoudtville which is over 100km away from the study site. Accommodation facilities in Nieuwoudtville include: Guest houses; Bed and Breakfasts, Self Catering, a Hotel and a Caravan Park. These accommodation facilities are important to the tourism in the Nieuwoudtville area. However this town is located way outside the study area and as such, no detailed tourism investigations in terms of number of beds as well as types of tourists at the accommodation facilities were undertaken.

Generally, the study area is not a popular tourist destination. Most tourist activities e.g. adventure vehicle trails and hiking trails are located over 60km outside of the study area (Figure 24). Tourism in the area (within a 60km) is mainly attributed to leisure tourism in Loeriesfontein as well as passing through tourists on their way to/from popular tourist destinations (via the Namaqualand flower route which traverses Loeriesfontein).

The surrounding land is used for agricultural purposes i.e. livestock farms (mostly sheep).

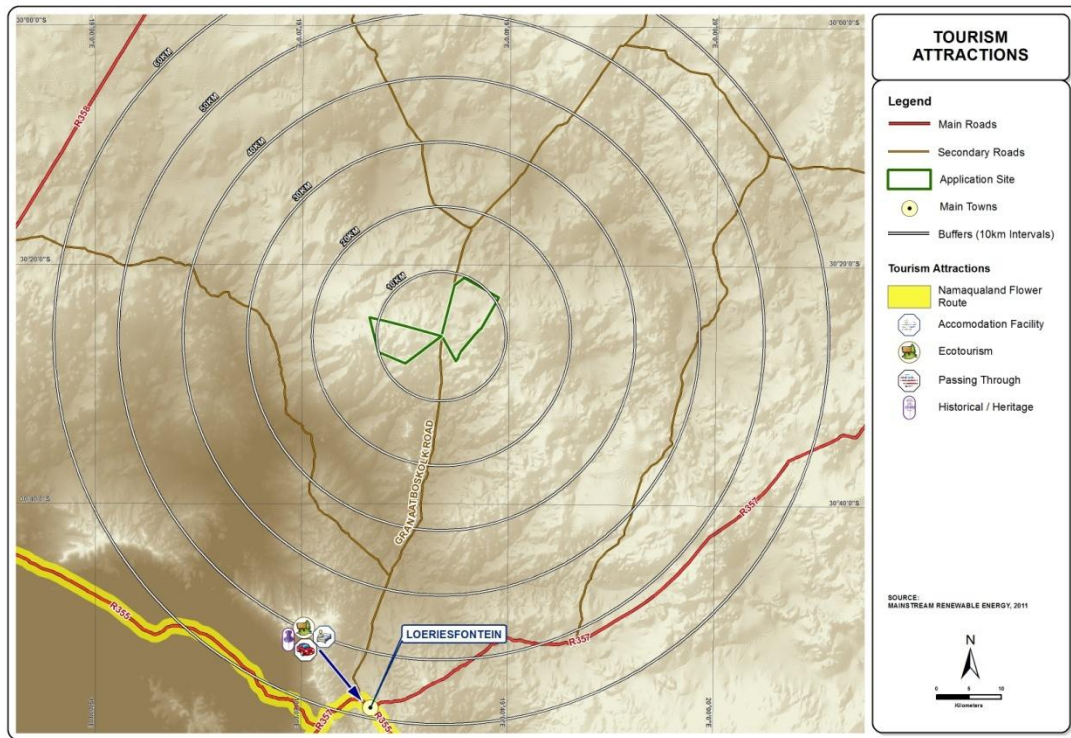


Figure 24: Tourism infrastructure around the study area (within a 60km radius)

Furthermore, according to the 2009/2010 IDP for Hantam Local Municipality, the area is renowned for its flat mountains and large open spaces as well as its tourism potential especially during the flower season which attracts thousands of tourists.

DEA and DTEC are currently in the process of establishing tourism forums and tourism associations within the District Municipality. This will ensure that each municipality gives input into tourism development. The Hantam Municipality has committed to making R15 000.00 available for tourism development (Hantam IDP, 2009/2010).

Also, a tourism office was planned for the town of Loeriesfontein in 2009/ 2010.

To add on to that, the development of the wind farms may increase the tourism potential in the area in the form of education as well as business tourism with engineers and schools visiting and working at the wind farms. Guest houses; Hotels and a Caravan Parks in and around Nieuwoudtville and Loeriesfontein could potentially benefit and there may even be a demand for more of these accommodation types to be developed in the area. The area could also increase its tourism potential if tours of the wind farms were offered to the public.

All in all, the study area and nearby towns have the potential to become popular tourist destinations but the wider area is largely undiscovered. In an effort to promote and develop tourism in the wider area, the 2010-2011 Namakwa District Municipality IDP suggests the following initiatives:

- Tourism Marketing:
 - To produce a documentary film, still photos and local music to market the whole region to potential tourists.
 - To build a tourism hub along the N7 to hold the information centre, incubate arts and crafters, host regional festivals among others.
 - To participate in the Northern Cape efforts in developing road signage policies and regulations for the Northern Cape and therefore the district and localities.
- Greening of Namakwa: To develop and upgrade tourism attractions in the Namakwa region.
- Mining: To establish a one stop mining centre to distribute information to small miners and showcase the area's mineral base to tourists.

5.14 Social Environment

The Social Assessment was conducted by Nonka Byker from MasterQ Research and is included in Appendix 2J. The environmental baseline from a tourism perspective is presented below.

5.14.1 Geographical Processes

Geographical processes relate to the land use patterns and established and planned infrastructural developments in an area. Land use is defined as “the human modification of the natural environment or wilderness into a built environment such as fields, pastures, and settlements”. This subsection therefore describes the current and future land use in the project area (baseline profile), followed by the description of the expected change processes and potential social impacts that can result from project implementation.

▪ Baseline Geographical Processes (Status Quo)

The Hantam Local Municipality (HLM) is located in the Northern Cape Province and forms part of the Namakwa District Municipality (NDM), the only one in The Northern Cape to have access to a coastline. Other Local Municipalities (LMs) in the District are Nama Khoi; Khâi-Ma; Kamiesberg; Karoo Hoogland; Richtersveld; and Namaqualand.

“Hantam” is a khoi term, meaning ‘mountains where the bulbs grow’, with the municipality being named after the local Hantam Mountains.

The HLM is bordered in the South and South-West by The Western Cape Province, in the West by The Kamiesberg LM, in the North by the Khâi-Ma LM and Siyanda District, and in the East by both The Pixley ka Seme District and The Karoo Hoogland LM. The LM is large, taking up an area of approximately 27,968km² (22% of the area of the district) and is comprised of 5 respective municipal wards.

Figure 25 provides an overview of the preliminary social sensitivity of the proposed Loeriesfontein site in relation to the surrounding area. The social sensitivity map was developed based on a desktop study using Google Earth™. The social specialist endeavoured to identify social sensitive areas such as residential areas (human settlement), scattered households, irrigated farmlands, etc. However, it should be noted that these were the areas visible to the social specialist at the time of the Scoping study and therefore the map might not be all inclusive, i.e. it is possible that more areas of a social sensitive nature might be found during the Impact Assessment phase.

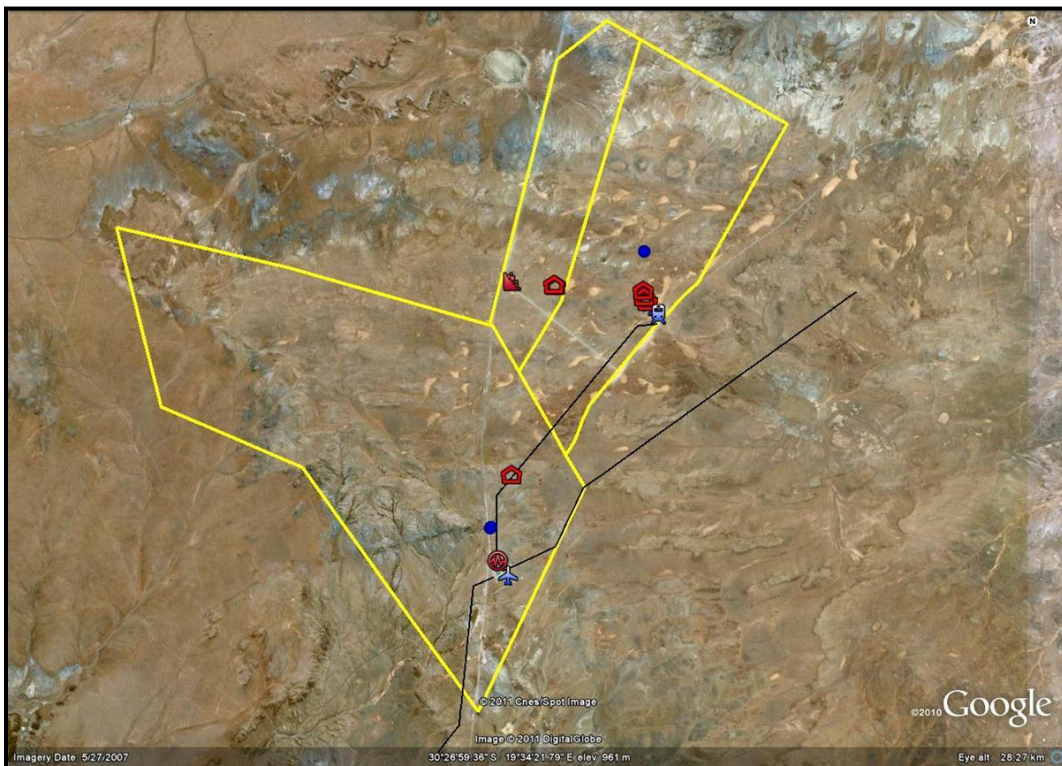


Figure 25: Preliminary social sensitivity map of the Loeriesfontein site

According to the Hantam Municipality's Integrated Development Plan (IDP), none of the towns within the municipality's area of jurisdiction have official town planning schemes and therefore planning is mostly done on an ad-hoc basis.

At approximately 60km south, Loeriesfontein is the closest town to the proposed site. According to the IDP, the area in the south-western quadrant of the town has been earmarked for housing development. However, much of the area is characterised by rocky outcrops with steep slopes, which makes it unsuitable for further development.

Businesses are found in the eastern quadrant of the town. To the west of town there are also businesses, but these are less ordered and more widely dispersed throughout the area. Land is quite readily available for agricultural purposes, but should be substituted with "summer land" to ensure that the land is suitable for grazing throughout the year. The possibility of mining lime in the area is currently being investigated.

The District itself compiled a State of the District Profile Report that identified several issues and challenges. These included:

- The effective maintenance of existing infrastructure;
- Minimising existing infrastructural backlogs;
- Developing additional water sources;
- Increased investment for the maintenance of roads in order to capitalise on the economic benefits that tourism and agriculture offered;
- Increased investment in development projects that were in line with the IDP, the NCPGDS and the NSDP;
- The effective use of resources to assist in development;
- Improving intergovernmental cooperation to ensure that common goals and targets were achieved; and
- Developing human potential within the district in an effort to retain the economically active population within the district.

The table below summarises the findings of the socio-economic scoping study.

Table 15: Summary of Social Findings

Social parameter	Findings
Baseline Demographics	
Population Size and Growth	A total of 21 235 persons in 2007, making up about 18% of the district population. An average annual population increase of around 237 persons per year or 1.12% of the 2007 population annually. A healthy growth rate.
Race, Age & Gender Composition	48.1% male; 51.9% female. Dominated by the Coloured racial group, comprising around 87.3%

	64% of the population is of working age.
Baseline Economic processes	
Levels of Education	Levels of education in HLM are relatively low, although increases in these figures can be observed.
Skill Levels	Skill levels are low. Majority involved in elementary occupations.
Employment	Employment statistics, intrinsically considered to be related to skill levels, income levels and education levels, which are low in this district. 49.10% of the population are employed which is an improvement. The dependency ration is 1.03% - which is not extraordinarily high. Unemployment rate which is slightly higher than the district but lower than the province but, importantly, it has a lower economically inactive population.
Income Levels	The data indicates that HLM experiences low income distributions and that the likelihood of the presence of widespread poverty is rather high. Nonetheless, it has been seen that skills and education levels are low which, in turn, have affected occupations and ultimately income per citizen and per household.
Social Grants	28% of all citizens were on some form of social grant in 2007 with the most prominent being child support.
Baseline Institutional and Legal Processes	
Housing and Household Status	Number of households had increased by a figure of 330 households (or approximately 55 households a year) to 5 820. The number of homes which were owned and fully paid off increased quite significantly, this may likely be seen as a positive sign of economic growth.
Water and Sanitation	94.1% of people received piped water. the HLM is slightly better off than its district and far superior to provincial standards regarding access to water for citizens. Sanitation facilities are slightly below the RDP standards (all persons should have access to at least a VIP flush toilet with ventilation). 84.7% had access to such in 2007. Improvement is required in this regard.
Refuse removal	In 2007, 90% of all refuse was collected and removed by authorities/private companies at least once a week. Only 1.2% of all people had no refuse removal whatsoever.
Energy Usage and Sources	Energy usage is mainly for cooking, lighting and heating. The residents of HLM had a higher

	usage (and thereby accessibility) of electricity in their homes, than the provincial average. Energy sources are mainly electricity but also wood.
Crime Statistics	In Loeriesfontein 4 types of crimes are on the increase: sex crimes, common assault, drug-related crimes, and crimen injuria. It appears that burglary and assault are the most common crimes, while drug-related issues also persist and may be fuelling the two former crimes.
Emergency, Safety & Security Infrastructure	In terms of emergency, safety and security, HLM needs, according to The Departments of Correctional Services and SAPS, to expand its current prison facility in Calvinia and to hire more skilled staff (more social workers and a full-time psychologist), and to furnish the police force with better resources in general (vehicles, radio upgrades, and human resources).
Health Infrastructure	Currently the Hospital in Calvinia services the major health-related needs of the community, while the Hantam Community Trust, an NGO, takes up a primary healthcare role. HLM needs more clinic services and to HIV/AIDS medication and education. In some instances, people will have to make major travel arrangements in order to service their medical needs. A number of private doctors, dentists, optometrists and other health professionals do operate within HLM.
Baseline Socio-Cultural Processes	
Cultural history	The largest cultural grouping in the whole of the HLM appears to be Coloured people (90%). The predominant language is Afrikaans in the form of 'Kaapse Taal' (a creolised dialect of Afrikaans) and 'Pure Afrikaans' (formal Afrikaans).

6 ENVIRONMENTAL ISSUES, POTENTIAL AND CULUMATIVE IMPACTS

6.1 Identification of potential impacts

The proposed development is likely to result in a variety of positive and negative impacts. Moreover, the proposed development could potentially result in collective and long term impacts more commonly known as cumulative impacts. A cumulative impact is the impact of an activity that, in itself, may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

The Scoping report assists in the identification of these potential and cumulative impacts, which will then be assessed at a more detailed level during the EIA stage.

Moreover, further details associated with the construction and operation of the various activities (as listed in the Project Description) in light of the above types of impacts that become available later in the EIA process will be discussed in detail in the EIR Phase.

The following impacts have been identified as being potentially significant:

6.1.1 Floral impacts

Table 16: Impact of the Loss of Natural Vegetation

ISSUE	Impact: loss of natural vegetation
DISCUSSION	Losses would be suffered where areas need to be cleared of natural vegetation.
EXISTING IMPACT	The existing impact is very low as the majority of vegetation is mostly intact.
PREDICTED IMPACT	Moderate as natural vegetation will be lost.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Predicted to be low due to the majority of the site being able to be retained once the infrastructure is in place.

Table 17: Fragmentation in Natural Systems

ISSUE	Impact: fragmentation in natural systems
DISCUSSION	Fragmentation could occur if the proposed infrastructure isolates habitats.
EXISTING IMPACT	Fragmentation is fairly low on the site at present however barriers such as existing roads and railway lines are already present.
PREDICTED IMPACT	Moderate as siting of infrastructure will ensure that ecological linkage is retained.
EIA INVESTIGATION REQUIRED	Yes in order to retain ecological linkage.
CUMULATIVE EFFECT	Moderate due to existing level of impact.

Table 18: Impact on Sensitive Vegetation

ISSUE	Impact: sensitive vegetation
DISCUSSION	A number of endemic species are present in this vegetation type and these species are likely to be affected by the proposed development
EXISTING IMPACT	Low given the level of grazing activities (mostly sheep) which are present
PREDICTED IMPACT	The impact is predicted to be low as the more suitable areas away from these sensitive features will be utilised. Not all vegetation will be required to be cleared.
EIA INVESTIGATION REQUIRED	Yes to ensure the infrastructure is located away from these sensitive features.
CUMULATIVE EFFECT	Moderate due to the level of existing impact.

6.1.2 Faunal impacts

Table 19: Impact on the loss of habitat

ISSUE	Impact: Loss of habitat for faunal species
DISCUSSION	The proposed development could result in a loss of habitat for several faunal species, particularly in the areas identified as sensitive.
EXISTING IMPACT	Intensive grazing is taking place in parts of the study area and large parts have been transformed.
PREDICTED IMPACT	The clearing of a site for the proposed wind farm is likely to result in loss of habitat however placement will be critical to determine the level of this impact.
EIA INVESTIGATION	Yes to determine the site with the least habitat loss for faunal species.

ISSUE	Impact: Loss of habitat for faunal species
REQUIRED	
CUMULATIVE EFFECT	Cumulative impacts could relate to the edge effect and potential long term habitat loss as a result although very little natural vegetation is present.

Table 20: Impact of bird collisions with wind turbines

ISSUE	Impact : Bird collisions with wind turbines
DISCUSSION	Proposed infrastructure could result in bird collisions with wind turbines.
EXISTING IMPACT	No existing impacts exist.
PREDICTED IMPACT	The proposed project could result in bird mortalities which are currently not being experienced in an area with rich bird life.
EIA INVESTIGATION REQUIRED	Yes to investigate this impact further and investigate mitigation measures.
CUMULATIVE EFFECT	Cumulative impacts are anticipated to be low at this stage as no other similar infrastructure is present.

Several impacts on bats could occur as a result of the proposed development of a wind farm and PV facility on the Loeriesfontein study site. These include bat mortalities due to collisions and barotraumas during foraging and migration, destruction of foraging habitat and lastly, destruction of roosts. The potential direct and cumulative impacts are outlined below (Table 21 to Table 24).

Table 21: Impact of bat mortalities due to blade collisions and barotrauma during foraging.

ISSUE	Bat mortalities due to blade collisions and barotrauma during foraging
DISCUSSION	Since bats have highly sophisticated navigation by means of their echolocation, it is unknown as to why they get hit by rotating turbine blades. It may be theorized that under natural circumstances their echolocation is designed to track down and pursue smaller insect prey or avoid stationary objects, not primarily focused on unnatural objects moving sideways across the flight path. Apart from physical collisions, a major cause of bat mortality at wind turbines is barotrauma. This is a condition where the lungs of a bat collapse in the low air pressure around the moving blades, causing severe and fatal internal hemorrhage.
EXISTING IMPACT	There is no existing impact in terms of this potential environmental issue.
PREDICTED IMPACT	Further studies are required to determine the extent of bat occurrence and the potential extent of this issue affecting bat populations.
EIA INVESTIGATION	Yes. Twelve months of bat monitoring is required in terms of the

ISSUE	Bat mortalities due to blade collisions and barotrauma during foraging
REQUIRED	relevant guidelines.
CUMULATIVE EFFECT	Further studies are required to determine whether there will be any cumulative effects in this regard affecting bat populations.

Table 22: Impact of bat mortalities due to blade collisions and barotrauma during migration.

ISSUE	Bat mortalities due to blade collisions and barotrauma during migration
DISCUSSION	The migration paths of South African bats in the Cape Provinces are virtually unknown. Cave dwelling species like <i>Miniopterus natalensis</i> and <i>Myotis tricolor</i> undertakes annual migrations, although no caves are known to be in close proximity to the study area.
EXISTING IMPACT	There is no existing impact in terms of this potential environmental issue.
PREDICTED IMPACT	Further studies are required to determine the extent of bat occurrence and the potential extent of this issue affecting bat populations.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Further studies are required to determine whether there will be any cumulative effects in this regard affecting bat populations.

Table 23: Impact of bat mortalities due to destruction of bat foraging habitat.

ISSUE	Destruction of bat foraging habitat
DISCUSSION	Some foraging habitat will be destroyed by the construction of the turbines and associated infrastructure. This impact will be effective during the lifespan of the wind farm.
EXISTING IMPACT	There is no existing impact in terms of this potential environmental issue.
PREDICTED IMPACT	Further studies are required to determine the extent of bat occurrence and the potential extent of this issue affecting bat populations.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Further studies are required to determine whether there will be any cumulative effects in this regard affecting bat populations.

Table 24: Impact of bat mortalities due to destruction of roosts.

ISSUE	Destruction of roosts
DISCUSSION	During the construction phase of the project bat roosts may be significantly impacted by earthworks and large machinery. Diggings

ISSUE	Destruction of roosts
	related to the placement of underground cables can also damage bat roosts.
EXISTING IMPACT	There is no existing impact in terms of this potential environmental issue.
PREDICTED IMPACT	Further studies are required to determine whether there are bat roosts present on site and the potential extent of this issue affecting bat populations.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Further studies are required to determine whether there will be any cumulative effects in this regard affecting bat populations.

6.1.3 Surface water Impacts

Several impacts on surface water resources could occur as a result of the proposed development of a wind farm and PV facility at Loeriesfontein during both the construction and operation phases. Each of the above impacts in terms of the construction and operation phase with respect to the potential direct and cumulative impacts are outlined in more detail below (Table 25)

Table 25: Impact of the foundations of the wind turbines on surface water resources

ISSUE	Impacts associated with the foundations of the wind turbines
DISCUSSION	Foundations will need to be constructed for each of the wind turbines and PV cells. The depth of the foundations will be approximately 2.5 metres below ground level and will cover an area of approximately 20m x 20m. Where the placement of the foundations for the wind turbines and PV cells extend into wetland and river areas (buffer zones included), the excavation of potential wetland soils may affect the functionality of these hydrological systems. Functionality may be affected in terms of hydrological functionality as well as pedological development.
EXISTING IMPACT	There is no existing impact in terms of this potential environmental issue.
PREDICTED IMPACT	It is unlikely that foundations will be set in surface water resources as the proposed structures will most likely not be able to be built in these types of environments.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	The construction of the wind turbine and PV cell foundations are considered a permanent structure, meaning that the area occupied by

ISSUE	Impacts associated with the foundations of the wind turbines
	the foundation will result in a degree of wetland habitat loss having a cumulative effect on reliant fauna.

Table 26: Impact of the foundation of the operation maintenance building and the substation on surface water resources

Table 27: Impact of the clearing of vegetation for wind turbines, PV cells, substation area, operation maintenance building and internal roads on surface water resources.

Table 28: Impact of abnormal\heavy vehicle access into wetlands

ISSUE	Impacts associated with the abnormal\heavy vehicle access into wetlands
DISCUSSION	During the construction phase, vehicles of variable size will need to access the site. Such vehicles may include conventional construction vehicles in addition to abnormal heavy vehicles that will need to transport the component parts (for example, the blades) of the wind turbines. Where these vehicles need to cross river\streams and/or wetlands, degradation can be caused to these sensitive environments. Compaction impacts are the primary concern, although where crossings will be required there may be implications from a “water use” perspective. Under the NWA, the alteration to the bed, banks, course or characteristics of a watercourse in addition to the impeding or diverting the flow of water in a watercourse constitutes a water use and will therefore, require a water use licence. Where a river or wetland will need to be crossed it is likely that the aforementioned water uses will be required in order to construct a crossing structure (for example, a culvert bridge) that is adequate to accommodate construction and abnormal, heavy vehicles. In order, to avert this impact as well as avoid applying for a water use licence (which will have financial implications as well as temporal delays), a well planned internal road network design needs to be devised in order to circumvent any surface water resources identified on the Loeriesfontein site. As a final note, tremendous structural damage can be caused to the channels of any hydrological system that will need to be crossed if the proper designs do not take this impact into consideration. It is therefore, vital that this potential impact is taken into consideration and remediated by a well planned internal road access network.
EXISTING IMPACT	There is no existing impact in terms of this potential environmental issue.
PREDICTED IMPACT	Should vehicle access be required across surface water resources,

ISSUE	Impacts associated with the abnormal\heavy vehicle access into wetlands
	impacts to the structure and functionality of these systems can be expected if structures are needed for road infrastructure. General compaction impacts can also be expected where vehicles will travel over surface water resources (such as wetlands).
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	With regards to water courses, implications for downstream siltation and sedimentation may take place. Additionally, inappropriate structures can create physical boundaries for aquatic organisms affecting the connectivity of these environmental systems. Compaction impacts may affect the hydrology of wetlands. Similarly, compaction impacts may hinder vegetative growth for surface water resources.

Table 29: Impacts associated with general access into wetlands.

ISSUE	Impacts associated with the general access into wetlands
DISCUSSION	General access into wetland and river areas refers to activities such as physical destruction of wetlands caused by humans, excavation and degradation of wetlands by construction machinery, use of wetlands for sanitary facilities and ablutions and dumping of materials, waste and litter into wetlands. This specifically relates to any construction areas that are situated near rivers or wetlands.
EXISTING IMPACT	There is no existing impact in terms of this potential environmental issue.
PREDICTED IMPACT	Physical degradation of surface water resources may take place. Pollution impacts in the form of solids, liquids and litter can impact on surface water resources.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Accumulation of various forms of pollution can result in a cumulative impact on the water quality of the surface water resources. Physical degradation can impact on the hydrological functionality of surface water resources.

Table 30: Impacts of storm water run-off associated with the internal roads, substation and operation maintenance building construction into nearby surface water resources.

ISSUE	Impacts related to storm water run-off associated with the internal roads, substation and operation maintenance building construction into nearby surface water resources
DISCUSSION	Where the location of internal roads, the substation, the construction lay

ISSUE	Impacts related to storm water run-off associated with the internal roads, substation and operation maintenance building construction into nearby surface water resources
	down area and the operation maintenance building are to be situated near surface water resources, increased run-off caused by rainfall events can induce erosion and sedimentation impacts to these sensitive environments where surfaces are left exposed. With exposed surfaces during the construction phase, a certain amount of rainfall may be absorbed into the ground. Any excess is likely to generate a certain stormwater run-off. Flat open surfaces allow run-off to accelerate creating an erosive degradation force. Wetlands and rivers are able to withstand floods and some hydrological systems help with attenuation. However, often the run-off generated by the exposed surfaces of flat open construction areas is usually left unhindered by supporting vegetation thereby causing erosion and structural degradation of rivers and wetlands. Additionally, the run-off commonly transports an unusual amount of sediment. This sediment is then deposited into wetland and rivers systems causing sedimentation effects. Sedimentation effects can result in the smothering of vegetation or the structural alteration of water courses.
EXISTING IMPACT	There is no existing impact in terms of this potential environmental issue.
PREDICTED IMPACT	Erosion and sedimentation impacts to surface water resources.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Structural damage may ensue with excessive erosion and/or sedimentation. This may affect the hydrological functioning of surface water resources. Sedimentation may have smothering effects on hydric vegetation.

6.1.4 Agricultural Potential Impacts

Several impacts on soils and agricultural impact could occur as a result of the proposed development of a wind farm and PV facility on the Loeriesfontein study site. The potential direct and cumulative impacts are outlined below.

Table 31: Agricultural potential impacts

ISSUE	Loss of agricultural land and production caused by the construction of the proposed wind farm and PV
DISCUSSION	Loss of agricultural land due to the construction of the wind farm and

ISSUE	Loss of agricultural land and production caused by the construction of the proposed wind farm and PV
	PV as well as associated infrastructure
EXISTING IMPACT	N/A
PREDICTED IMPACT	The proposed development's primary impact on agricultural activities will involve the construction of the wind turbines and PV cells and associated infrastructure. This will entail the clearing of vegetation and leveling of the site. This will effectively eliminate the lands agricultural potential in terms of crop production and grazing for as long the development persists.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	The reduction in usable grazing could place increased pressure on adjacent land.

6.1.5 Noise Impacts

In order to establish a coherent framework within which all impacts could be objectively assessed, it was necessary to establish a rating system. An explanation of the impact assessment criteria is defined in Table 32.

Table 32: Impact Assessment Criteria

DURATION	
The lifetime of the impact that is measured in relation to the lifetime of the proposed development (construction, operational and closure phases). Will the receptors be subjected to increased noise levels for the lifetime duration of the project, or only infrequently.	
<i>Temporary</i>	The impact will either disappear with mitigation, will be mitigated through a natural process, or will last less than an hour.
<i>Short term</i>	The impact will be applicable less than 24 hours.
<i>Medium term</i>	The impact will last up to a week.
<i>Long term</i>	The impact will last up to a month.
<i>Permanent</i>	Any impacts lasting more than a month. It is considered non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact is transient.
SPATIAL SCALE	
Classification of the physical and spatial scale of the impact	
<i>Site</i>	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
<i>Local</i>	The impact could affect the local area (within 1.0 km from footprint of activity).
<i>Regional</i>	The impact could affect the area including the neighbouring farms, the

	transport routes and the adjoining towns.
<i>National</i>	The impact could have an effect that expands throughout the country (South Africa).
<i>International</i>	Where the impact has international ramifications that extend beyond the boundaries of South Africa.
PROBABILITY	
This describes the likelihood of the impacts actually occurring, and whether it will impact on an identified receptor. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:	
<i>Improbable</i>	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0 %).
<i>Possible</i>	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25 %.
<i>Likely</i>	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50 %.
<i>Highly Likely</i>	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.
<i>Definite</i>	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.
MAGNITUDE	
This defines the impact as experienced by any receptor. In this report the receptor is defined as any resident in the area, but excludes faunal species.	
<i>Low</i>	Increase in average sound pressure levels between 0 and 1 dB from the expected wind induced ambient sound level ($L_{Aeq,ambient}$). No change in ambient sound levels discernable. Total projected noise level is less than the Zone Sound Level in wind-still conditions.
<i>Low-medium</i>	Increase in average sound pressure levels between 1 and 3 dB from the expected wind induced ambient sound level ($L_{Aeq,ambient}$). The change is barely discernable, but wind turbines could become audible. Increase in sound pressure levels between 3 and 5 above the acceptable zone sound level (wind less conditions). Total projected noise level is less than the Zone Sound Level in wind-still conditions.
<i>Medium</i>	Increase in average sound pressure levels between 3 and 5 dB from the expected wind induced ambient sound level ($L_{Aeq,ambient}$ or Proposed Night Rating Levels). Increase in sound pressure levels between 5 and 7 above the acceptable zone sound level (wind less conditions). Sporadic complaints. Any point where the zone sound levels are exceeded during wind still conditions.

<i>High</i>	Increase in average sound pressure levels between 5 and 7 ($L_{Aeq,ambient}$ or Proposed Night Rating Levels) from the expected wind induced ambient sound level. Increase in sound pressure levels higher than 7 dB above the acceptable zone sound level (wind less conditions). Medium to widespread complaints. Any point where noise levels exceed zone sound level during wind still conditions.
<i>Very High</i>	Increase in average sound pressure levels higher than 7 dBA (proposed night rating level) from the expected wind induced ambient sound level. Increases in sound pressure levels higher than 10 dB above the acceptable zone sound level (wind less conditions). Change of 10 dBA is perceived as 'twice as loud', leading to widespread complaints and even threats of community or group action. Any point where noise levels exceed 65 dBA at any receptor.

In order to assess each of these factors for each impact, the following ranking scales as contained in Table 33 were used.

Table 33: Assessment Criteria: Ranking Scales

PROBABILITY		MAGNITUDE	
Description / Meaning	Score	Description / Meaning	Score
<i>Definite/don't know</i>	5	<i>Very high/don't know</i>	10
<i>Highly likely</i>	4	<i>High</i>	8
<i>Likely</i>	3	<i>Medium</i>	6
<i>Possible</i>	2	<i>Low Medium</i>	4
<i>Improbable</i>	1	<i>Low</i>	2
DURATION		SPATIAL SCALE	
Description / Meaning	Score	Description / Meaning	Score
<i>Permanent</i>	5	<i>International</i>	5
<i>Long Term</i>	4	<i>National</i>	4
<i>Medium Term</i>	3	<i>Regional</i>	3
<i>Short term</i>	2	<i>Local</i>	2
<i>Temporary</i>	1	<i>Footprint</i>	1

- Identifying the Potential *Impacts Without Mitigation Measures (WOM)*

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned probabilities, resulting in a value for each impact (prior to the implementation of mitigation measures). Significance without mitigation is rated on the following scale:

SR < 30	Low (L)	Impacts with little real effect and which should not have an influence on or require modification of the project design or alternative mitigation. No mitigation is required.
30 < SR < 60	Medium (M)	Where it could have an influence on the decision unless it is mitigated. An impact or benefit which is sufficiently important to require management. Of moderate significance - could influence the decisions about the project if left unmanaged.
SR > 60	High (H)	Impact is significant, mitigation is critical to reduce impact or risk. Resulting impact could influence the decision depending on the possible mitigation. An impact which could influence the decision about whether or not to proceed with the project.

Applying the precautionary principle, due to the various unknowns and uncertainties, a first assessment of potential impacts (considering the preliminary layout) is presented in Table 34 **Error! Reference source not found.**.

Table 34: Preliminary Impact Estimation: Operational Phase

Component	Scenario 1: All Acoustically Hard Ground	Scenario 2: All Acoustically Soft Ground
Magnitude	Low to Very High. The noise will be a combination of the cumulative effects of a number of WTGs operating at night (see Section Error! Reference source not found. for nature of noise).	
Spatial Extent	Regional. In terms of the set definition, the noise could impact on receptors further than 1,000 meters from the boundary of the WEF (worst case scenario – wind blowing from wind turbines to receptor).	
Potential Significance	Low to High. Based on the preliminary impact estimations and layout, potential sensitive receptors closer than 2,000 meters could be impacted.	

6.1.6 Visual Impacts

In the context of the proposed development, several visual impacts could occur as a result of the proposed development of a wind farm and PV facility on the Loeriesfontein study site. The potential direct and cumulative impacts are outlined below.

Table 35: Visual Impacts

ISSUE	Visual Impact of the proposed Wind Farm and PV Plant
DISCUSSION	<p>Wind turbines and PV cells are extensive in terms of their scale and height and can be visually intrusive, especially in visually sensitive environments, and where potentially sensitive visual receptors are present. Shadow flicker may also impact on people residing within close proximity to proposed wind turbines</p> <p>Majority of the surrounding area has a natural visual character; a</p>

	number of potential sensitive receptor locations were identified.
EXISTING IMPACT	The study area is largely natural and there is not a high degree of visual intrusion of anthropogenic (human-related) infrastructure in the landscape. Existing visual impacts are limited to isolated areas of human infrastructure including railway infrastructure and a very tall telecommunications tower, as well as power lines and a substation.
PREDICTED IMPACT	<ul style="list-style-type: none"> - Potential alteration of the natural visual character of the site by numerous proposed wind turbines - Visual intrusion of the development that could adversely affect farmsteads / homesteads houses on and around the proposed site; - Potential impact of shadow flicker on people residing within close proximity to proposed wind turbines; - Visual intrusion of the development that could adversely affect receptors travelling on Visibility from the district road that bisects the site gravel farm roads and the railway line. - Potential alteration of the night-time visual environment by the aviation lighting placed on top of each wind turbine that would create a network of red lights in the night-time sky. It must be noted that the CAA does not require lights on top of each turbine. Only patterns to light the wind farm as one obstacle will include turbines on wind farm borders, and then evenly spaced (every 2nd or third turbine.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	A cumulative impact would occur as the wind farms would add to the low level of existing visual impact in the landscape, although the visual impact of the wind farm on its own would be much more significant than any cumulative visual impact.

6.1.7 Geotechnical Impacts

From a geotechnical perspective no fatal flaws have been identified that would prevent the development of a wind farm on the Loeriesfontein site. However, there are several issues that could result in potential impacts on the environment as a result of the proposed development of a wind farm. The potential direct and cumulative impacts are outlined below.

Table 36: Impact of the wind turbines and associated infrastructure the ground conditions of the Loeriesfontein Site.

ISSUE	Impact of the wind turbines and associated infrastructure on the ground conditions of the Loeriesfontein Site.
DISCUSSION	<p>No fatal flaws have been identified that would prevent development of a wind farm on the Loeriesfontein site. However, certain geotechnical constraints are likely to be encountered in small sections of the site.</p> <p>The alluvial deposits that are expected to occur along the larger drainage lines are likely to consist of loose, unconsolidated sands and gravels. These materials will provide a poor founding medium for wind turbines. Depending on the thickness of the alluvial deposits, deep foundations or specialised foundation preparation may be required.</p> <p>Aeolian sands are known to exhibit a collapsible grain structure. Specialised foundation preparation or the use of deep foundation methods may be required where collapsible soils are encountered. Further geotechnical investigations must focus on identifying and quantifying the collapse potential of these soils.</p> <p>Should collapsible soils be encountered to significant depths, then a revised turbine layout may be recommended to avoid the problematic founding conditions. Shale and dolerite bedrock exhibiting various degrees of weathering is expected to be encountered at relatively shallow depth over the majority of the site. This material should provide an adequate founding medium for the construction of shallow foundations for wind turbines. Intermediate excavation conditions are expected at relatively shallow depth in areas underlain by shale. Intermediate to hard excavation conditions are expected in areas underlain by dolerite. The difficult excavation conditions are inferred from the apparent shallow depth of borrow pit excavations observed on aerial photographs of the site.</p>
EXISTING IMPACT	There is no existing impact in terms of this potential environmental issue.
PREDICTED IMPACT	<p>Alluvial deposits expected to occur along the larger drainage lines are likely to consist of loose, unconsolidated sands and gravels. These materials will provide a poor founding medium for wind turbines.</p> <p>Aeolian sands are known to exhibit a collapsible grain structure.</p>

ISSUE	Impact of the wind turbines and associated infrastructure on the ground conditions of the Loeriesfontein Site.
	Should intermediate to hard excavation conditions be encountered, the substrates will pose problematic conditions where the proposed development is to take place. As a result, potential impacts that may take place include blasting which will affect the landscape.
EIA INVESTIGATION REQUIRED	Yes – Mainstream will conduct a detailed engineering geotechnical assessment prior to construction. These recommendations will be taken into consideration in the EIA phase when determining the preferred layout. It is not mainstream's intention to build turbines on slopes more than 8°. Apart from environmental and civil construction constraints, there are limitations from wind turbulence generated by steep slopes in terms of warranty offered by wind turbine suppliers.
CUMULATIVE EFFECT	Should blasting of areas need to take place, the greater landscape could be physically affected which could impact negatively on ecological processes of the environment.

6.1.8 Heritage Impacts

Several impacts on heritage resources could occur as a result of the proposed development of a wind farm and PV facility on the Loeriesfontein study site. The potential direct and cumulative impacts are outlined below.

Table 37: Impact of the proposed development on heritage resources in the Loeriesfontein study site

ISSUE	Impact of the proposed development on heritage resources
DISCUSSION	<p>This Scoping study has revealed that a limited variety of heritage resources are known to occur in the larger region.</p> <p>Based on current information regarding heritage sites in the surrounding area, heritage resources can be expected to occur in the study region. These are judged to have Grade III significance (other heritage resources worthy of conservation on a local authority level).</p> <p>In light of the above, the proposed development can potentially result in the damage or destruction of heritage resources in the Loeriesfontein study site.</p>
EXISTING IMPACT	There is no existing impact in terms of this potential environmental issue.

ISSUE	Impact of the proposed development on heritage resources
PREDICTED IMPACT	The proposed development can result in the potential damage or destruction of heritage resources, if further studies indicate that such heritage resources are present on site.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Potential loss of heritage resources on the study site can result in the loss of heritage resources on a provincial or national scale should artefacts or structures be found that are of Grade I significance and which are destroyed.

6.1.9 Palaeontological Impacts

Several palaeontological impacts could occur as a result of the proposed development of a wind farm and PV facility on the Loeriesfontein study site. The potential direct and cumulative impacts are outlined below.

Table 38: Impact of the adverse impacts on paleontological resources

ISSUE	Impact of adverse impacts on paleontological resources.
DISCUSSION	The proposed Mainstream wind farm to the north of Loeriesfontein is located in an area of Bushmanland that is underlain by potentially fossil-rich sedimentary rocks of the Ecca group (Karoo Supergroup) that are of Permian age. The construction phase of the development will entail substantial excavations into the superficial sediment cover (soils etc) and also into the underlying bedrock. These include excavations for the turbine foundations, buried cables (c. 1m deep), any new gravel roads and transmission line pylons. In addition, sizeable areas of bedrock may be sealed-in or sterilized by associated infrastructure such as any hard standing areas for the wind turbines, a large lay-down area (this is temporary, however), ancillary buildings (e.g. an operations and maintenance building) as well as the new gravel road system. All these developments may adversely affect potential fossil heritage within the study area by destroying, disturbing or permanently sealing-in fossils that are then no longer available for scientific research or other public good. Once constructed, the operational and decommissioning phases of the wind energy facility will not involve further adverse impacts on palaeontological heritage.
EXISTING IMPACT	There is no existing impact in terms of this potential environmental issue.

ISSUE	Impact of adverse impacts on paleontological resources.
PREDICTED IMPACT	The development of all structures may adversely affect potential fossil heritage within the study area by destroying, disturbing or permanently sealing-in fossils that are then no longer available for scientific research or other public good.
EIA INVESTIGATION REQUIRED	No, however before the development footprint of the wind farm and PV facility is finalized, a professional palaeontologist should be contracted at the developer's expense to carry out a field study to assess the extent, sensitivity and distribution of fossil heritage actually present within the entire study area. This will be incorporated into the finalised EMP, and will be a requirement during and before construction.
CUMULATIVE EFFECT	Potential loss of palaeontological resources on the study site can result in the loss of heritage resources on a provincial or national scale should artefacts or structures be destroyed, disturbed or permanently sealed in.

6.1.10 Tourism

Table 39: Tourism Impacts

ISSUE	TOURISM
DISCUSSION	<p>Generally, the study area is not a popular tourist destination. Most tourist activities e.g. adventure vehicle trails and hiking trails are located beyond the 60km radius of the study area.</p> <p>Loeriesfontein town (approximately 60km away from the study area) is the only closest town which lies along the Namaqualand Flower Route. The town is characterised by a few attractions including the Fred Turner Windmill Museum, Quiver Tree Forests and the Spring wild flowers. Therefore, tourism within a 60km is mainly attributed leisure tourism in Loeriesfontein as well as to passing through tourists on their way to/from popular tourist destinations (via the Namaqualand flower route which traverses Loeriesfontein). The supply of accommodation facilities in Loeriesfontein is extremely low. There are a few accommodation facilities (such as the Loeriesfontein Hotel and Noute Self Catering) within a 60km radius of the study area.</p> <p>The wind farm may increase the tourism potential in the area in the form of business tourism.</p>
EXISTING IMPACT	No existing impact. This is because the study area is not a popular

ISSUE	TOURISM
	tourist destination.
PREDICTED IMPACT	The proposed development is likely to boost business tourism and education tourism in the area if approved.
EIA INVESTIGATION REQUIRED	No
CUMULATIVE EFFECT	None

6.1.11 Socio-economic

▪ Expected Geographical Change Processes

The identification of geographical (land use) change process from a social perspective looks at how the presence of the proposed substations and distribution power lines might change the behaviour/lives of land owners and/or land users in the affected area. This is done by considering actual or perceived land use changes, whether on a temporary or permanent basis.

The geographical change processes and expected impacts are summarised as per Table 40 below.

Table 40: Geographical Change Processes and Expected Impacts

ISSUE	Geographical Change Processes
DISCUSSION	The use of the proposed site for the construction and operation of the wind farm turbines and associated infrastructure imply a permanent change in land use.
EXISTING IMPACT	<p>The following structures were identified on site:</p> <ul style="list-style-type: none"> ▪ A number of scattered households; ▪ What appears to be two airfields or landing strips; ▪ A train station (presumably for goods as there are no formal passenger rail in the area); ▪ An Eskom substation and three transmission lines in various directions; ▪ What appears to be a borrow pit; and ▪ A couple of cattle watering dams. <p>It is presumed that the land is currently zoned for agricultural use.</p>
PREDICTED IMPACT	The impact on land use largely depends on the current land use. In the event of extensive agricultural use, a micro economic impact on the landowner can be expected, whereas a more macro impact can be expected on the regional area in terms of food security. However, at

ISSUE	Geographical Change Processes
	present it does not seem as if the area is cultivated or that extensive agricultural activities are taking place on site, bar possible grazing areas.
EIA INVESTIGATION REQUIRED	<ol style="list-style-type: none"> 1. Determine landownership by consulting the public participation consultants. 2. Undertake a site visit to social receptors identified and determine general land use in the area.
CUMULATIVE EFFECT	None expected at this stage.

- Expected Demographical Change Processes

The construction and operation of the proposed wind farms and associated infrastructure can lead to a change in the number and composition of the population within the affected local area, which in turn could lead to economic, land use, and socio-cultural change processes.

The demographical change processes and expected impacts are summarised as per Table 41 below.

Table 41: Demographical Change Processes and Expected Impacts

ISSUE	Demographical Change Processes
DISCUSSION	Although MRP intends to source their construction team locally as far as possible, the prospect of employment can lead to an influx of unemployed work seekers to the area.
EXISTING IMPACT	The current total population within the affected area stands at 21 235 people, a high proportion of which are unemployed, especially in the historical "township" area.
PREDICTED IMPACT	A change in the number and composition of the local area can lead to economic, health, safety and social-wellbeing impacts.
EIA INVESTIGATION REQUIRED	Obtain information on MRP's employment policies. Attend public participation events to determine word-of-mouth practices in the community, e.g. if there is work available, to they let family members know who are staying in other areas?
CUMULATIVE EFFECT	Depending on the timing, the population influx can be more severe if it coincides with the construction of MRP's PV plant in the same area.

- Expected Economic Change Processes

Economic change processes relate to the changes brought about to the employment and general economic profile of an area as a result of the introduction of any development. For example, job

opportunities might be created as a result of the construction and maintenance of the proposed wind farms and associated infrastructure. Employment creates a source of income, which in turn enables the employed individual to access services as a support mechanism for his/her family.

The economic change processes and expected impacts are summarised as per Table 42 below.

Table 42: Economic Change Processes and Expected Impacts

ISSUE	Economical Change Processes
DISCUSSION	<p>Net gain in economic output during construction and operations A net gain is expected as there will be substantial gains from the construction and operation of the power plant but there will be some farming production and capacity lost. However, land is not of exceptionally high value from an agricultural point of view.</p> <p>Net gain in employment construction and operations A net gain is expected as there will be substantial gains from the construction and operation of the power plant but there will be some agricultural industry jobs lost. However, the number of lost opportunities is likely to be low.</p> <p>Enabling economic growth through the removal of electricity supply constraints Additional electricity capacity is an enabler of economic growth as it allows for further development, especially of industrial expansion, which requires large amounts of electricity.</p> <p>Increase in local disposable income and business earnings and resulting downstream effects Area will experience injections due to the activities in the project, and this will result in increased business and consumer spending.</p> <p>Improvement in the economic profile of the area The area may experience improved visibility as an investment destination for renewable energy projects, will in turn create further industry development, with production, income and employment effects.</p> <p>Increased revenue for national and local authorities The creation of a new operating entity will result in national and local tax payments and local use of services/utilities, which will increase revenues. This effect is likely to be noteworthy at a local government</p>

ISSUE	Economical Change Processes
	level in the project area.
EXISTING IMPACT	None
PREDICTED IMPACT	<ul style="list-style-type: none"> ▪ Gain in construction output and energy production, loss of agricultural production. ▪ Determination of construction and operations phase employment, loss of agricultural employment. ▪ Economic opportunities due to surplus electricity supply. ▪ Increase in disposable income and business earning, thus resulting in business and consumer spending ▪ Better investor visibility for renewable energy ▪ Increased revenues from taxation and provision of services/utilities
EIA INVESTIGATION REQUIRED	<ul style="list-style-type: none"> ▪ Determination of construction and operations phase new business sales and GDP increases due to the project. ▪ Determination of output loss in the agricultural industry. ▪ Determination of construction and operations phase employment due to the project. ▪ Determination of job loss in the agricultural industry. ▪ Determination of the effect of electricity supply projects i.t.o. economic enablement. ▪ Modelling of downstream economic impacts of the projects through multiplier analysis. ▪ Determination of the effect of similar projects elsewhere. ▪ Determination of likely national and local impact due to taxation and service/utility use.
CUMULATIVE EFFECT	<ul style="list-style-type: none"> ▪ May create industry if other similar operations start in the area, opportunity for downstream industries. ▪ May create industry if other similar operations start in the area, opportunities for local skills creation and sustainable long-term employment. ▪ May create a renewable energy industry if other similar operations start in the area, opportunities for local skills creation and sustainable long-term employment.

- Expected Institutional and Legal Change Processes

Institutional and Legal Change Processes assesses the way in which a development of this nature could change the face of service delivery in the affected area and how this change in turn could affect the quality of life of local residents.

The institutional and legal change processes and expected impacts are summarised as per Table 43 below.

Table 43: Institutional and Legal Change Processes and Expected Impacts

ISSUE	Institutional and Legal Change Processes
DISCUSSION	A larger number of people can affect the quality of municipal and other social services, e.g. an influx of 'strangers' can increase the crime rate, placing a higher strain on the police services.
EXISTING IMPACT	The existing baseline municipal profile suggests that most of the basic municipal services are adequately supplied throughout the area. The quality of services might diminish towards the more rural areas and in informal settlements.
PREDICTED IMPACT	Additional demand on municipal services, such as water, sewerage and roads could impact on health and safety if such services are not available. An influx of unemployed job seekers can lead to the development of informal settlements. This can impact on health (as services are not provided or further taxed) and safety (an increase in crime is possible as people do not find employment and become frustrated with their living conditions).
EIA INVESTIGATION REQUIRED	<ul style="list-style-type: none"> ▪ Assess the issues and response register. Consult with interest groups via the public participation focus group meetings. ▪ Consult with the local municipality via the public participation focus group meetings. ▪ Obtain information from the project proponent to determine the likelihood for the use of a residential construction village and how the location for such a village is determined.
CUMULATIVE EFFECT	The additional influx of people as a result of the nearby construction of the PV plant can further tax services. Over taxed services can take a long time to recover, with a residual effect of poor service delivery.

- Expected Socio-Cultural Change Processes

As socio-cultural processes recount the way in which humans behave, interact, and relate to each other and their environment, socio-cultural change processes in turn looks at the way in which the proposed developments can alter the interactions and relationships within the local community.

The socio-cultural change processes and expected impacts are summarised as per Table 44 below.

Table 44: Socio-Cultural Change Processes and Expected Impacts

ISSUE	Socio-Cultural Change Processes
DISCUSSION	Although it is not foreseen that the development per se will alter family cohesiveness and the traditional role played by families, the introduction of strangers to the area might have this affect. This can happen when social integration is hindered (through conflict) and also because migratory workers are one of the highest risk groups for contracting and spreading HIV and other contagious infections.
EXISTING IMPACT	At present there appears to be no apparent conflict situations between the residents of Loeriesfontein. However, as with many other cities and towns, racial segregation is still very evident.
PREDICTED IMPACT	Apart from the obvious health implications, HIV infection in particular also has an economic impact. Conflict situations can impact on community cohesion and social well-being.
EIA INVESTIGATION REQUIRED	<ul style="list-style-type: none"> ▪ Consult with local residents via the public participation focus group meetings. ▪ Assess information obtained from focus group meetings.
CUMULATIVE EFFECT	None expected at this stage.

7 PUBLIC PARTICIPATION PROCESS

Public participation is the cornerstone of any EIA. The principles of NEMA as well as the EIA Regulations govern the EIA process, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment, and ensuring the participation of previously disadvantaged people, women and the youth.

The public participation process is primarily based on two factors; firstly, ongoing interaction with the environmental specialists and the technical teams in order to achieve integration of technical assessment and public participation throughout. Secondly, to obtain the bulk of the issues to be addressed early on in the process, with the latter half of the process designed to provide environmental and technical evaluation of these issues. These findings are presented to stakeholders for verification that their issues have been captured and for further comment.

Input into the public participation process by members of the public and stakeholders can be given at various stages of the EIA process. Registration on the project can take place at any time during the EIA process up until the final EIA report is submitted to DEA. There are however set periods in which comments are required from Interested and / or Affected Parties (I&APs) in order to ensure that these are captured in time for the submission of the various reports. The comment periods during the Scoping phase were implemented according to NEMA EIA Regulations. The comment periods during the Scoping phase (as set out by DEA) are as follows:

- Background Information Document (BID): 4 Calendar weeks, but also as and when an I&AP registers.
- Comment period for the Draft Scoping Report (DSR): 5 Calendar weeks (40 days).
- Comment on the Amended DSR: should there be a significant change from the DSR an appropriate comment period will be set out in consultation with DEA. This period may be seven (7) days, fourteen days (14), etc., as to be approved or set by DEA. Should there be no significant changes, then the Final Scoping Report (FSR) will be submitted to DEA.

The EIA regulations emphasise the importance of public participation. In terms of the EIA regulations, registered interested and/or affected parties –

- may participate in the application process;
- may comment on any written communication submitted to the competent authority by the applicant or environmental consultant;
- must comment within the timeframes as stipulated by the EIA Regulations;
- must send a copy of any comments to the applicant or Environmental Assessment Practitioner (EAP) if the comments were submitted directly to the competent authority; and
- must disclose any direct business, financial, personal or other interests that the person has in the application being granted or refused.

Further, in terms of the EIA regulations, the EAP:

- manages the application process;
- must be independent;
- must undertake the work objectively – even if this results in views and findings that are not favourable to the applicant;
- must disclose material information that may influence the decision; and
- must conduct a public participation process.

The following actions were taken upon receiving comments/queries/issues:

- The contact details provided were entered into the project database for use in future notifications.
- Confirmation of receipt of comments.
- Addressed comments in the Issues & Response Report.

7.1 Objectives of Public Participation

An understanding of what the public participation is, and is what it is not, needs to be explored and must be clarified.

- Public Participation is:
 - A communication mechanism to inform I&APs regarding a proposed project.
 - A communication mechanism to record comments and/or concerns raised during the relevant phase of the EIA by I&APs regarding a proposed project.
- What Public Participation is not:
 - A marketing exercise.
 - A process to address grievances but rather to record comments raised.

- One-on-one consultation with each I&AP during the EIA process (not relevant to possibly affected landowners identified).

The primary aims of the PPP are:

- To inform interested and affected parties (I&APs) and key stakeholders of the proposed development.
- To initiate meaningful and timeous participation of I&APs.
- To identify issues and concerns of key stakeholders and I&APs with regards to the proposed development
- To promote transparency and an understanding of the proposed project and its potential environmental impacts.
- To provide information used for decision-making.
- To provide a structure for liaison and communication with I&APs and key stakeholders.
- To assist in identifying potential environmental impacts associated with the proposed development.
- To ensure inclusivity (the views, needs, interests and values of I&APs must be considered in the decision-making process).
- To focus on issues relevant to the project and issues considered important by I&APs and key stakeholders.
- To provide responses to I&AP queries.
- To encourage co-regulation, shared responsibility and a sense of ownership.

In addition to the guidance of the PPP in the EIA Regulations, every effort was also made to conform to the requirements of the Promotion of Administrative Justice Act 2000 (Act 3 of 2000), which ensures that SiVEST acts in the best interests of the public to make sure that the public has free access to information regarding developments that may have an impact on I&APs.

7.2 Overview of the Public Participation Process to date

The public participation process for the EIA was initiated on the 12th August 2011. The stages that formed part of the public participation process to date for this proposed project are reflected in the Figure 26 below:

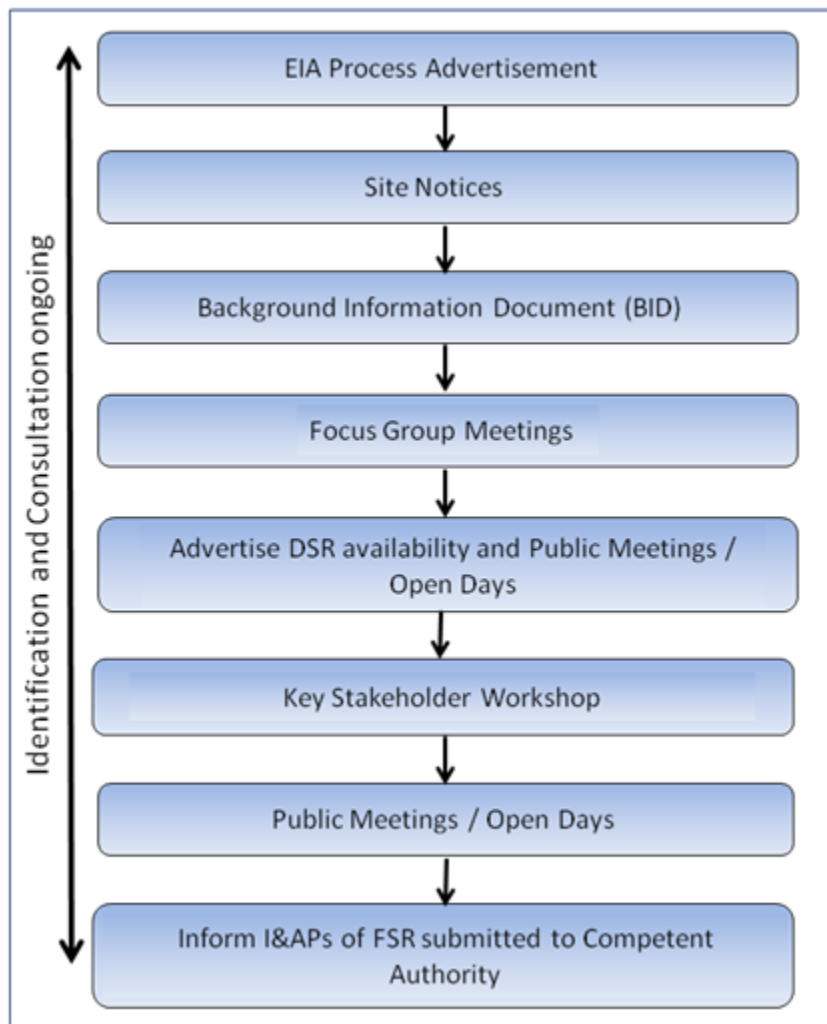


Figure 26: Public Participation Process

Members of the public who wished to be registered on the database as an I&AP were able to do so via telephone, fax, email, mail or SiVEST's website (www.sivest.co.za).

On-going consultation with key stakeholders (e.g. provincial, district and local authorities, relevant government departments, local business etc.) and identified I&APs ensured that I&APs were kept informed regarding the EIA process. Networking with I&APs will effectively continue throughout the Scoping phase of the project until the Final Scoping Report and EIA Plan of Study is submitted to DEA. Where required, stakeholders and I&APs were engaged on an individual basis.

During the environmental studies, consultations were held with individuals, businesses, institutions and organisations, and the following sectors of society have been identified and were afforded the opportunity to comment (the full stakeholder database list is included in Appendix 4):

- National Authorities
- Provincial Authorities
- Namakwa District Municipality
- Hantam Local Municipality
- Government Structures such as SAHRA, SANRAL, Telkom, etc
- Agriculture Associations
- Regional and local media (advertisements and public documents e.g. BID)
- Business and commerce
- Environmental bodies / NGOs
- Community representatives, CBOs, development bodies
- Landowners

7.3 Consultation and Public Involvement

Through the consultation process, issues for inclusion within the DSR were identified and confirmed. Telephonic discussions and one-on-one consultation was undertaken where relevant. Meetings and focus group meetings are scheduled to take place during the comment period of the DSR in order to identify key issues, needs and priorities for input into the proposed project. Special attention was paid to the consultation with possibly affected landowners and communities within the study area to try and address their main concerns.

7.4 Stakeholders and I&APs

In order to identify possible I&APs, use was made of:

- print media – EIA process advertisements
 - The Noordwester (English and Afrikaans)

- site notices throughout the study area (Proofs included in Appendix 4A)
- referrals
- requesting databases and/or contact information from NGOs / CBOs and other organisations

A full database list of registered I&APs was compiled and is included in Appendix 4F.

7.5 Announcing the Opportunity to Participate

The opportunity for stakeholders to participate in the EIA were invited as follows:

- EIA process advert (12 August 2011).
- Copies of the BID were posted to all registered I&APs on the project database.
- Those I&APs with e-mail addressed also received an electronic copy of the BID.
- BIDs were delivered to various locations within the study area:
- The letter of invitation to participate as well as the Registration and Comment Form accompanied the BID.

7.6 Notification of the Potential Interested and Affected Parties

Communication with I&APs were conducted by means of telephone, faxes and email in order to obtain the necessary background information to compile this report. The advertising process was followed in terms of regulation 56 of the EIA Regulations published in R543 in Government Gazette No. 33306 of 18 June 2010, as amended.

Advertisements were placed in the Noordwester on the 12th of August 2010.

Accordingly, many site notices (as per regulations) were placed near the study area. The site notices were placed in the following locations:

- On-site (Remainder of the Farm No. 226 and Portion 2 of the Farm No. 213, Calvinia Road, Northern Cape)
- Loeriesfontein LaerSkool
- Loeriesfontein Library
- Loeriesfontein Hotel
- Loeriesfontein Post office
- Spar supermarket
- Boesmanland pub and grill

As stakeholders responded to these advertisements, they were registered on the project database and sent letters of invitation to participation and the BID.

7.6.1 Summary of comments received

I&AP	Date received	Summary of comments
Thys Horak - ATNS	26 August 2011, 19 September 2011	Requested GIS data which was sent through to ATNS. ATNS indicated that they had no objection to the proposed development near Loeriesfontein.
Mnr AP Braam Albert Lintvelt Trust	7 September 2011	Wished to be registered on the project database and stated his interest in the development.
Giel Waterboer Community Development:	7 September 2011	Enquired about what development programs would be in place that would assist with the development of the community, especially for the youth. Concerns about unemployment in the community. Will the proposed development provide permanent employment opportunities? What training will be available for the community? Will animals or plants be impacted during the development of the proposed project? Can they be handled in an environmentally friendly manner?
Walter Gresse Transnet Freight Rail	5 September 2011	Acknowledgement of the proposed project. SiVEST were asked to please direct application to Transnet in terms of location in right of way.
Andries Landman	9 September 2011	Registered on the project database.
Bradley Gibbons EWT: African Crane Conservation Programme	29 August 2011	Registered on the project database.
Mr Mongoato DAFF	25 August 2011	Registered on the project database.

7.7 Proof of Notification

Appendix 4 includes all proof of notification of Interested and Affected Parties;

- Site notice text (Appendix 4A)
- Photographs of site notices (Appendix 4A)
- Proof of advertisements in the newspapers (Appendix 4C)
- Background Information Document (Appendix 4B)
- Correspondence to registered I&APs and key stakeholders (Append 4D)

7.8 Focus Group Meetings

Focus Group Meetings (FGMs) are due to be held with the possibly affected landowners and the District and Local Municipalities on the 20th and 21th of October 2011. FGMs are smaller meetings with specific groups or organisations who have similar interests in or concerns about the project. This process is ongoing and will continue throughout the EIA process.

Table 45: Focus Group meetings

Venue	Interested Parties	Date	Time
Kaap-Agri Building, Main Street, Loeriesfontein	Farmers' Association	Friday, 21 October 2011	09:00 - 11:00
Boardroom Hantam LM Calvinia	Municipal Manager and Officials of Pixley ka Seme District Municipality	Thursday 20 October 2011	14:00 - 16:00

Minutes of this meeting will be compiled and forwarded to all attendees for their review and comment. The primary aim of these meetings is to:

- disseminate information regarding the proposed development to I&APs
- provide I&APs with an opportunity to interact with the EIA team and the Mainstream Renewable Energy representatives present.
- supply more information regarding the EIA process;
- answer questions regarding the project and the EIA process;
- receive input regarding the public participation process and the proposed development.

7.9 Key Stakeholder Workshop

A Key Stakeholder Workshop will take place during the review period of the DSR on the 19th of October 2011 and stakeholders will be invited by personalised invitation letters.

The Key Stakeholder Workshop will be held in order to provide stakeholders with any additional information regarding the proposed development, to present the environmental findings of the Scoping-phase studies and to invite stakeholders to submit their comments on the DSR and to raise any further comments and/or concerns that they may have.

Table 46: Key Stakeholder Workshop

Venue	Date	Time
La Casa Mia, Kimberley	Wednesday 19 October 2011	10h00 – 12h00

The draft minutes will be compiled and forwarded to all attendees, and the final minutes will be included in the Final Scoping Report that will be submitted to the Competent Authority.

7.10 Public Meetings / Open Days

A Public Meeting will take place during the review period of the DSR on the 20th of October 2011.

This meeting will be advertised in the same newspapers that were used for the EIA process. Advertisement and invitation letters will be sent by mail and e-mail to all registered I&APs on the project's database.

Furthermore, posters advertising the Public Meeting will be displayed at the public venues as advertised as well as various public places frequented by the public i.e. cafés. Photos of these will be included in the final report.

Proof of the advertisement will be included in Appendix 4C).

The Public Meetings / Open Days will be held in order to provide I&APs with information regarding the proposed development, present the environmental findings (desk-top) and invite I&APs to raise any further comments and/or concerns that they may have.

The Public Meeting is proposed for the following venue and dates:

Table 47: Public Meetings / Open Days

Venue	Date	Time
Loeriesfontein Sports Hall No 13 Long Street Loeriesfontein	Wednesday 20 October 2011	18h00 Till 20h00

Draft minutes of this meeting will be compiled and forwarded to all attendees, and the final minutes will be included in the Final Scoping Report that will be submitted to the Competent Authority.

7.11 One-on-One Consultation

Where possible, potentially directly affected landowners will be consulted on a one-on-one basis and informed about the proposed project. Any comment and/or concern received will be noted and included in the Issues and Responses Report.

This consultation process is seen as one of the important aspects of the EIA and Public Participation process. Should the proposed project be granted an Environmental Authorisation, these particular stakeholders will be directly affected and their properties impacted upon. The consultation process will also ensure that as many uncertainties and concerns as possible are raised upfront and channelled to Mainstream Renewable Energy to ensure that the stakeholders and the applicant are informed about these issues.

7.12 Issues and response report

Issues, comments and concerns raised during the public participation process have been captured in the Issues and Response Report (I&RR) – Appendix 4E. This I&RR provides a summary of the issues raised, as well as responses which were provided to I&APs. This information will be used to feed into the evaluation of social impacts. A separate section to the I&RR will be added to the Final Scoping Report to reflect the comments received during the review period from I&APs on the DSR.

7.13 Public comments on Draft Scoping Report

The Draft Scoping Report will be made available for public review prior to submission to DEA, the competent authority. The availability of the DSR will be advertised in the Noordwester. Proof of the advertisement will be included in Appendix 4C.

The report will be out for public review and comment for a period of 40 calendar days. The comment period will run from Tuesday, the 4th of October 2011 to Monday, the 14th of November 2011 (end of business day). Written notice will be given to all registered I&APs as well as all key stakeholders on the database that the DSR is available for public review.

Electronic copies (CD) of the report will also be made available and will be distributed on written request. The draft Scoping Report will be made available at the following venues:

Table 48: Venue where Scoping Report will be publically available

Venue	Street Address	Hours	Contact No.
Loeriesfontein Library	Main Street, Loeriesfontein	Mondays- Fridays 14h00 – 17h00	027 662 8607

8 ASSESSMENT IN TERMS OF EQUATOR PRINCIPLES

The Equator Principles (“EP”) is a financial industry benchmark for determining, assessing and managing social & environmental risk in project financing. A number of banks, exchanges and organisations worldwide have adopted the Principles as a requirement to be undertaken for funding to be granted. However, certain funding institutions may not have formally adopted the Principles, although will require clients to be compliant with them in order to qualify for loans. The principles are summarised below:

Principle 1: Review and Categorisation

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

Principle 2: Social and Environmental Assessment

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

Principle 3: Applicable Social and Environmental Standards

The Assessment will refer to the applicable IFC Performance Standards and applicable Industry Specific EHS Guidelines.

Principle 4: Action Plan and Management System

The client / borrower must prepare an Action Plan (“AP”) or management system that addresses the relevant findings, and draws on the conclusions of the Assessment. The AP will describe and prioritise the actions needed to implement mitigation measures, corrective actions and monitoring measures necessary to manage the impacts and risks identified in the Assessment. The management measures are required to comply with applicable host country, social and environmental laws and regulations, and requirements of the applicable Performance Standards and EHS Guidelines, as defined in the AP.

Principle 5: Consultation and Disclosure

The client / borrower or third party expert must consult with project affected communities in a structured and culturally appropriate manner. For projects with significant adverse impacts on affected communities, the process will ensure their free, prior and informed consultation and facilitate their informed participation as a means to establish, to the satisfaction of the EPFI, whether a project has adequately incorporated affected communities’ concerns.

In order to accomplish this, the non-technical summaries must be made available to the public by the borrower for a reasonable minimum period in the relevant local language and in a culturally appropriate manner.

Principle 6: Grievance Mechanism

To ensure that consultation, disclosure and community engagement continues throughout construction and operation of the project, the borrower must, scaled to the risks and adverse impacts of the project; establish a grievance mechanism as part of the management system. This will allow the borrower to receive and facilitate resolutions of concerns and grievances about the project's social and environmental performance raised by individuals or groups from among project-affected communities.

Principle 7: Independent Review

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

Principle 8: Covenants

An important strength of the Principles is the incorporation of covenants linked to compliance. For Category A and B projects, the client / borrower will covenant in financing documentation:

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

Principle 9: Independent Monitoring and Reporting

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

Principle 10: EPFI Reporting

Each EPFI adopting the Equator Principles commits to report publicly at least annually about its Equator Principles implementation processes and experience, taking into account appropriate confidentiality considerations.

8.1 Assessment Results

This section details the current compliance level with which the wind farm and PV facility project meets with the Equator Principles and the related Performance Standards which are outlined below.

Table 49: Wind farm and PV facility Compliance Level in terms of Equator Principles and Related Performance Standards

The coding key is as follows:

Compliance Level			
Clear			
Not assessed/ determined	Not compliant	Partially compliant	Compliant

Principles	Compliance Level	Reference
General, Performance Standard 1 Environmental & Social Reporting		
1. Baseline Information		Refer to Chapter 5
2. Impacts and risks		Refer to Chapter 6
3. Global impacts		N/A
4. Transboundary		N/A
5. Disadvantaged / vulnerable groups		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
6. Third party		Refer to section 1.2.
7. Mitigation measures		To be addressed as part of the

Principles	Compliance Level	Reference
		EMP during the EIA phase
8. Documentation process		Refer to Chapter 2
9. Action Plans		To be addressed during the EIA phase
10. Organisational capacity		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
11. Training		To be addressed as part of the EMP during the EIA phase
12. Grievance mechanism		To be addressed during the EIA phase
13. Report content		To be addressed as part of the EMP during the EIA phase
Performance Standard 2, Labour & Working Conditions		
1. Human Resource Policy		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
2. Working relationship		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
3. Working conditions with and terms of employment		To be addressed as part of the EMP during the EIA phase
4. Workers organisation		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
5. Non discrimination and equal opportunities		Refer to Chapter 5, section 5.15.3. This issue will also be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
6. Grievance mechanism		To be addressed during the EIA phase
7. Occupational Health and Safety		Refer to section 6.1.10. To be further addressed as part of the EMP during the EIA phase

Principles	Compliance Level	Reference
8. Non-employee workers		To be addressed as part of the EMP during the EIA phase
9. Supply Chain		
10. Labour Assessment Component of a Social and Environmental Assessment		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
Performance Standard 3, Pollution		
1. Pollution Prevention, Resource Conservation & Energy Efficiency		To be addressed as part of the EMP during the EIA phase
2. Wastes		To be addressed as part of the EMP during the EIA phase
3. Hazardous material		To be addressed as part of the EMP during the EIA phase
4. Emergence preparedness & response		To be addressed as part of the EMP during the EIA phase
5. Technical guidance – ambient considerations		To be addressed as part of the EMP during the EIA phase
6. Greenhouse gas emissions		N/A
Performance Standard 4, Health & Safety		
1. Hazardous materials safety		To be addressed as part of the EMP during the EIA phase
2. Environmental and natural resource issues		Refer to sections 5.3-5.15
3. Emergency preparedness and response		To be addressed in the EMP during the EIA phase
Performance Standard 5, Land Acquisition		Refer to Chapter 7
Performance Standard 6, Biodiversity		Refer to Chapter 5, section 5.5
Performance Standard 7, Indigenous People		Refer to Chapter 7
Performance Standard 8, Cultural Heritage		Refer to Chapter 5, section 5.12 and 5.13

It is important to note that, most of the issues listed per performance standard in the table above will only be addressed during the EIA phase. Therefore at this stage (Scoping phase), most of the issues are categorised as “not assessed/ to be determined”. Full compliance with the EPs will only be realised following EIA assessments.

9 CONCLUSIONS AND RECOMMENDATIONS

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

The EIA Phase will culminate in the compilation of mitigation measures to reduce impacts, the identification of the least impactful routing of the power lines, the identification of least impactful locations for the turbines, the identification of least impactful locations for building structures and the identification of sensitive areas within the study area which may require more specific management measures. The EIA Phase will also aim to optimise and improve potential positive impacts that may result from the proposed development.

9.1 Conclusions

No specialist study conducted during the Scoping phase for the proposed development has identified any fatal flaws for the Loeriesfontein Site.

However, a number of potentially significant (positive and negative) environmental impacts have been identified and will need to be evaluated during the detailed EIR phase of the project. In addition, the EIR Phase will provide a more detailed comparative analysis of these potential impacts against the “no-go” alternative.

Detailed mitigation and management measures will be developed during the Environmental Management Programme (EMPR) phase of the project, in response to the detailed assessment, and will be run towards the end of EIR phase of the project. Should this project receive a positive environmental authorisation, the EMPR will guide the project proponent and appointed contractor(s) through the final design, construction and operational phases of the proposed project.

9.1.1 Layout Alternatives

One of the aims of the Scoping report is to identify a preferred layout for the proposed location of the each of the components of the wind farm and PV facility to carry through to the EIA phase of the investigation for detailed assessment. The selection of a preferred layout during the Scoping

phase of the project helps to focus future investigations, both in terms of the environmental investigations required and the scope of the public participation process. As no fatal flaws have been identified, and as most of the studies have recommended that further detailed EIR-level studies are required to comparatively assess the alternatives and recommend a preferred alternative, layout alternatives will be investigated in more detail in the EIA phase of the project.

9.1.2 Summary of Findings

A summary of the findings for the wind farm in Loeriesfontein, for each identified environmental impact, (both biophysical and social) is provided in the tables below.

Table 50: Summary of environmental issues identified in Specialist Studies

Aspect	Potential impacts
Biodiversity (Flora, fauna)	<ul style="list-style-type: none"> ▪ Loss of natural vegetation; ▪ Fragmentation in natural systems; ▪ Impact on sensitive vegetation; ▪ Loss of habitat for faunal species; ▪ Bird collisions with and displacement due to wind turbines; ▪ Bat mortalities due to blade collisions and barotrauma during foraging; ▪ Bat mortalities due to blade collisions and barotrauma during migration; ▪ Destruction of bat foraging habitat; ▪ Destruction of bat roosts.
Surface Water	<ul style="list-style-type: none"> ▪ Impacts associated with the foundations of the wind turbines; ▪ Impacts associated with the access into wetlands; ▪ Impacts associated with the storm water run-off associated with the internal roads, substation, operation maintenance building and substation construction into nearby water resources;
Agricultural potential	<ul style="list-style-type: none"> ▪ Loss of agricultural land due to construction of wind turbines and PV plant as well as associated infrastructure.
Noise	<ul style="list-style-type: none"> ▪ Noise disturbance impact on nearby potential noise sensitive receptors.
Visual	<ul style="list-style-type: none"> ▪ Potential alteration of the natural visual character of the site by numerous proposed wind turbines and the PV plant ▪ Visual intrusion of the development that could adversely affect farmsteads / homesteads and the viewers travelling on the district road that bisects the proposed site; ▪ Potential impact of shadow flicker on people residing within close

Aspect	Potential impacts
	<p>proximity to proposed wind turbines;</p> <ul style="list-style-type: none"> Potential alteration of the night-time visual environment by the aviation lighting placed on top of each wind turbine that would create a network of red lights in the night-time sky.
Geotech	<ul style="list-style-type: none"> Impact of the wind turbines and the PV plant as well as associated infrastructure on the ground conditions of the Loeriesfontein Site.
Heritage	<ul style="list-style-type: none"> Impact of the proposed development on heritage resources by physical destruction.
Palaeontology	<ul style="list-style-type: none"> Impact of adverse physical impacts on palaeontological resources.
Tourism	<ul style="list-style-type: none"> Impact on visual, noise, land-use change and corporate demand on Loeriesfontein tourism industry.
Social	<p>Geographical Change Processes</p> <p>The impact on land use largely depends on the current land use. In the event of extensive agricultural use, a micro economic impact on the landowner can be expected, whereas a more macro impact can be expected on the regional area in terms of food security. However, at present it does not seem as if the area is cultivated or that extensive agricultural activities are taking place on site. But grazing takes place.</p> <p>Demographical Change Processes</p> <p>A change in the number and composition of the local area can lead to economic, health, safety and social-wellbeing impacts.</p> <p>Economical Change Processes</p> <ul style="list-style-type: none"> Gain in construction output and energy production, loss of agricultural production. Determination of construction and operations phase employment, loss of agricultural employment. Economic opportunities due to surplus electricity supply. Increase in disposable income and business earning, thus resulting in business and consumer spending Better investor visibility for renewable energy Increased revenues from taxation and provision of services/utilities <p>Demographical Change Processes</p> <ul style="list-style-type: none"> Additional demand on municipal services, such as water, sewerage and roads could impact on health and safety if such services are not available. An influx of unemployed job seekers can lead to the

Aspect	Potential impacts
	<p>development of informal settlements. This can impact on health (as services are not provided or further taxed) and safety (an increase in crime is possible as people do not find employment and become frustrated with their living conditions).</p> <ul style="list-style-type: none"> ▪ Cultural clashes can occur where people are brought into the area from elsewhere. Apart from conflict situations, the rules of interaction can be blurred, impacting on things like family and cultural cohesiveness.

Based on the specialist studies, the following conclusions can be reached for each environmental parameter assessed. .

Table 51: Conclusions of Specialist Studies.

Biodiversity (Flora and Fauna)	<p>The uniform nature of the site has made it difficult to identify distinct sensitive areas. At this stage the entire site will be investigated during the EIA phase to identify a suitable site for the proposed development.</p> <p>Detailed recommendations on site selection will be undertaken during the EIA phase when layouts and alternatives are made available.</p> <p>Detailed assessments will take place during the EIA phase and this will involve more detailed species identification and investigation of impacts.</p>
Bats	<p>The areas designated as sensitive must be treated as sensitive, implicating that no turbines or PV cells are allowed to be placed in this zone due to the possible impacts it can have on bat mortalities.</p>
Surface water	<p>All surface water resources that were identifiable from a desktop level were identified and delineated. A preliminary buffer zone has been applied to these identified features in order to assist with the design process of the proposed development. A 50metre buffer was provisionally applied wetlands and a 100metre buffer was provisionally applied to rivers and streams. Furthermore, the potential impacts to surface water resources that may be associated with the proposed development were scoped and discussed. Implications with respect to the design layout and location of the wind turbines, internal roads, underground cable, operation control building, substation and construction lay down area in addition to potential water use license implications were raised and analysed.</p> <p>Conclusively, it can be expected that several impacts may affect the surface water resources of the Loeriesfontein site where the buildings and associated structures encroach on these sensitive environments. It is therefore, provisionally recommended that all structures and associated infrastructure be located outside of any wetlands and rivers\streams as well</p>

	as their associated buffer zones to avoid and minimise potential impacts adequately. Detailed studies in the impact phase will investigate and verify the findings of this report
Soils and Agricultural Potential	According to the ENPAT agricultural dataset the study area is dominated by soils which are not suited for arable agriculture but which can still be used as grazing land. The highly restrictive soil and climate characteristics contribute to an extremely low agricultural potential in terms of crop production. The majority of the site consists of vast grazing land which can be seen as a non-sensitive land use in terms of agricultural production when assessed within the context of the proposed development.
Noise	<p>The noise assessment indicated that the proposed project could have an impact of a low to high significance on the noise climate of the surrounding area (with the currently layout).</p> <p>Further study (an Environmental Noise Impact Assessment) is required. The developer should therefore conduct a full environmental noise impact study as per the requirements of SANS 10328:2008.</p> <p>The results of the conceptual scenarios indicated that the following information is critical in order to estimate the impact on potential receptors during the EIA phase:</p> <ul style="list-style-type: none"> ▪ For any modeling the total number of wind turbines proposed for the area should be considered (cumulative impact); ▪ The noise emission characteristics of the proposed wind turbine (in octave sound power levels) is of critical importance; ▪ The total area over which the turbines are developed is important; ▪ The number and location of receptors is critical (distance between the receptor and closest turbines - layout); ▪ Prevailing wind direction(s) and speed(s) are critical; ▪ Topographical layout of the terrain; and Existing ambient sound levels should be considered. This is because background ambient noise levels have been measured during previous field work ranging between 16 dBA (no wind) to more than 70 dBA (wind blowing at 17 m/s). With wind energy facilities only operating during windy periods, the SANS 10103:2008 guideline is not strictly applicable and likely ambient sound levels at different wind speeds should be considered.
Visual	The majority of the study area has a natural untransformed visual character; with a low capacity to absorb the development due to its natural character and the absence of shielding factors in the form of bushy vegetation or hilly topography. Due to the sparse inhabitation of the wider area and low level

	<p>of human activity on the site there are potentially very few visual receptor locations that were identified in the study area. A preliminary assessment of the study area seems to indicate that the receptor locations are unlikely to be highly sensitive to visual impacts associated with the potential wind and solar plant development, however this will need to be confirmed through further assessment in the next phase of the study. Despite the low density of potential visual receptors, the nature of visual impacts that are associated with a wind farm development of this size entail that a visual impact exerted on a receptor in the study area could be significant.</p> <p>Accordingly further assessment will be required in the EIA-phase to investigate the sensitivity of receptor locations to visual impacts associated with the proposed development and to quantify all impacts that would be created</p>
Geotechnical	<p>From a geotechnical perspective no fatal flaws have been identified that would prevent development of a wind farm and PV facility on the Loeriesfontein site. However, certain geotechnical constraints are likely to be encountered in small sections of the site and these must be taken into account during development planning as they may influence the site layout and foundation design for the wind turbines, PV plant as well as associated infrastructure.</p> <p>Possible Geotechnical constraints include:</p> <ul style="list-style-type: none"> ▪ Potentially collapsible sands in areas underlain by aeolian sand deposits ▪ Alluvial deposits along larger drainage lines ▪ Hard excavation conditions particularly areas underlain by dolerite <p>Detailed geotechnical investigations are required at each site to confirm the findings of this study.</p>
Heritage	<p>A limited variety of heritage resources are known to occur in the larger region and therefore there is a likelihood that similar resources would be located in the study area.</p> <p>Based on current knowledge, the site, features and objects known to exist or that are expected to exist in the study area are judged to have Grade III significance and therefore would not prevent the project from continuing.</p>
Palaeontology	<p>The Mainstream wind farm study area north of Loeriesfontein is largely underlain by marine to freshwater sediments of the Eccu Group (Karoo Supergroup) that are of Early to Mid Permian age. Important fossil material</p>

	<p>of aquatic vertebrates (mesosaurid reptiles, fish), invertebrates (e.g. crustaceans) and petrified wood is known from the Whitehill Formation and to a lesser extent from the Prince Albert and Tierberg Formations. However fossils other than trace assemblages are generally sparse and most of the Eccra sediments are of low overall palaeontological sensitivity. Their palaeontological potential may well have been locally compromised by chemical weathering and dolerite intrusion.</p> <p>Futhermore, a substantial portion of the Eccra Group outcrop area is mantled by superficial sediments (downwasted gravels, alluvium etc) of low palaeontological sensitivity. It is concluded that the proposed Loeriesfontein wind farm development is unlikely to pose a substantial threat to local fossil heritage. The impact significance of this project as far as palaeontological heritage is concerned is rated as LOW (negative). Therefore, pending the discovery of significant new fossil material here, no further specialist studies are considered to be necessary.</p>
Tourism	<p>The wind farm and PV facility study site is not located in close proximity to any major tourist hotspots. Furthermore, most farmsteads in and around the area of the proposed development are uninhabited. The closest town Loeriesfontein, where a few tourist facilities and the Namaqualand Flower Route are found is sufficiently distanced away from the proposed development for any significant impact to occur. Negative impacts that may potentially affect the surrounding area include visual impacts and land-use change impacts. Positive impacts associated with the proposed development pivots on increasing corporate demand, which could potentially bring in additional tourism to the vicinity thereby increasing the area's contribution to the provincial GDP.</p> <p>Given that area of the proposed wind farm and PV facility is not a popular tourist destination, and that there are no current or planned sensitive tourism features in close proximity, no EIA phase study is required.</p>
Social	<ul style="list-style-type: none"> ▪ The proposed project is located in an area that is in transition away from established mining industries (as can be found in Northern Cape in general) to a more diversified local economy. The transition has resulted in higher unemployment and has probably negatively affected local economic opportunities. As such, the economic effects are likely to be an important feature associated with the project.

9.2 Recommendations

Table 52: Outcomes and recommendations of Specialist Studies

Aspect	Fatal flaws	Site refinement recommendations	Further Investigations
Flora	None	Detailed recommendations on site selection will be undertaken during the EIA phase when layouts and alternatives are made available.	Yes.
Fauna (including birds)	None	Detailed recommendations on site selection will be undertaken during the EIA phase when layouts and alternatives are made available.	Yes.
Bats	None	The areas designated as sensitive must be treated as sensitive, implicating that no turbines or PV plant are allowed to be placed in this zone due to the elevated impacts it can have on bat mortalities.	Yes.
Surface water	None	It is recommended that all structures and associated infrastructure be located outside of any wetlands and rivers\streams as well as their associated buffer zones to avoid and minimise potential impacts adequately. Detailed studies in the impact phase will investigate and verify the findings of this report.	Yes.
Agricultural potential	None	Loeriesfontein site is dominated by grazing land and this land use can be seen as a non-sensitive when assessed within the context of the proposed development. Detailed studies in the impact phase will investigate	Yes.

Aspect	Fatal flaws	Site refinement recommendations	Further Investigations
		and verify the findings of this report.	
Noise	None	<p>It is recommended that the potential noise impact associated with the Wind Energy Facility be investigated in more detail in the Environmental Impact Assessment phase. The following information is considered critical:</p> <ul style="list-style-type: none"> ▪ The prevailing night-time background ambient noise levels; ▪ The available meteorological data; ▪ The exact locations of the various WTGs in the WEF; ▪ The full specifications of the WTGs (preferably IEC 61400-11 certificates); ▪ An overview of the equipment, processes and schedules for the construction phase. 	Yes.
Visual	None	Further assessment will be required in the EIA-phase to investigate the sensitivity of the receptor locations to visual impacts associated with the proposed development and to quantify all impacts that would result	Yes.
Geotechnical	None	The creation of a 200m buffer zone around rivers will reduce the occurrence of poor quality alluvial soils from within the development areas.	Yes (to be conducted prior to construction).

Aspect	Fatal flaws	Site refinement recommendations	Further Investigations
Heritage	None	It is recommended that, in accordance of Section 38 of the NHRA, a Phase I HIA be undertaken to determine the presence of any heritage resources that may occur in the development area. Such a study would determine the level of significance of the identified resources as well as proposing mitigation measures for those resources that may be affected by the proposed developments.	Yes.
Palaeontology	None	<ul style="list-style-type: none"> The ECO responsible for the development should be aware of the possibility of important fossils being present or unearthed on site and should monitor all substantial excavations into fresh sedimentary bedrock for fossil remains. In the case of any significant fossil finds during construction, these should be safeguarded - preferably in situ - and reported by the ECO to the relevant heritage management authority (SAHRA); <p>The above recommendations should be incorporated into the EMP for the Mainstream wind farm project near Loeriesfontein.</p>	No - palaeontologist to visit site prior to final layout being finalised prior to construction. .
Tourism	None	Given that area of the proposed wind farm is not a popular tourist destination, and that there are no current or planned sensitive	No

Aspect	Fatal flaws	Site refinement recommendations	Further Investigations
		tourism features in close proximity, no EIA phase study is required.	
Social	None	<p>The following is recommended in terms of the socio-economic study and associated studies going forward:</p> <ul style="list-style-type: none"> ▪ Agree the extent of the local agricultural impact in consultation with landowners and tenants to ensure adequate mitigation provisions are made; ▪ Realistically model local benefits considering the lack of businesses and skilled labour in the area especially in the renewable energy sector; ▪ Determine the exact local benefits to local government for improvement of services in the area; and ▪ Obtain information on the geochemical and botanical impact of the project and the opportunities for post operations rehabilitation of the land. 	Yes.

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

- Biodiversity (flora and fauna) Assessment (Liesl Koch - SiVEST)

- Avifauna Assessment (Chris van Rooyen)
- Bat Assessment (Werner Marais - Animalia)
- Surface Water Impact Assessment (Paul da Cruz – SiVEST)
- Agricultural Potential (Kurt Barichiev – SiVEST)
- Noise Impact Assessment (Morne de Jager – M²)
- Visual Impact Assessment (Paul da Cruz – SiVEST)
- Geotechnical Assessment (Mainstream)
- Heritage Assessment (Johnny van Schalkwyk)
- Socio-economic Impact Assessment (Nonka Byker – MasterQ)

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

10 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

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

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

10.1 Aim of the EIA Phase

The aim of the impact assessment phase is to:

- Conduct a detailed impact assessment of the issues identified
- Identify potential mitigation measures to reduce impacts
- Ensure information is disseminated to Interested and / or Affected parties and there is a constant flow of communication

The following tasks will form part of the Environmental Impact Assessment Phase:

- A comprehensive Public Participation Process (as above)
- Conduct specialist studies
- Conduct alternatives assessment
- Compilation of an Environmental Impact Report (EIR)
- Compilation of an Environmental Management Programme
- Make draft EIR available for public comment
- Submit Final EIR to DEA
- Await decision

The following specialist studies will form part of the Environmental Impact Report:

- Biodiversity (flora and fauna) Assessment (Liesl Koch - SiVEST)
- Avifauna Assessment (Chris van Rooyen)
- Bat Assessment (Werner Marais - Animalia)
- Surface Water Impact Assessment (Paul da Cruz – SiVEST)
- Agricultural Potential (Kurt Barichiev – SiVEST)
- Noise Impact Assessment (Morne de Jager – M²)

- Visual Impact Assessment (Paul da Cruz – SiVEST)
- Geotechnical Assessment (Mainstream)
- Heritage Assessment (Johnny van Schalkwyk)
- Socio-economic Impact Assessment (Nonka Byker – MasterQ)

The terms of reference for these studies involve assessing the potential impacts that have been identified in the Scoping Report in addition to any new issues that are identified during the detailed assessments. The qualifications of these specialists are included in their CV's which are included in Appendix 1.

10.2 Authority Consultation

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

- Submission of draft Scoping Report;
- Submission of final Scoping Report;
- Receipt of comments and confirmation of Scoping Report;
- Submission of draft Environmental Impact Report for comment;
- Submission of final Environmental Impact Report; and
- Response from competent authority regarding acceptance of final Environmental Impact Report.

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

10.3 Proposed Method of Assessing Environmental Issues

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

10.3.1 Biodiversity Assessment (including avifauna and bats)

The biodiversity assessment will entail field verification which will be utilised to assess the potential impacts and issues that have been identified. These are listed below.

- Loss of natural vegetation;
- Fragmentation in natural systems;
- Impact on sensitive vegetation;
- Loss of habitat for faunal species;
- Bird collisions with and displacement due to wind turbines.
- Bat mortalities due to blade collisions and barotrauma during foraging;
- Bat mortalities due to blade collisions and barotrauma during migration;
- Destruction of bat foraging habitat;
- Destruction of bat roosts.

Quantitative data will be collected by undertaking vegetation sampling according to the Braun-Blanquet approach. Additional checklists of plant species will be compiled by traversing areas around each site on foot and recording species as they were encountered.

Consultation with relevant authorities and other specialists will take place to ensure all relevant information is incorporated into the study.

The aspects that are identified as sensitive during the Scoping Phase such as areas containing potential Red Data species or areas of intact vegetation. The areas which have been identified as sensitive during the Scoping Phase will be analysed in detail during the EIA phase.

Based on the findings of the Scoping Report, the applicable faunal investigations at EIA level could involve site specific surveys for the following faunal groupings, mammals, avifauna, reptiles, amphibians, and invertebrates. Dependant on the groupings to be investigated, additional specialists may need to be recruited onto the team. This will be determined at the end of the Scoping Phase/beginning of the EIA Phase. The level of these investigations would include pitfall trapping, net sweeping, tracks, scat as well as visual and acoustic sampling.

Field verification will be undertaken during the growing season. The study will focus on habitat provision and the potential occurrence of Red Data species on the site. Sensitivity mapping will be undertaken for all faunal groupings assessed.

The study will culminate in the compilation of a Biodiversity Impact Assessment as well as mitigation measures which will feed into the Environmental Management Programme (EMPr).

10.3.2 Surface Water Impact Assessment

The surface water assessment during the EIA phase would primarily entail more detailed field investigation of surface water bodies (identified during the scoping phase) within the proposed site.

The fieldwork would be focused on:

- larger wetland and drainage systems,
- Those wetland systems identified as sensitive or as having a high functionality,
- Riparian zones of larger river systems

The primary aim of the EIA-level assessment would be to determine the boundaries of the relevant wetland / riparian systems so that the wind farm and PV facility can be placed outside of the wetlands / riparian areas. The wetland / riparian area boundary delineation would be undertaken using the DWAF guideline 'A practical field procedure for the identification and delineation of wetlands and riparian areas'.

The surface water analysis would propose measures to mitigate any identified potential negative impacts associated with the wind farm and PV facility, and these would inform the EMP phase. Mitigation measures would possibly entail slight changes to the proposed locations and extent of the wind farm and PV facility to avoid impacts on surface water bodies, where significant or likely impacts have been predicted.

Input will be given to the proposed layout and buffers recommend in terms of the National Water Act, 1995 (Act 36 of 1995).

The study will culminate in the compilation of a Surface Water Impact Assessment as well as mitigation measures which will feed into the Environmental Management Programme (EMPr).

10.3.3 Agricultural Potential Assessment

A full agricultural assessment during the EIA Phase will encompass the following:

- Field verification of agricultural activities and production potential where necessary.
- Mapping and delineation of agricultural land uses and rating of production value and potential based on satellite imagery and site visits.
- Consultation with farmers and pertinent stakeholders.

- Identifying the potential agriculturally related issues and impacts as a result of the proposed activities.
- Provide mitigation measures and routing recommendations in order to reduce the impacts of the proposed development on soil characteristics agriculture potential.
- Providing responses to I&APs comments.
- Attendance at a specialist workshop in Johannesburg.
- Compilation of findings and report writing.

This study will comply with the requirements of the Department of Agriculture, Forestry and Fisheries. The study will culminate in the compilation of a Agricultural Impact Assessment as well as mitigation measures which will feed into the Environmental Management Programme (EMPr).

10.3.4 Noise Impact Assessment

Measurements of the background noise levels in terms of LAeq (10min) at selected points will be taken to identify the noise levels in terms of sensitive receptors. Measurements will be taken for day and night-time measurements taking into account ambient sound levels, wind speed, temperature and humidity. The LAeq measurements as obtained during fieldwork will be displayed in an appropriate scale on a topographical map, using contours of constant sound levels if relevant. Noise Propagation Modelling for both the Construction and Operational phase, with the resulting total future predicted sound levels will be projected on a topographical map.

The calculated noise levels LAeq will be compared against the measured background noise level as well as the appropriate SANS rating level to determine the potential impact on the surrounding environment, focusing on potential sensitive receptors. The compilation of an EIA Report for the EIA Phase as per SANS 10328:2008.

The study will culminate in the compilation of a Noise Impact Assessment as well as mitigation measures which will feed into the Environmental Management Programme (EMPr).

10.3.5 Visual Impact Assessment

The visual focus of the EIA phase will involve a far more detailed assessment of the likely visual impacts of the proposed wind farms. Detailed GIS-based assessment will be used to identify the degree of visual impact of each wind turbine on sensitive receptors. This assessment will be based on established criteria including:

- Extent of viewsheds / zones of visual influence;
- Visual sensitivity of the receiving environment / sensitive receptors;
- Visual absorption capacity;

- Level of visual intrusion.
- Modelling of proposed development on the site.

This phase of the study will include a more detailed assessment of potential lighting impacts at night. Information as to the location, amount and type of lighting to be used on each site will be sourced from the client for this assessment.

Should sufficient digital data and technical information be available, 3D modelling and simulations could be provided for each site.

The study will culminate in the compilation of a Visual Impact Assessment as well as mitigation measures which will feed into the Environmental Management Programme (EMPr).

10.3.6 Heritage Assessment

Field verification will be required which will consist of walking through the proposed development area and is aimed at locating heritage resources falling within (and directly adjacent to) the proposed development footprint. The locations of all heritage resources that are recorded during the survey will be documented using a handheld GPS. Furthermore, the documentation will reflect a brief qualitative description and statement of significance for each site and includes a photographic record of all the sites.

It is important to also note that informal social consultation (i.e. with local community members, residents and knowledgeable individuals) will be undertaken during the fieldwork component. The aim of social consultation is to identify any tangible and intangible resources (i.e. sacred places, myths and indigenous knowledge systems) that may exist.

- Reporting

A report will be written which would include the following components:

- The identification and mapping of all heritage resources in the affected area;
- An assessment of the significance of such resources in terms of the heritage assessment criteria;
- An assessment of the impact of the development of such heritage resources;
- If heritage resources will be adversely affected by the proposed development, consideration of the alternatives;
- Proposed mitigation of any adverse effects during and after the completion of the proposed development.

The study will culminate in the compilation of a Heritage Impact Assessment as well as mitigation measures which will feed into the Environmental Management Programme (EMPr).

10.3.7 Socio-economic Impact Assessment

The following will be undertaken in the EIA Phase in terms of the social and economic environment:

- Refine methodology as appropriate based on input from stakeholders.
- Meet with consultant team as necessary to discuss revisions, required inputs from other team members, and timetable.
- Conduct socio-economic assessment for both proposed sites, to include (at a minimum)
 - More refined site reconnaissance and impact area assessments
 - Employment impacts (direct and indirect, temporary (construction period) and permanent.
 - Business impacts (contractor, supplier, SMME, and local spin-off).
 - Income impacts on impact-area populations and supplier base.
 - Development impacts, in terms of spin-off or related housing and commercial development.
 - Environmental economic impacts, relating to changes in environmental conditions as possible within the impact area.
 - Social impacts in terms of access to facilities or infrastructure and community well-being.
 - Other socio-economic impacts to be defined.

The study will culminate in the compilation of a Socio-economic Impact Assessment as well as mitigation measures which will feed into the Environmental Management Programme (EMPr).

10.4 Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas Intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 54.

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

10.5 Impact Rating System

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

- planning
- construction
- operation
- decommissioning

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

10.5.1 Rating System Used To Classify Impacts

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

Table 53: Description of terms.

NATURE
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.
GEOGRAPHICAL EXTENT
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.

1	International and National	Will affect the entire country
2	Province/region	Will affect the entire province or region
3	Local/district	Will affect the local area or district
4	Site	The impact will only affect the site
PROBABILITY		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Irreversible	The impact is irreversible and no mitigation measures exist.
2	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
3	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
4	Completely reversible	The impact is reversible with implementation of minor mitigation measures
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION		

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

2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
Significance		
SIGNIFICANCE		
<p>Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:</p> <p>(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.</p> <p>The summation of the different criteria will produce a non weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.</p>		
Points	Impact Rating	Significance Description
6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.

29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

The table below is to be represented in the Impact Assessment section of the report.

Table 54: Rating of impacts.

IMPACT TABLE	
Environmental Parameter	<i>A brief description of the environmental aspect likely to be affected by the proposed activity e.g. Surface water</i>
Issue/Impact/Environmental Effect/Nature	<i>A brief description of the nature of the impact that is likely to affect the environmental aspect as a result of the proposed activity e.g. alteration of aquatic biota The environmental impact that is likely to positively or negatively affect the environment as a result of the proposed activity e.g. oil spill in surface water</i>
<i>Extent</i>	<i>A brief description indicating the chances of the impact occurring</i>
<i>Probability</i>	<i>A brief description of the ability of the environmental components recovery after a disturbance as a result of the proposed activity</i>
<i>Reversibility</i>	<i>A brief description of the environmental aspect likely to be affected by the proposed activity e.g. Surface water</i>
<i>Irreplaceable loss of resources</i>	<i>A brief description of the degree in which irreplaceable resources are likely to be lost</i>
<i>Duration</i>	<i>A brief description of the amount of time the proposed activity is likely to take to its completion</i>
<i>Cumulative effect</i>	<i>A brief description of whether the impact will be exacerbated as a result of the proposed activity</i>
<i>Intensity/magnitude</i>	<i>A brief description of whether the impact has the ability to alter the functionality or quality of a system permanently</i>

IMPACT TABLE		
	<i>or temporarily</i>	
<i>Significance Rating</i>	<i>A brief description of the importance of an impact which in turn dictates the level of mitigation required</i>	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	1
Probability	4	1
Reversibility	4	1
Irreplaceable loss	4	1
Duration	4	1
Cumulative effect	4	1
Intensity/magnitude	4	1
Significance rating	-96 (high negative)	-6 (low negative)
Mitigation measures	<i>Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. Describe how the mitigation measures have reduced/enhanced the impact with relevance to the impact criteria used in analyzing the significance. These measures will be detailed in the EMPR.</i>	

10.6 Recommendations

It is recommended that the specialist studies pertaining to certain aspects be carried forward into the EIR Phase, namely, pertaining to the studies mentioned above. Various issues and concerns have been identified which require detailed assessment and thus it is recommended that the EIA phase be allowed to continue in order to assess these and the impacts associated.

10.7 Public Participation

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

Table 55: Public Participation activities still to take place

ACTIVITY	FUNCTION
Prepare and distribute EIA newsletter	Notify registered I&APs of outcome of the Scoping Phase (including timeframes and when their input is required).
Focus Group Meetings / Key Stakeholder Workshops	Meeting to report back to key stakeholders
Public Meetings	Report back on the process to the general public.
Public comment period	Notification of I&APs of the availability of the EIR report for public comment.
Notification of granting or refusal of Environmental Authorisation	Informing of all registered I&APs of the EA
Environmental Authorisation appeal period	Receive any appeals and forward to DEA

10.8 Proposed Project Schedule going forward

The table below represents the proposed schedule of events for the project till closure upon DEA's decision.

Table 56 Proposed Project Schedule

	November 2011	December 2011	January 2012	February 2012	March 2012	June 2012
End of DSR Comment period	14 November 2011					
Submission of FSR to DEA	16 November 2011					
DEA Decision on FSR		16 December 2011				
Distribution of EIA Newsletter			16 January 2011			
DEIR Comment period						
Hold Meetings (FGM, PM and KSW)						
Submission of FEIR to DEA						
DEA Decision						

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