

**FINAL
HERITAGE IMPACT ASSESSMENT COMPILED IN TERMS OF SECTION
38(8) OF THE NATIONAL HERITAGE RESOURCES ACT, 1999 (ACT 25 OF
1999)**

**PROPOSED N1 WIND FARM PROJECT: LEMOENFONTEIN 158/2,
KUILSPOORT 161/9, LEMOENFONTEIN SOUTH 162/REM & BULSKOP
163/1, BEAUFORT WEST DISTRICT**



ON BEHALF OF: ENERGY FOR SOUTH AFRICA (E4SA)

OCTOBER 2011

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PERCEPTION

CONTENTS:

1. INTRODUCTION
2. INDEPENDENCE OF ASSESSOR
3. BACKGROUND
4. METHODOLOGY
5. DESCRIPTION OF STUDY AREA
6. DEVELOPMENT PROPOSAL AND ALTERNATIVES
 - 6.1 *Alternative One – 240MW*
 - 6.2 *Alternative Two – 160MW*
 - 6.3 *Alternative Three – 80MW*
 - 6.4 *Mitigated Layout – 72.5MW (Preferred Alternative)*
 - 6.5 *Alternative Five – Status quo*
7. STATUTORY CONTEXT
 - 7.1 *Western Cape Provincial Spatial Development Framework (Nov 2005)*
 - 7.2 *Beaufort West Draft Spatial Development Framework (May 2007)*
 - 7.3 *Beaufort West Municipality Integrated Development Plan (2007/8)*
8. HISTORICAL BACKGROUND
 - 8.1 *Introduction*
 - 8.2 *Anglo Boer War*
 - 8.3 *Deed search*
 - 8.4 *Conclusion*
9. HERITAGE RESOURCES & ISSUES
 - 9.1 *Built environment*
 - 9.2 *Landscape issues*
 - 9.2.1 *Regional and Natural landscape setting*
 - 9.2.2 *Cultural landscape context*
 - 9.2.3 *Urban context*
 - 9.3 *Visual – Spatial issues*
 - 9.3.1 *Comments regarding Regional landscape*
 - 9.3.2 *Site Findings*
 - 9.3.3 *Viewshed Findings*
 - 9.3.4 *Exposure Findings*
 - 9.3.5 *Scenic Findings*
 - 9.3.6 *Landscape Sensitivity Findings*
 - 9.3.7 *VRM Sensitivity Mapping Findings*
 - 9.3.8 *Conclusions*
 - 9.4 *Archaeology*
 - 9.4.1 *Extract from Executive Summary*
 - 9.4.2 *Recommendations*
 - 9.4.3 *Required Mitigatory measures*
 - 9.5 *Palaeontology*
 - 9.5.1 *Palaeontological occurrences noted*
 - 9.5.2 *Recommendations for Mitigation and Management*
 - 9.5.3 *Conclusions*
10. HERITAGE INFORMANTS AND INDICATORS
 - 10.1 *Built environment*
 - 10.2 *Landscape issues*
 - 10.3 *Visual-spatial issues*

- 10.4 *Archaeology*
- 10.5 *Palaeontology*
- 11. PUBLIC PARTICIPATION
- 12. ASSESSMENT OF IMPACTS
 - 12.1 *Indicators relating to Built environment issues*
 - 12.2 *Indicators relating to Landscape issues*
 - 12.3 *Indicators relating to Visual-Spatial issues*
 - 12.4 *Indicators relating to Archaeology*
 - 12.5 *Indicators relating to Palaeontology*
 - 12.6 *Summary of Mitigation measures/ Recommended conditions of approval*
- 13. RECOMMENDATIONS

ANNEXURES:

1. Power of Attorney
2. HWC Records of Decision/ Comments
3. Photographs
4. Alternative Layouts, Constraints mapping, Background info
5. Integrated Mapping summarising Visual issues and Design indicators
6. Surveyor General diagrams
7. Visual Impact Assessment
8. Archaeological Impact Assessment
9. Palaeontological Impact Assessment
10. Perceived significance of impacts on heritage resources
11. Proof of Public Participation

LIST OF FIGURES:

1. Locality plan
2. Extract from 1880-1890 SG Maps
3. Recent aerial view: existing buildings
4. Major regional landscape, man-made features
5. Collage compiled from 1945 aerial photography
6. Recent aerial view: former cultivation patterns
7. Exposure and Receptor Mapping
8. Perspective rendering of views from Lemoenfontein historic farmstead

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10. Cape Environmental Assessment Practitioners (Pty) Ltd, (2011). Draft Environmental Impact Assessment Report – Beaufort West N1 Wind Farm. Unpublished report, George
11. Ms. Ingrid Koster, Lemoenfontein Game Lodge

ABBREVIATIONS:

CA – Cape Town Archives
CDSM – Chief Directorate: Surveys & Mapping, Mowbray
CTDO – Cape Town Deed's Office
DEA – National Department of Environmental Affairs
NHRA – National Heritage Resources Act, 1999 (Act 25 of 1999)
NID – Notice of Intent to Develop
HIA – Heritage Impact Assessment
HWC – Heritage Western Cape
PPP – Public Participation Process
PAWC – Provincial Administration: Western Cape
RoD – Record of Decision
SDF – Spatial Development Framework
SGO – Surveyor General's Office

COVER PAGE: Site boundaries transposed onto Google Earth image, 2010

1. INTRODUCTION

PERCEPTION was appointed during April 2010 by *Energy for South Africa – E4SA* (Implementation entity: *Wind Farm Beaufort West Phase 1 (Pty) Ltd*) for the provision of professional services relating to this proposal, as required in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA). Sanction for compilation and submission of this application was provided by Florian Kroeber, (representative of the developer duly authorised), by way of a formal appointment (Power of Attorney) attached as Annexure 1.

This submission serves as a Heritage Impact Assessment (HIA) and includes inputs from the following specialist reports sanctioned as part of the HIA:

- Archaeological Impact Assessment (Pre-colonial, Historical) – CHARM (Dr. Peter Nilsson)
- Historical background report – Kathleen Schulz
- Desktop Palaeontological Impact Assessment – Natura Viva (Dr. John Almond)
- Visual Impact Assessment – VRM Africa (Stephen Stead)

2. INDEPENDENCE OF ASSESSOR

The Developer appointed *SE de Kock (PERCEPTION Heritage Planning)* as an independent professional heritage practitioner to facilitate the Heritage Impact Assessment (HIA) process running concurrently with the EIA process, the latter of which is facilitated by Cape Environmental Assessment Practitioners (Pty) Ltd. ("Cape EAPrac").

According to Regulation 18 of NEMA an EAP must be independent; amongst others have experience in conducting EIA's (as well as specialist reports forming part of such EIA's), perform the work relating to the application in an objective manner, comply with the Act, the environmental Regulations and all other applicable legislation, take into account, to the extent possible the matters relevant to the receiving environment, disclose all material information in the possession of the EAP that reasonably has or may have the potential of influencing a decision, or the objectivity of any submission to the competent authority, which with relation to the HIA refers to Heritage Western Cape.

With relation to the author's appointment to compile and submit to Heritage Western Cape a Heritage Impact Assessment in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 of 1999), it is hereby declared that:

- This consultancy (including the author) is not a subsidiary, legally or financially, of the proponents;
- Remuneration for professional services by the proponent in relation to this proposal is not linked to approval by any decision-making authority responsible for permitting this proposal;
- Nor this consultancy, nor the author has any interests in secondary or downstream activities as a result of the authorisation of this project.

It is further hereby certified that the author has 14 years professional experience (3 years of which were abroad) as urban planner and 7 years professional experience as heritage practitioner (2 years of which were abroad). The author holds the following qualifications:

- Town and Regional Planning (B-Tech, CPUT, 1997)
- Environmental Impact Assessment Management – Heritage, Environmental (Dipl/ Masters, Dublin University, 2002)
- Architectural & Urban Conservation (CDP, UCT, 2007)
- Urban Design (CPD, UCT, 2009).

The author is professionally registered as follows:

- Town and Regional Planner – Irish Planning Institute (IRL)
- Accredited Heritage Practitioner – Association for Professional Heritage Practitioners

- Member – International Association of Impact Assessment (SA)
- Able to register as Town and Regional Planner with South African Council for Planners

3. BACKGROUND

The report follows submission of a NID and Heritage Statement to Heritage Western Cape by *Perception Heritage* during June 2010 and its subsequent assessment by former BELcom and APM Committees as summarised below (copies attached as part of Annexure 2):

- BELcom RoD dated 10th July 2010 – “*Committee requests HIA which must incorporate recommendations of the consultant*”, i.e. incorporating the following specialist studies and detailed site analysis:
 - Archaeological Impact Assessment;
 - Palaeontological Impact Assessment;
 - Visual Impact Assessment;
 - Analysis of Cultural Landscape Issues;
 - Analysis of Visual – Spatial Issues.
- APM decision dated 23rd July 2010 – “*Recommendations of the [Scoping] AIA were accepted. Any development of this type will have a serious and permanent impact on archaeology and palaeontology, regardless of mitigation and therefore before anything is approved, a full [archaeological] impact assessment must be conducted.*”

Subsequently, in response to a Draft Scoping Report for the proposed development submitted to HWC by Cape EAPrac during March 2011, the Impact Assessment Review Committee during its meeting held on 6th April 2011 provided the following Interim Comments dated 20th April 2011 (copy attached as part of Annexure 2 hereto):

“*Committee resolved to endorse specialist consultant’s recommendations in Draft Scoping report. Summary of the recommendations is as follows*”:

- *HIA required. Position of the historic roads on the properties needs to be established and mapped;*
- *HIA must include full VIA, including photomontages and such study must consider cumulative visual-spatial impacts of the proposal;*
- *See point 4 of Scoping Archaeological Impact Assessment;*
- *See point 6 of Palaeontological Impact Assessment.*

4. METHODOLOGY

As part of this HIA report the author has studied, visited, photographed and assessed the study area and its environs over a period of approximately eighteen months, which more specifically involved the following:

- Studying ownership history and social history pertaining to the site and its environs from relevant primary sources obtained in the Cape Town Archives and Deeds Office (independent research by historian Kathleen Schulz);
- Field work carried out on 19th June 2010 and 23rd June 2011;
- Negotiations, discussions with consultant team regarding nature and detailed design of proposed development;
- Focussed public participation process aimed at soliciting heritage-related comments from community members regarding proposed development and running concurrent with EIA Process;
- With relation to compilation of this HIA:
 - Research (site specific but also local context/ environs);
 - Identification of heritage-related issues and concerns;
 - Analysis of development site and its environs;
 - Identification of contextual spatial informants;
 - Transpose findings of Visual Impact Assessment, Archaeological Impact Assessment and Palaeontological Impact Assessment into this report;

- Establishing cultural significance, based on criteria set out in NHRA;
- Identification of heritage-related design informants based on the above;
- Assess conformity of final proposed site layout to design informants identified.

5. DESCRIPTION OF STUDY AREA

The subject site (approximately 1,810 ha in extent) is comprised of portions of four individual cadastral land units listed below, all of which are registered to the Beaufort West Municipality (refer to Annexure 2 for diagram indicating historic property boundaries/ site boundary):

- Bulskop 163/1 – 771,2722 ha
- Kuilsport 161/9 – 845,8693 ha
- Lemoenfontein 158/2 – 88,8821 ha
- Lemoenfontein South 162/Rem – 531,9222 ha

The site is located c. 5km northeast of the Beaufort West urban area bounded by the N1 National Road (southern site boundary) and the De Jagers Pass Road to the village of Loxton (northern site boundary) as illustrated with the locality plan below. The site is east of the Karoo National Park and northwest of the Beaufort West “Karoo Gateway” Airfield. The historic Lemoenfontein guesthouse is located along the slopes of the Nuweveld Mountains, directly northwest of the site.

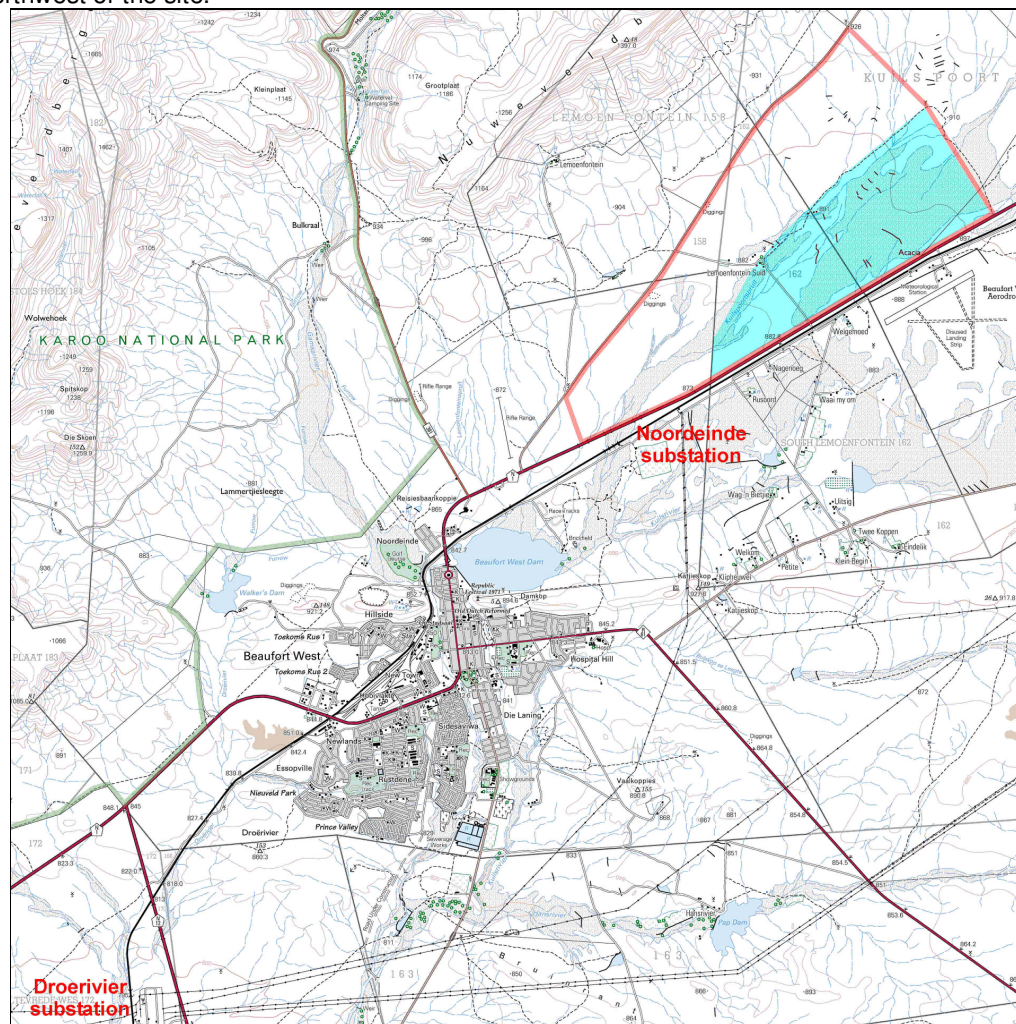


Figure 1: Locality of overall site (excluding area highlighted blue) in relation to Beaufort West town, Karoo National Park and regional electricity grid (Source: 1:50,000 Topo-cadastral series, 3222BC, CDSM)

The site is located within a flat and arid landscape traversed by numerous natural drainage lines created over time by the non-perennial Kuilspootspruit. Due to significant overgrazing, the entire site is sparsely vegetated and evidence of erosion was noted across the site, particularly along natural drainage lines. No structures or ruins older than 60 years and/or gravesites could be located on the site. A former residence and associated outbuildings (used by SAPD as the headquarters for the local livestock theft prevention unit between February 1995 and January 2001), appear to have fallen in complete disuse. Further photographs of the site as well as detailed description of the site and its environs are contained in Annexure 3 and Section 9.2 of this report respectively.

Note that the southeast section (highlighted in blue on locality plan, page 7) of the overall site (red) is the subject of a separate application for a photovoltaic park, which is dealt with as part of separate EIA and HIA processes).

6. DEVELOPMENT PROPOSAL AND ALTERNATIVES

The Beaufort West – N1 Wind Farm concept has been adjusted from an initial 240MW wind farm proposal, to a 160MW alternative, to a 80MW proposal and finally a 72.5MW mitigated layout to accommodate constraints identified by stakeholders and the project team¹. From an environmental perspective, this adjustment process is considered positive, and will continue to be assessed through the on-going impact assessment process. Four project proposal alternatives are described below, the third being the preferred concept, at this stage in the environmental process. Site layout plans and environmental constraints mapping are attached hereto as part of Annexure 4.

6.1 240MW Alternative One

This initial alternative, proposed that the energy generation facility would have a **maximum capacity of 240MW** (megawatts), amounting to approximately **96 wind turbines** spread across the entire combined property. This capacity had to be adjusted due to:

- The recording of **less favourable wind conditions** as previously expected, which has necessitated that the turbines be spaced further apart from one another to achieve higher wind efficiency;
- Preliminary specialist studies and siting guidelines have revealed several site-specific possible constraints / restrictions, which have necessitated the further reduction of the number of turbines possible on the development property;

Based on the above, this alternative has been found to be **unviable**. For this reason this initial 240MW alternative has been **excluded** and will thus no longer be assessed as part of the on-going environmental process.

6.2 160MW Alternative Two

This project proposal considered a total **generation capacity of 160MW** amounting to approximately **64 wind turbines** spread across the entire combined property, which would be implemented in two phases: The first phase was to be 80MW and the second phase was to be made up of the remaining capacity (determined by the incoming wind data). This proposal has been **eliminated** from the impact assessment process for the following reason:

- The need to institute a buffer area from the Karoo Gateway Aerodrome located to the south of the combined property, due to concerns raised regarding the close proximity of proposed turbine layout (160MW at the time) to the airstrip. This buffer from the airstrip, together with several site-specific possible constraints/ restrictions identified by preliminary specialist studies and regional criteria thresholds have necessitated the further reduction of the number of turbines possible on the development property.

¹ Information transposed from Draft Scoping Report – Beaufort West N1 Wind Farm, Cape Environmental Assessment Practitioners (Pty) Ltd

As a result this alternative is **not considered feasible** and is therefore **excluded** from the process.

6.3 **Alternative Three– 80MW**

This preferred proposal involves an energy generation facility with a **capacity of 80MW** (megawatts), with turbines to be spaced across the northern section of the 1 810ha property (approximately **882ha**), outside the 2.5km buffer from the Karoo Gateway Aerodrome to the south of the property. As described in Section 5 above, this proposal excludes the southeast section of the original site. The electricity to be generated is to be injected into the national Distribution System. This 80MW wind farm concept includes the following:

Three blade wind turbines with a **capacity of either 2MW or 2.5MW**. Two turbine layout options are being considered, based on these turbine type/capacity options:

- **32 x 2.5MW turbines** with a hub height of 100m and rotor diameter of 100m, and;
- **40 x 2MW turbines** with a hub height of 105m and rotor diameter of 90m.

6.4 **Mitigated Layout – 72.5MW (Preferred Alternative)**

Following recommendations made through this integrated Heritage Impact Assessment report in relation to Alternative Three (formerly the “Preferred Alternative”), the following, fourth preferred alternative was defined:

- **29 x 2.5MW turbines** with a hub height of 100m and rotor diameter of 100m.

This Mitigated Layout (Preferred Alternative) responded to the following key recommendations made through the various specialist heritage studies:

- a) Visual Impact Assessment – Mitigated layout has fewer turbine and incorporates a 750m visual buffer area as measured from the N1 National Road;
- b) Archaeological Impact Assessment – Mitigated layout avoids fourteen significant archaeological occurrences noted by the specialist;
- c) Palaeontological Impact Assessment – Mitigated layout provides for a 50m radius buffer area around all significant palaeontological occurrences noted by the specialist;

Each of the three turbine layouts listed in Sections 6.3 and 6.4 were assessed against the identified environmental potential constraints (see constraint maps attached as part of Annexure 4), as well as the regional constraints/thresholds, by the specialists in the Impact Assessment Phase. The exact number, exact type and measurements / scale of the turbines are to be confirmed as further wind data is assimilated during the process. Associated infrastructure to this Preferred Alternative includes:

- **Circular foundations** (diameter of approx.17m) to support the turbines;
- **Crane area** - A cleared, compacted area (approx. 22m x 45m) for the crane next to each turbine foundation for turbine assembly, maintenance and decommissioning;
- **Transformers**, within or at the base of each turbine;
- **22kV switching substation / control building**, of approx. 225m² located on-site;
- A new **substation**, of approx. 80m x 80m in size, to be constructed directly west of the existing Noordeinde Substation opposite the property, on RE/1/163, beside the N1;
- Internal **underground cabling** from the turbines to the control building/station;
- A **transmission** power line linking the proposed control building to the new substation (beside the existing Noordeinde substation, over the N1), then to the existing Beaufort substation and finally the existing Droërivier substation (beside the N12). This power line, of approximately 14.9km, will run within an existing servitude alongside an existing overhead power line;
- An **access road** to the site. It is proposed to make use of the existing farm access off the DR2311 as a primary access and the existing access off the N1 highway as a secondary access. The vertical and horizontal alignments of the DR2311 access will be upgraded to allow access for abnormal loads (turbine transport vehicles and cranes);
- **Permanent internal roads** to each turbine on site (approximately 4.5m wide).

The proposed concept and layout details, and the associated structures and infrastructure (roads, overhead power lines, sub-stations, grid connections etc.), will be informed and

adjusted by the incoming wind data recorded by the on-site wind monitoring mast, as well as by inputs and feedback gathered from the project team and the public through the process.

6.5 Alternative Five – Status quo

This alternative proposes that the four properties, owned by the municipality, remain undeveloped as they are currently. Considering the poor agricultural potential of this land (due to water constraints and disturbed conditions) the overall potential of the land is limited should the status quo remains. Details of this alternative are discussed in the main body of the report.

7. STATUTORY CONTEXT

7.1 Western Cape Provincial Spatial Development Framework (Nov 2005)

This document identifies the importance of renewable energy, including wind energy. This document however recommends that proposed wind farms should be located where they will cause least visual impact taking into consideration the viability of the project. The Western Cape provincial government has undertaken a study to inform the strategy guideline for locational criteria for wind farms in the Western Cape, which has been considered in this EIA process.

The PSDF also makes reference to transmission lines, specifying that they should be aligned along existing and proposed road and/or rail linkages corridors rather than along point to point cross-country routes, as these raise issues of visual blight, unviably shaped land parcels, need for access roads and destruction of cultural landscapes. It also mentions that care should also be taken to avoid bird migration routes.

The proposed overhead transmission line associated with the Beaufort West-N1 Wind Farm will be aligned within an existing servitude, beside an existing transmission line. The impacts of the transmission line will be assessed along with those of the farm itself.

7.2 Beaufort West Draft Spatial Development Framework, May 2007

This policy guideline document does not make any spatial/ land use proposals for the subject site and as such, an extract from said plan has not been inserted here. According to the SDF, the municipality completed a feasibility study and EIA during November 2003 for the construction of a wind farm, “at the old Airport Site” (Section 8.1.3, Volume 1). While this project has not been implemented it is therefore clear that what is currently proposed herewith, had been contemplated by the municipality before. It further states that the said wind farm project was, “seen as one of the IDP strategies with a high community benefit as it will aim to avoid power cuts and also provide the opportunity to use energy in developing SMME.

This document makes no mention of future development within the proximity of the aerodrome that would place a restriction on the development of the wind farm to the north. Given the above statements and taken in conjunction with the municipal IDP (Section 7.3 below), we do not consider that the proposal would be inconsistent with the overall aims of the Draft SDF.

7.3 Beaufort West Municipality Integrated Development Plan (2007/8)

This document identified the development of a wind farm facility as one of their key performance areas / proposed interventions. Considering the proximity of the proposed Beaufort West-N1 Wind Farm to the Karoo Gateway Airstrip, the Beaufort West SDF and IDP were reviewed. Although the SDF makes no reference to the further development of the aerodrome, the IDP discusses the need to “revitalize” the airport. The reasoning behind this need includes: foreseen increases in visitors and business people to Beaufort West, the need for increased investment in human and infrastructure, the limitations of overland transport (far from harbours), the poor flight climatic conditions in George and prospects of uranium mining initiative near Beaufort West. The proposed Beaufort West-N1 Wind Farm will be assessed in terms of its potential impact on the Karoo Gateway Airstrip in its current form, however mindful of its potential redevelopment.

In addition to a project of this nature being supported through local policy and planning, the proposed Beaufort West N1 Wind Farm would contribute towards both National and Provincial targets for renewable energy and Eskom's target for IPP's, as well as assist in meeting the increasing electricity demands in South Africa and specifically in the Western Cape.

8. HISTORICAL BACKGROUND

Historical background research (Kathleen Schulz) was commissioned as a specialist input into this Heritage Impact Assessment report and focussed primarily on ownership and social history but included inputs from other relevant primary sources obtained in the Cape Town Archives, Deeds Office and Surveyor General's Office.

8.1 Introduction

Beaufort West was established on a farm named Hooyvlakte in 1818 near the foothills of the Nuweveld Mountain range. The Gamka River ran through the farm. The town was awarded municipal status in February 1837². The Koup³ and Nieweveld were regional names given to the Karoo interior prior to the establishment of towns Graaff Reinet⁴ and Beaufort West. Land surrounding the now Beaufort West region was more frequently referred to as the Nieweveld region. By the year 1800 colonial stock farmers were well established in the Koup and Nieweveld areas as attested by deceased residents' estate papers lodged with the Dutch East India Orphan Chamber during the eighteenth and nineteenth centuries. During the latter part of the 18th century land ownership of the Koup and Nieweveld was bitterly contested between indigenous groups and colonial settlers and these border conflicts are historically significant. There is a possibility that material evidence may be still be found on or in the ground relating to this period.

Formal recorded commando attacks on nomadic tribes living in the Roggeveld and Coup began in 1770 and continued until 1799. Thereafter factional conflicts between indigenous people and colonial settlers continued to move towards the borders of the Eastern Cape. Conflict zones appear to have been on farms, areas near to the higher mountain ranges and along the wagon routes⁵.

Estate papers were found from archival sources referring to occupation of the Nieweveld region from as early as 1760⁶. Documents included inventories of goods owned by the deceased at the time of death and usually included the name of the farm or farms owned. No inventories were found for the farms under investigation. The absence of documentation from this source does not eliminate the possibility of informal colonial or indigenous occupation on the farms during the eighteenth century, or before this time.

No Dutch East India loan farm agreements were found to be registered against any of the four farms in the Cape Town archive repository⁷. Loan farm agreements ceased to exist between farmers and Government in 1813 when South African British government replaced loan farm agreements with the quitrent system. The quitrent system allowed tenants to own state land after paying an annual rental for a period of twenty years.

8.2 Anglo Boer War

British army camps were established in the Beaufort West region soon after the outbreak of the Anglo-Boer war in 1899. A camp was set up on the northern aspect of the dam site in order to be near a water source. Another was positioned across the Kuils River on the

² A Dictionary of South African Place Names ; P E Raper Pub. J Ball Johannesburg. 1989.

³ Also spelt 'Coup', 'Ghaup', 'Gouph' in early written records.

⁴ Formally established in 1786.

⁵ Sources consulted:- *The Shaping of South African Society 1650 – 1840*; Edited by Richard Elphick and Hermann Gilomee, Maskew Miller 1992. : *Moodie The Recort : Reprint Balkema 1955: Kaapse Archiefstukken 1781,1782, 1783*; Kathleen Jeffreys, *Cape Times Bep. 1931. Resolutions of the Cape*;www.tanap.net. MOOC series; www.tanap.net.

⁶ Desktop archive :

⁷ Cape Town Archives: Loan Farm Indices. RLR series.

eastern side of town and a third between the Gamka River and the railway station. The fourth camp was positioned south of the town on the farm Weltevrede and housed approximately 800 soldiers. It was not established how many soldiers were stationed in Beaufort West altogether. 25 British war graves are said to be present in the Beaufort West town cemetery indicating that military contact took place in the district⁸.

Six blockhouses were erected for the duration of the war of which five were apparently demolished when the war ended in 1902. Although the position of these blockhouses is not known, it is presumed that they were positioned on the tops of hillocks and served as look-out points⁹. No evidence was found in the documentation consulted, of military contact or conflict having taken place on the farms being researched. Any number of artefacts relating to this period of conflict may be present on the ground.

It was felt necessary to spend a fair amount of time assessing the possibility of graves being present on the sites under review. While the possibility cannot be ruled out, no firm archival evidence was found confirming victims of struggle interments on the site. Similarly, no archival and/or oral history sources pertaining to possible socio-political themes relating to former use of a portion of the property by the SAPS could be identified or located.

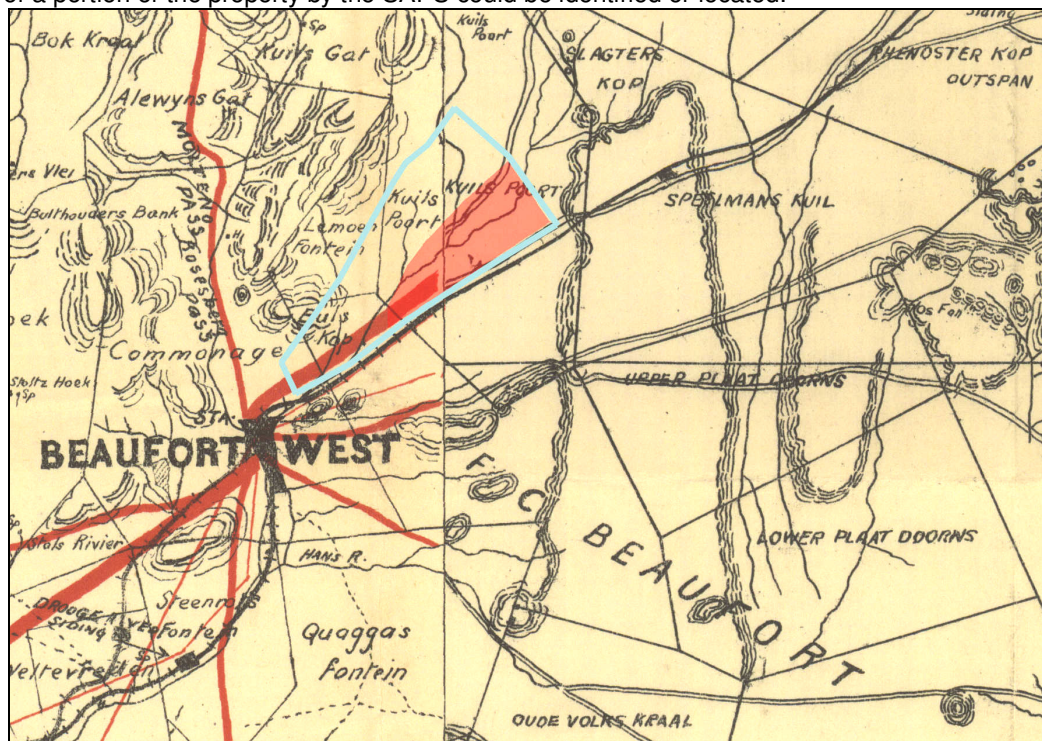


Figure 2: Extract from 1880-1890 compilation of SG Maps – subject development site boundary in blue, excluding area hatched in red (Source: CDSM)

8.3 Deeds search

The research included a Deeds Office search relating to former ownership and subdivision transactions for each of the four properties. Copies of original S.G. Diagrams for each of the four farms are attached as part of Annexure 5.

Bulskop 163/1

1894: Quitrent grant number 15/9 dated 27th March in favour of Municipality of Beaufort West 1/3 Hendrik Johannes de Jager 1/3, Arthur Shute Piers 1/3. Extent, 9364,262 morgen (8,021 hectares);

⁸ www.communitywalk.com/beaufort_west

⁹ Vivier, W.G.H. & S. 1969. Hooyvlakte: Die verhaal van Beaufort-Wes 1818-1968. Nasionale Boekhandel.

1894: Portion 1 deducted in favour of Municipality of Beaufort West. Title 4397/1894 dated 7th August.

Kuilspoort 161/9

1841: Quitrent grant number 6/18 dated 15th April in favour of Joseph Wood. Extent 12737 Morgen 250 rds (10910 hectares);

1842: J M Mynard. Title 1249/1842 dated 21st October. Amended Title in favour of W H Allhusen dated 13th October 1909. No Title number listed on Erf Register. No further information found;

2008: Municipality Beaufort West Title 17758/2008. To date this transaction has not been captured in the Surveyor Generals Office.

Lemoenfontein 158

1830: Lieutenant Baird surveyed 1988 morgen (1,703 hectares);

1837: Granted to John Baird the local magistrate in 1837¹⁰;

1851: Transferred to Matthys Godlieb de Jager, Johan Hendrik Valyntyn de Jager and Hendrik Johannes de Jager;

1906: Subdivision 2 was deducted and registered in the name of William H Allhusen. (also spelt Allusen). Extent, 1140 morgen (976 hectares). Title 8362/1906 dated 11th October;

1922: Francisius Jacobus Weitz. Title 1390/1922 dated 23rd February;

1929: James Christie. Title 6538/1929 dated 28th June;

1939: Magid Seelig. Title 4882/1939 dated 15th May;

1946: Hubert Frederick Thompson. Title 14602/1946 dated 30th August;

1969: Benjamin Mostert Title 33829/1969 dated 4th December. Further deduction leaving a remainder of 103.7697morgen (88,8821 hectares);

1981: Petrus Erasmus Oosthuizen. Title 47887/1981 dated 3rd November;

1984: Beaufort West Municipality. Title 27611/1984 dated 28th May.

Lemoenfontein South 162

1909: William H Allhusen. Beaufort West Freeholds 3.1 dated 30th September. Extent 2294 morgen 234rds (1,965 hectares)

1922: Francisius Jacobus Weitz

From 1922 onwards, transactions continued on the same Title Deeds as with Lemoen Fontein.

8.4 Conclusions

Historically the Beaufort West region is highly significant, for the following reasons:

- The region bore witness to frontier wars, a period of history that has only recently been acknowledged as pertinent;
- Beaufort West played an important role in the Anglo-Boer war as a military base and encampment;
- Access roads to the hinterland from the Cape appear to be present on the earliest diagrams of the farms being researched

9. HERITAGE RESOURCES AND ISSUES

With relation to the integrated mapping of all heritage resources and/ or occurrences noted on the site please note that:

- Integrated heritage resource mapping, including visual-spatial issues, the built environment, archaeological and palaeontological occurrences are presented through Annexure 6A whereas those in relation to Mitigated Layout (Preferred Alternative) are represented through Annexure 6B;
- Archaeological, Palaeontological and Visual aspects highlighted through the respective specialist inputs, which have been transposed into this report have been included on the above mapping where possible. Please however refer to respective specialist reports for detailed mapping and visual presentations.

¹⁰ Cape Town Deeds Office (CTDO) Beaufort West Quitrents 2.49.

- Again, note reference in this report to the overall development site (red line) and the southeast section (blue hatching), the latter of which is the subject of separate EIA and HIA applications for a Photovoltaic Park.

9.1 Built environment

Structures noted on within the boundaries of the overall development site, within the boundary of the proposed wind farm, included a cluster of buildings (refer to Figure 3) located on the remainder of the farm Lemoenfontein South 621, roughly in the centre of the overall site. These were the former farmstead, former labourer's cottages, agricultural outbuildings and associated structures as listed in the table and annotated with recent aerial photograph below.

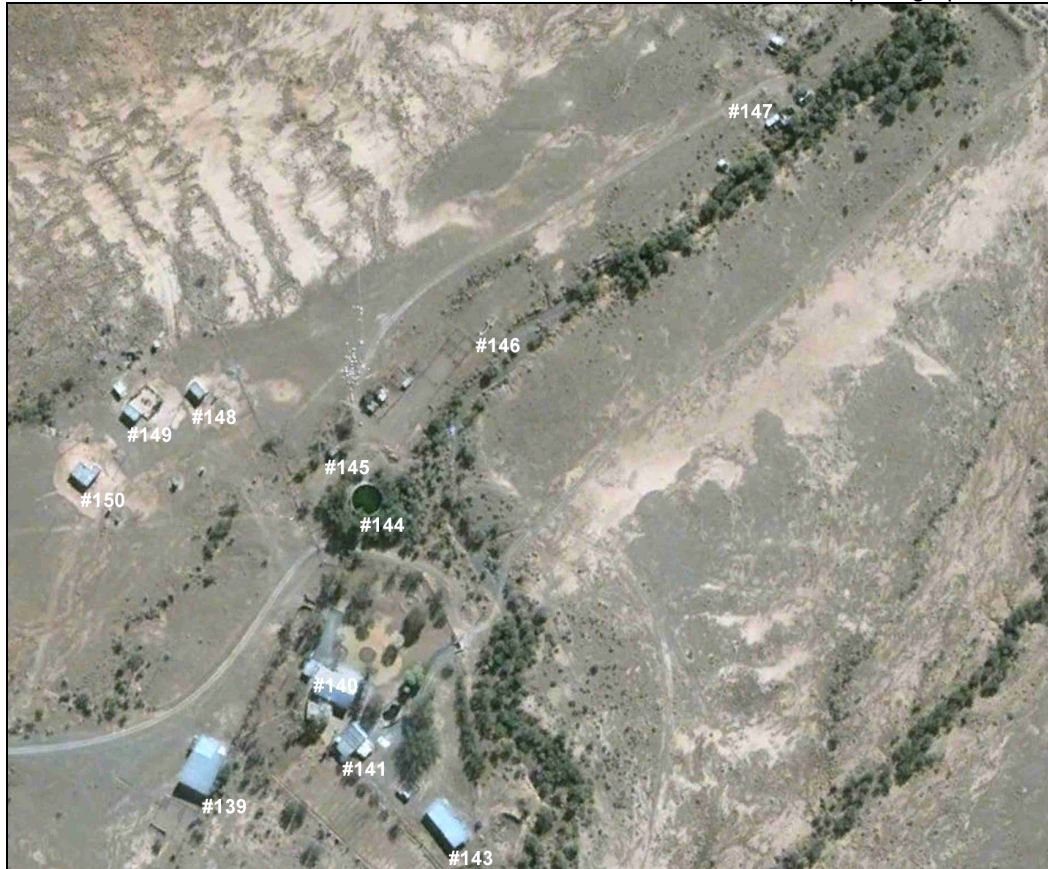


Figure 3: Recent aerial view of building cluster (former farmstead/ formerly occupied by the SAPD), located roughly in centre of overall development site (Source: GoogleEarth)

Table 1: Structures noted during fieldwork – refer aerial photograph (Figure 3)

GPS #	Coordinates	Photograph reference nr, Annex 3	Description	> 60 yrs of age
139	S32 17.947 E22 38.047	6	Agricultural outbuilding and stores	No
140	S32 17.921 E22 38.094	5	Former farmstead/ SAPD office	Yes (*)
141	S32 17.921 E22 38.094	4	Outbuilding occupied by resident	No
143	S32 17.957 E22 38.120	-	Agricultural outbuilding/ shed	No
144	S32 17.881 E22 38.097	10	Cement dam	No
145	S32 17.868 E22 38.093	12	Small pump house/ store for gas tanks	No
146	S32 17.836 E22 38.137	-	Old cattle dip	No
147	S32 17.782 E22 38.222	-	Informal structures: pig sty	No
148	S32 17.855 E22 38.053	7	Labourer's cottage	No
149	S32 17.856 E22 38.034	9	Labourer's cottage	No
150	S32 17.871 E22 38.023	8	Labourer's cottage	No

(*) Historic core likely older than 60 years

As confirmed through the deeds search (Section 6.3), this property was transferred to the Beaufort West Municipality during 1984. The farmstead and outbuildings fell into disuse when the former owner, Petrus Erasmus Oosthuizen, vacated the property. These buildings were occupied by the South African Police Service livestock theft prevention unit between February 1995 and January 2001.¹¹ Two buildings directly northeast of the farmstead (No's 148, 149) were formerly used as two labourer's cottages while a larger third structure (No. 150) had been divided internally into four smaller residential units – each with a hearth, door and windows, save for two smaller units to which no windows have been fitted. Magazine articles pasted on the internal walls of No. 148 suggest that this unit may have been occupied until c. 2003. As evident from the photographs attached (Annexure 3), all buildings are either derelict or in poor state of repair.

None of the abovementioned buildings on the site are considered to be of historical, aesthetical, architectural or socio-historic significance. We could not locate any other structures (including ruins, foundations, public memorials and/or gravesites) on the site.

While not "structures" in the strictest sense, made-made occurrences noted across the overall development site include linear accumulations of loosely-packed stone features, the locations of which are indicated on the heritage resource mapping (Annexures 6A, 6B). We note that the location of these features, which coincides with 1:50,000 mapping for the area¹², are located within and orientated perpendicular to, natural drainage lines on the site and most likely served as measure against excessive sheet wash and erosion. Although these features contribute to the overall "agricultural use/ cultural landscape theme", they are considered to be of low cultural significance.

Situated 2,5km northeast of the site boundary at an elevated location along the lower slopes of the Nuweveld Mountains and overlooking the southwest portion of the site, the Lemoenfontein Game Lodge is a historic farm residence constructed in the 1850's. Originally built by an English nobleman as a hunting retreat, the farmstead is currently used as a guesthouse and remains largely unchanged and has been well maintained (Annexure 3). While no heritage inventory has been drawn up for the Beaufort West area, the building is considered to be of high local cultural significance.

Given its elevation and southeast-facing orientation, the following visual-spatial links between the farmstead and its environs were noted (also refer to Section 9.3 of this report):

- Though partly obscured through vegetation forming part of the gardens located directly south and southeast of the farmstead, it overlooks the adjoining Karoo landscape;
- Long-distance views of Beaufort West town are possible.

The proposed preferred alternative is likely to affect views from the historic Lemoenfontein farmstead across the surrounding Karoo rural landscape with long-distance views of Beaufort West town. This would seem to be of particular relevance within the westernmost section of the proposed development site. Of the three turbine options mentioned in Sections 6.4 and 6.4 above Mitigated Layout (Preferred Alternative, being a 29 turbine layout (2.5MW turbine), is likely to have the less significant impact on said views from the historic farmstead.

The location of a new substation and related infrastructure required as part of the proposed development, which will follow existing overhead lines/ registered servitudes between the existing Droërvier and Noordeinde substations, would not affect any heritage resources.

¹¹ Mr. le Roux, Beaufort West Municipality Electro-Technical Department, 6th July 2011

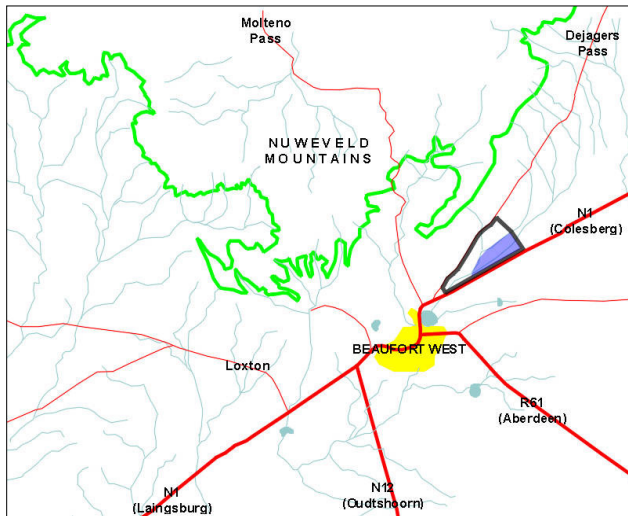
¹² 1:50,000 Topocadastral 3222BC Beaufort West, CDSM

9.2 Landscape issues

9.2.1 Regional & Natural landscape setting

The proposed development site is located along the foothills of the Nuweveld Mountains, which form a scarp reaching an elevation of well over 1,000m above mean sea level in places. These mountains overlook an arid Karoo landscape consisting mostly of open plains interspersed by series of low hills resulting in an undulating landscape character, which to the east, extends towards the Swartberg range.

The greater part of the site consists of flat pans underlain by beds of mostly mudstone, siltstone, shale and sandstone of the Beaufort Group, and overlain by alluvial deposits of silt, sand and gravel. These alluvial soils are calcareous and have variable plant nutrient status. They are also weakly structured and highly erodible. The vegetation on the properties fall into two broad vegetation types: Southern Karoo Riverine Thicket (e.g. *Acacia karoo* (Sweet Thorn trees along drainage lines) and Gamka Karoo (occurring along stone outcrops, as well as on the alluvial plains - both dominated by dwarf shrubs).¹³



The plains around the Nuweveld Mountains have clearly been eroded over time by a number of rivers and its lesser tributaries, including the Gamka River, Hans River and Kuils River but none of these are perennial and the landscape remains dry. The site is traversed by the southwest-flowing Kuilspootspruit, which has scoured this area directly south of the adjoining mountain range through a network of shallow natural drainage lines.

Figure 4: Diagram illustrating major regional landscape and man-made features, including urban areas, N1 route and other secondary routes

9.2.2 Cultural landscape context

The term “*cultural landscape*” refers to the imprint created on a natural landscape through human habitation and cultivation over an extended period of time. While the Cape has been inhabited for many ten of thousands of years (pre-colonial history) prior to Western settlement (colonial history), the nomadic lifestyles of early inhabitants are not always as evident within the landscape than the significant imprints made by humans during the last two – three hundred years.

Unlike ancient landscapes in parts of the world where intensive cultivation over periods much longer than locally have allowed natural and cultural components of the landscape to become interwoven, climatic conditions prevailing with this arid Karoo landscape mostly precluded large-scale cultivation, save within the proximity of perennial rivers or places with a reliable water source. Ultimately, definition of a cultural landscape is informed by the following elements, weighed through professional opinion, public values and statutory (legal) framework:

- Natural Landscape
- Public Memory
- Social History
- Historical Architecture
- Palaeontology
- Archaeology

¹³ Ken Coetzee, of Conservation Management Services, July 2009

Analysis of early aerial photography for the Beaufort West area (Flight Series 90 of 1945) reveals the following traditional (i.e. Pre-Modern) cultural landscape patterns on the overall development site and its environs:

- Limited cultivation is legible within the landscape, directly south of the farmstead;
- Number of linear features, orientated perpendicular to natural drainage lines being part of the Kuilspoortspruit and generally northeast of the farmstead are visible within the landscape;
- Alignment of the historic “Main Road to Interior”, depicted as green line on SG Diagram 6/1872 (Annexure 5), is highlighted as yellow line on the image and is now the northern boundary of the proposed development site (Provincial District Road DR2311 or the “De Jagers Pass Road”);
- Alignment of unnamed historic road, depicted as red line on same SG Diagram now replaced by N1 National road reserve;
- Locality of historic Lemoenfontein farmstead highlighted as yellow dot north of the site.

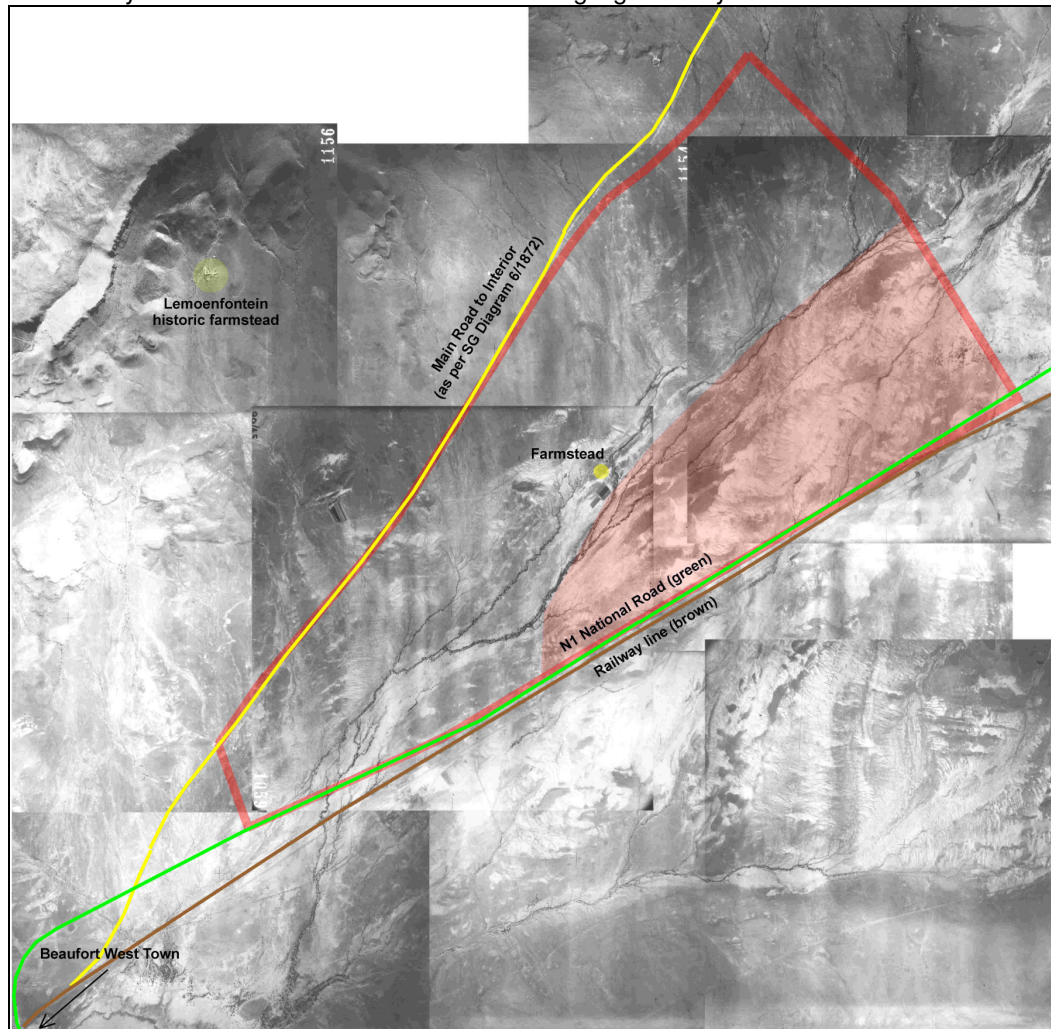


Figure 5: Collage compiled from 1945 aerial photography (not geo-referenced) highlighting proposed development site (excluding area hatched in red) indicating its farmstead as well as historic road and historic Lemoenfontein farmstead (Source: Flight Series 90 of 1945, CDSM)

Further to the above, recent aerial photography of area within proximity of the farmstead clearly highlights the following former land use patterns that remain within the current landscape:

- Former cultivated fields directly south of farmstead (remains of modern irrigation system noted here during fieldwork);
- Main farm access road leading from farmstead in eastern direction towards old “Main Road to Interior”, now northern boundary of proposed development site;
- Remains of formerly cultivated fields located on eastern side of Kuilspootspruit natural drainage line, on either sides of farm access road;
- Various narrow tracks diverge from this area.

As mentioned, the location of a new substation and related infrastructure required as part of the proposed development will follow existing overhead lines/ registered servitudes between the existing Droërivier and Noordeinde substations (refer to site development plan, Annexure 4). Given the occurrence of an established route alignment for overhead lines across the landscape and the fact that this element of the proposal would not deviate from this alignment, we are of the view that this part of the proposal would not detract from the overall landscape quality of the area.



Figure 6: Recent aerial photography highlighting former cultivation (blue hatching) within direct environs of farmstead (Source: Google Earth)

9.2.3 Urban context

The subject development site is located well outside the existing urban area of Beaufort West town within a predominantly rural landscape. The site is however directly opposite the N1 National Road from the local airport and an undeveloped (permitted) smallholding area. We are aware that the possibility of expanding the existing airfield is currently being investigated.

9.3 **Visual-Spatial issues**

Parts of this Section have been transposed from the Visual Impact Assessment (VIA) compiled by *VRM Africa*¹⁴, attached to this report as Annexure 7, and should therefore be read in conjunction with said document and its annexures for detailed analysis.

¹⁴ With permission from author

9.3.1 Comments regarding Regional landscape

- The “great” escarpment is a significant landscape feature and the mountainous area to the north is used for eco-tourism activities. In order to protect the visual resources of the area, it is recommended that a two kilometre visual buffer be maintained (from the escarpment) in which the landscape context should remain the same;
- Receptors using this area for eco-tourism activities would be sensitive to landscape changes which detract from the wilderness landscape context and sense of place and the activity nodes within this buffer zone should be identified as Key Observation Points (KOP's);
- The N1 is a significant tourist view corridor and a 750 meter visual buffer next to the highway should be maintained in the areas outside the visual context of the town landscape;
- The Karoo National Park is an important tourist destination, which has significant landscape character, which needs to be preserved. It is recommended that a two kilometre visual protection buffer be defined around the boundary to protect the visual resources of the park.

9.3.2 Site Findings

- The site is predominantly flat with the Kuilspootspruit, which flows along the length of the property being the main feature and defining the site landscape character. The other main features associated with the site are the close proximity to the N1 highway located to the south and the clear views of the escarpment and associated eco-tourism areas located to the north of the site;
- Half of the site does fall within the foreground/ middle ground of the town of Beaufort West where a more developed landscape is beginning to be recognised;
- The site is degraded and the dwellings are in a very run down state;
- The areas that are in close proximity to the N1 are strongly associated with the road sense of place from visual disturbance of the moving traffic and the associated noise;
- The vegetation on the site does add to the landscape character and the vegetation recommendations of the Biodiversity Sensitivity Analysis should be implemented; [p. 20]

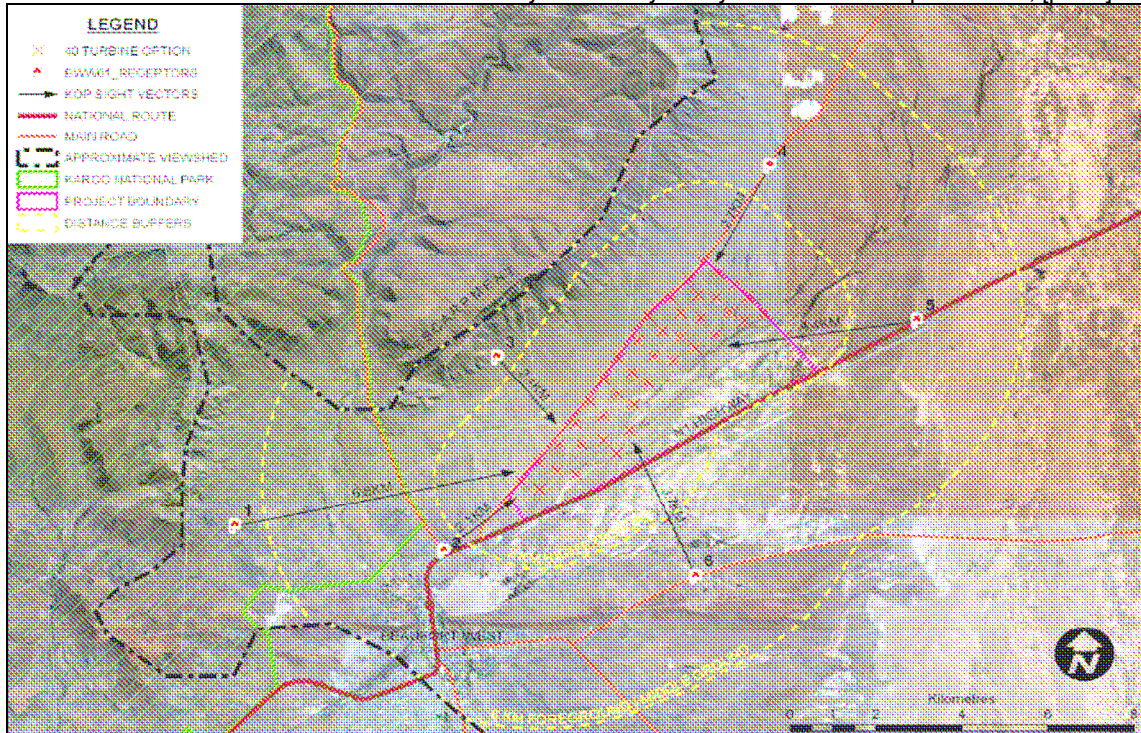


Figure 7: Exposure and Receptor Mapping for overall proposed development site and its direct environs (Source: VRM Africa, 2011)

- The land use options of the site are limited due to the lack of viable agriculture (refer to Agricultural Potential comment above). The close proximity of the site to the N1, which does detract from the landscape character.

9.3.3 Viewshed Findings

- Based on findings of the site visit and the viewshed analysis generated from the DEM, viewsheds for both options are defined as High as they cover a large extent of ground;
- The extent of the viewshed is contained to the north by the Nuweveld Mountains, which reach a height of 1260 m above sea level. There are also some elevated ridgelines to the SW of the site which restrict views to the south of Beaufort West;
- The viewshed mapping does include the northern extent of the town, however due to local screening from dwellings and trees in the vicinity of the town, views would be limited to multi-storey buildings and dwellings located on elevated terrain with clear views to the north;
- The following receptors and landscape features were identified as being included in the viewshed of the proposed component landscape modifications:
 - Receptors:
 1. N1 receptors north and south bound
 2. Lemoenfontein Guest House
 3. Some residential receptors of Beaufort West
 4. Receptors making use of the game viewing roads within the Karoo National Park
 - Significant landscapes:
 1. Great escarpment of the Nuweveld mountains to the north of the site
 2. The Karoo National Park

9.3.4 Exposure Findings (refer Figure 7)

- High exposure:
 - N1 receptors north and southbound
 - Gravel road receptors north of the property
- Moderate exposure:
 - Lemoenfontein receptors
 - Smallholding receptors to the south of the site
- Low exposure:
 - Karoo National Park receptors

9.3.5 Scenic Quality Findings

As a whole, the surrounding areas have Moderate to High scenic values:

- High (A) scenic values included the escarpment and the two kilometre buffer area as well as the waterbodies and wetlands which being an arid zone are important biodiversity areas and generally would have increased vegetation due to the proximity to water sources;
- Moderate (B) scenic values were defined for some of the bare rock areas outside the visual context of the town of Beaufort West as this land cover with the low fynbos are key elements which define the Karoo landscape;
- The areas with Low (C) scenic values are all associated with the modified landscape of the town and agriculture.

9.3.6 Landscape Sensitivity Findings

- Making use of the VRM criteria for assessing receptor sensitivity, it was found that the receptor sensitivity to the landscapes would be Moderate to High;
- The High sensitivity areas are the areas in close proximity to the escarpment. This has high levels of landscape character, which significantly add to the wilderness sense of place. These areas are more associated with eco-tourism activities where a change in land use could threaten the tourism activities taking place. For similar reasons the landscape of the KNP is also rated high;
- The majority of the other landscapes were defined as having Moderate sensitivities as they are more associated with the urban context of the town of Beaufort West. The areas

outside of the urban context are strongly associated with the Karoo cultural landscape and as such, although widespread, are more likely to be recognised as a special area.

9.3.7 VRM Sensitivity Mapping Findings

CLASS I: One landscape type was defined as Class I where the visual objective is to preserve the existing character of the landscape where the level of change to the characteristic landscape should be very low and must not attract attention.

- Karoo National Park

CLASS II: where the objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low but should not attract the attention of the casual observer

- The escarpment and Karoo National Park 2km buffer areas
- The areas outside of the Beaufort West landscape context (approx. 6km foreground/ middle ground buffer) where the Karoo landscape defines a sense of place that needs to be controlled

CLASS III: where the objective is to partially retain the existing character of the landscape where the level of change to the characteristic landscape should be moderate and may attract attention but should not dominate the view of the casual observer.

- The Beaufort West urban areas and the areas outside the town where the urban context is apparent (6 kilometre Foreground/ Middle ground)

9.3.8 Conclusions

Due to the size and scale of the proposed project, the wind turbines would be clearly visible from within the 6 kilometre Foreground/ Middle ground area. This does include some important receptors such as the N1 and the Karoo National Park. The visual impact from the Karoo National Park would be weak due to the distance from the proposed landscape modifications. The wind turbines will be seen mostly within the context of the town of Beaufort West. This is not a pristine landscape and has a pre-context of some vertical components.

The site where the project is proposed is degraded in nature and the sense of place is strongly associated with the adjacent N1 with the movement / lights of the vehicles being the focus. Hence, the sense of place of this transition zone will not be significantly altered should the project be implemented.

Cumulative effects need to be taken into consideration as further wind farming in the area will create a massing effect that has potential to detract from the significant escarpment views as seen from the N1. There are other wind farm proposals located within the 30km buffer from the site, but more importantly, there is a proposed wind farm directly adjacent to this property site to the north (*See Terra Wind Farm Background Information document in Annexure 4 of VIA report*). Of the two wind farms proposed (that are known of) to the north of Beaufort West, the northern site is more strongly associated with a wilderness landscape due to its further distance from the town of Beaufort West and its associated infrastructure.

The northern area also has more vivid views of the escarpment cliff faces, which in association with the lack of manmade modifications create an impressive vista. Of the two, the southern site (considered as part of this assessment) has lower visual resources and will probably create less intrusion. This issue needs to be addressed at a higher level where all prospective wind farms will be taken into consideration. This is to ensure that there is a more comprehensive understanding of the cumulative impacts of the wind farms on scenic related tourist resources of the area. In order to facilitate this process, this study emphasised visualisation of the turbines to provide information for the relevant authorities to make an informed decision.

This study assessed three alternative layout options, namely the 32 turbine layout, the 40 turbine layout and 29 turbine Mitigated Layout, which is the Preferred Alternative. The latter layout has incorporated into the design the recommended 750 metre visual buffer from the

N1. The visual impacts for the Mitigated Layout will very similar to that of the 32 wind turbine layout and as such our initial recommendations on the suitability of the landscape modification remain the same.

9.4 **Archaeology**

A copy of the Archaeological Impact Assessment (AIA), compiled by CHARM (Dr. Peter Nilsson), is attached as Annexure 8, the findings of which are summarised below¹⁵. Kindly refer to specialist's full report and recommendations.

9.4.1 Extract from Executive Summary

"A Scoping Archaeological Impact Assessment (SAIA) was conducted for the above-named project in May 2010 (Nilssen 2010). Results of the scoping study provided information regarding potential sites for the placement of wind turbines, associated services and facilities, as well as the way forward concerning the Archaeological Impact Assessment (AIA). Due to a 2.5km buffer zone centred on the Beaufort West airstrip, the development layouts were restricted to the northern portion of the larger study area.

Additionally, based on the findings of various specialist scoping or baseline studies, the developer formulated two alternative layout plans for the above-named project that would have the least possible negative impact on natural and anthropogenic resources. Mostly, wind turbines, roads and associated services were positioned in areas already surveyed during the SAIA that were found to be less sensitive and/or that lack archaeological materials. Archaeological occurrences considered to be of medium to high significance were avoided.

Based on the two layout plans for the proposed wind farm, the fieldwork for the AIA focused on areas in the northern portion of the larger study area where proposed development activities lie outside areas surveyed during the SAIA. Fieldwork for the SAIA and AIA was conducted in May 2010 and May 2011 respectively. Findings of the SAIA and AIA are combined in this report to avoid frequent cross-referencing and so that the archaeological component of the Heritage Impact Assessment (HIA) is available in one document.

The study area is a relatively flat part of a large drainage basin and includes several small tributaries of the Kuilspoortspruit drainage system that run to the SW. Apart from Acacia thickets and dense grasses in and immediately adjacent to the watercourses, the landscape is open with typically sparse, low Karoo vegetation providing excellent archaeological visibility across most of the study area. Evidence for modern human activities in the form of structures, vehicle tracks and minor earth moving activities were noted. Evidence for burrowing by large and smaller mammals was also seen.

There were no restrictions to the archaeological investigation and the entire study area was accessible on foot and open to inspection and assessment. Although several structures occur in the study area, no material culture or structural remains of potential historical significance were observed. Additionally, no structures or material culture suggestive of Frontier and Anglo-Boer war activity was seen. Numerous isolated and very low density scatters of Stone Age implements were identified and mapped. Fourteen occurrences of Stone Age origin were identified and are considered to be of medium to high significance. In his Palaeontological Impact Assessment Dr. John Almond noted that subsurface archaeological materials occur in the study area.

In addition to the work reported here, the proposed site for a new substation was inspected. The latter locality contained no archaeological or heritage related resources.

Provided that either of the two proposed layout plans, as well as the mitigated layout plan for activities associated with the Beaufort West N1 Wind Energy Farm are adhered to, and that

¹⁵ Nilssen, P (2011). Archaeological Impact Assessment – Proposed Beaufort West N1 Wind Energy Farm. Unpublished report, Mossel Bay

the below recommendations are implemented, there are no further objections to the proposed development.”

Table 2 Summary of potential impact on and loss of archaeological resources

	With Mitigation	Without Mitigation
Extent	Local	Local
Duration	Permanent	Permanent
Intensity	Unknown	High
Probability	Medium	High
Significance	Medium to High	Medium to High
Status	Unknown	Medium to High
Confidence	Medium	High

Table 3 below represents coordinate and descriptive data for archaeological occurrences considered to be of medium to high significance (see Figures 5 & 8 and Plates 3 through 9 in AIA).

Name	Description snd=sound	img=image	Datum: WGS 84 Lat/Lon dec.degrees	Datum: WGS 84 SA National	Grid:
2	ESA-MSA-ESA img7297-300 snd7300		S32.30492 E22.63969	23 Y0033934	X3575722
3	ESA-MSA-LSA		S32.30552 E22.63997	23 Y0033907	X3575788
9	ESA-MSA img7310-4 snd7314		S32.30894 E22.63409	23 Y0034460	X3576170
027a	LSA stone scatter img2704-12 snd2712		S32.30313 E22.62986	23 Y0034860	X3575526
61	MSA-LSA img7353-61 snd7361		S32.28245 E22.63165	23 Y0034700	X3573232
74	ESA ?MSA img7369-73 snd7373		S32.30047 E22.64524	23 Y0033413	X3575226
109	LSA one MSA img7387-96 snd7396		S32.29356 E22.64487	23 Y0033450	X3574460
164	MSA some ESA img7406-20 snd7416		S32.28095 E22.64476	23 Y0033465	X3573062
190	MSA-ESA few LSA img7421-32 snd7432		S32.27638 E22.65661	23 Y0032350	X3572552
243	LSA img7444-54 snd7454		S32.28988 E22.67518	23 Y0030596	X3574043
249	LSA - like 243		S32.28991 E22.66876	23 Y0031201	X3574048
250	LSA - like 243 img7458-9 snd7459		S32.29014 E22.66833	23 Y0031241	X3574074
251	LSA - like 243 img7458-9 snd7459		S32.28995 E22.66822	23 Y0031252	X3574053
313	LSA - like 243		S32.29037 E22.66198	23 Y0031840	X3574102

9.4.2 Recommendations (Section 4 of AIA report):

- “As far as possible, archaeological occurrences considered to be of medium to high significance should be protected and conserved in perpetuity. To this end, the boundaries of 14 archaeological occurrences should be mapped, and measures for their protection, conservation and management should be detailed in an Archaeological Conservation Management Plan (ACMP) for the proposed project. At a minimum, these sites should be fenced with materials that blend into the surrounding environment;
- Where the above is not possible, at least two archaeological occurrences should be sampled via piece-plotting with a Total Station, and mapped specimens should be collected, analysed and curated;
- Two to four archaeological sites and a collection of artefacts in secondary context should be incorporated into the project for education and tourism purposes. This will add value and provide further attraction to the proposed activity. The specifics of this should be developed in an ACMP;
- Surveyed areas (walk tracks) – with the exception of the 14 significant Stone Age occurrences – are suitable for the proposed activities provided that archaeological monitoring is implemented, Archaeological monitoring should be conducted by a professional archaeologist during earthmoving activities so as to avoid or minimize negative impact on potential subsurface archaeological resources, and;
- The proposed site for a new substation is considered to be of no cultural significance and therefore no further heritage related studies are required.”

9.4.3 Required mitigation measures:

- “In the event that vegetation clearing and earthmoving activities expose archaeological materials, such activities must stop and Heritage Western Cape must be notified immediately;
- If archaeological materials are exposed during vegetation clearing and/or earth moving activities, then they must be dealt with in accordance with the National Heritage Resources Act (No. 25 of 1999) and at the expense of the developer;

- In the event of exposing human remains during construction, the matter will fall into the domain of Heritage Western Cape (Ms. Jenna Lavin) or the South African Heritage Resources Agency (Ms Mary Leslie) and will require a professional archaeologist to undertake mitigation if needed.”

9.5 **Palaeontology**

A copy of the Desktop Palaeontological Impact Assessment (PIA), compiled by Dr. John Almond, is attached as Annexure 9, the findings of which are summarised below. Kindly refer to specialist’s full report and recommendations.

9.5.1 Palaeontological occurrences noted:

- Finely-rippled distal crevasse splay sandstone exposed within mudrocks at the margin of a shallow dam or borrow pit, Lemoenfontein 158 (Loc. 376)
- Fine-grained sandstone palaeosurface showing open network of narrow, straight to gently-curving invertebrate burrows preserved in positive relief. These burrows were probably generated by small invertebrates feeding beneath microbial mats (Loc. 374);
- Sandstone cast of a small horizontal burrow with longitudinal ridges on the upper surface, embedded in mudrocks (Scale = 15cm). Note also small calcrete nodules here (Loc. 374);
- Sole surface of Hoedemaker Member sandstone showing poorly-preserved horizontal burrows (possibly *Scoyenia* arthropod burrows) (Loc. 367)
- Limited exposure of thin-bedded, current ripple cross-laminated sandstones of the Hoedemaker Member just east of Lemoenfontein Suid farmstead (Loc. 373);
- Extensive palaeosol horizon within the Hoedemaker Member dominated by ferruginous calcrete nodules (Loc. 369). In the Beaufort Group pedocrete horizons are often associated with fossilized tetrapods;
- Prominent-weathering low cliff of calcretized “high level gravels” capping the pediment shown in the previous figure (Loc. 366).

Table 4: Coordinate, descriptive data for palaeontological occurrences noted on overall development site

Locality Number	South	East
367	32° 15' 26.5"	22° 42' 25.3"
369	32° 15' 07.9"	22° 42' 42.9"
373	32° 17' 53.7"	22° 38' 08.5"
374	32° 17' 24.7"	22° 37' 32.8"
376	32° 18' 11.8"	22° 37' 03.8"
380	32° 16' 08.9"	22° 39' 53.9"

9.5.2 Recommendations for Mitigation and Management:

“Among the very few palaeontological sites recorded during the field assessment of the development area, only the partially exposed, rippled sandstone palaeosurface on Lemoenfontein 158 (Loc. 376) is regarded as of conservation significance. *A 50-meter buffer zone around this site has already been incorporated into both alternative plans for the wind farm.* Any further areas of thin-bedded, well-rippled sandstones, such as illustrated in this report (Figs. 14-15 in PIA report, Annexure 9), that are newly exposed during development should be protected from damage since they may well preserve valuable trace fossil data (e.g. vertebrate trackways). *No buffer zone is necessary for the five other fossil sites recorded during the field study, which are all of low heritage significance.*

Because the overall significance of the proposed wind energy project is assessed as low in palaeontological heritage terms, no further specialist mitigation of fossil heritage is regarded as necessary here.

The ECO for the project should be alerted to the possibility and scientific significance of new fossil finds during the construction phase of the development. They should familiarise themselves with the sort of fossils involved through museum displays (e.g. the Fossil Trail at the Karoo National Park, Beaufort West) and accessible literature on South African fossils such as MacRae (1999).

Should substantial fossil remains, such as vertebrate bones, teeth, petrified wood or animal trackways, be found, disturbed or exposed within the project area during construction, the responsible ECO should safeguard these – in situ, if feasible – and alert SAHRA as soon as possible so that appropriate mitigation can be undertaken by a professional palaeontologist at the developer's expense. These recommendations should be incorporated into the EMP for the Beaufort West wind energy facility project.

Where professional mitigation is triggered by significant new fossil finds during construction, this would involve the recording and judicious sampling of fossil material concerned as well as the recording of pertinent geological data (e.g. sedimentological, stratigraphic and taphonomic information). Note that the palaeontologist involved would be required beforehand to obtain a palaeontological collection permit from SAHRA and to arrange a suitable repository for any fossils collected (e.g. Bernard Price Institute for Palaeontological Research at Wits University, Johannesburg or Iziko: South African Museums, Cape Town)".

9.5.3 Conclusions

The overall palaeontological sensitivity of the Beaufort Group sediments is *High* (Almond *et al.* 2008). These continental sediments have yielded one of the richest fossil records of land-dwelling plants and animals of Permo-Triassic age anywhere in the world. However, due to the extensive drift cover, potentially fossiliferous Beaufort Group bedrocks are at present hardly exposed at all within the study area. Rare exceptions are occasional shallow dams and borrow pits where low diversity trace fossil assemblages are recorded in association with sandstone palaeosurfaces and overbank mudrocks. Comparable trace-rich rippled palaeosurfaces (refer Section 9.5.1 above) have already been recorded in the Beaufort West area by Smith (1993) and Stear (1978) and they are certainly worthy of protection and preservation because of their sedimentological and palaeontological interest.

Deep bedrock excavations are unlikely to be required for wind turbines, electricity powerlines, a possible new electrical substation or other ancillary developments. Given the extensive and moderately thick alluvial cover, it is unlikely that the proposed alternative energy / wind farm development will pose a serious risk to local fossil heritage. The overall impact significance of the pre-construction, construction and operational phases of the wind farm project is considered to be *LOW*. Specialist palaeontological mitigation for this project is therefore not considered necessary.

Of the two alternative turbine layout proposals for the proposed wind farm, neither is preferable to the other on palaeontological heritage grounds and there are no fatal flaws involved.

Recommendations and mitigation measures set out in Section 9.5.2 above, and as discussed in detail in the PIA report (Annexure 9), must be adhered to.

10. HERITAGE INFORMANTS AND INDICATORS

According to the requirements of Section 38(3) of the NHRA it is crucial that the land use planning and EIA processes be informed by and incorporate heritage informants and indicators as done through the mapping and grading of relevant heritage resources in Section 9 of this report. It is the purpose of this Section to define heritage informants and indicators pertaining to the way in which heritage resources must be incorporated into the overall design of the proposed development and should therefore be read in conjunction with Annexure 6A (Integrated heritage resource mapping). Kindly also note integrated heritage resource

mapping relating to the Mitigated Layout (Preferred Alternative) as represented through Annexure 6B.

10.1 **Built environment issues**

- With the exception of the historic core of the original farmhouse on the site, no structures older than 60 years were noted on the site. The old farmhouse relates to former agricultural use of a relatively small portion of the overall proposed development site. Archival and other reference sources does not highlight and heritage-related themes in relation to any remaining structures, whether older than 60 years or not and is therefore considered to be of low local cultural significance only;
- Some of the turbines proposed on the westernmost portion of the proposed development site would affect existing views from the historic Lemoenfontein farmstead (an off-site resource), which is considered to be of moderate to high local cultural significance, across the adjoining Karoo landscape.

10.2 **Landscape issues**

- From a regional and natural landscape perspective, the escarpment partly formed by the Nuweveld Mountains are considered to be of high significance and a 2km buffer within which no development/ landscape modification should be permitted, is therefore recommended;
- The N1 is a significant tourist view corridor and a 750 meter visual buffer next to the highway should be maintained in the areas outside the visual context of the town landscape;
- The Karoo National Park represents a Karoo wilderness landscape character, which is of high significance and may not be impacted upon. The VIA recommends that two kilometre visual protection buffer be defined around the Park boundaries so as to protect the visual resources of the Park;
- Cultivated fields (now laying fallow) directly south of the farmstead as well as linear accumulations of stones within drainage lines are representative of former agricultural land use that occurred on the site (cultural landscape characteristics) and is considered to be of moderate to low local cultural significance;

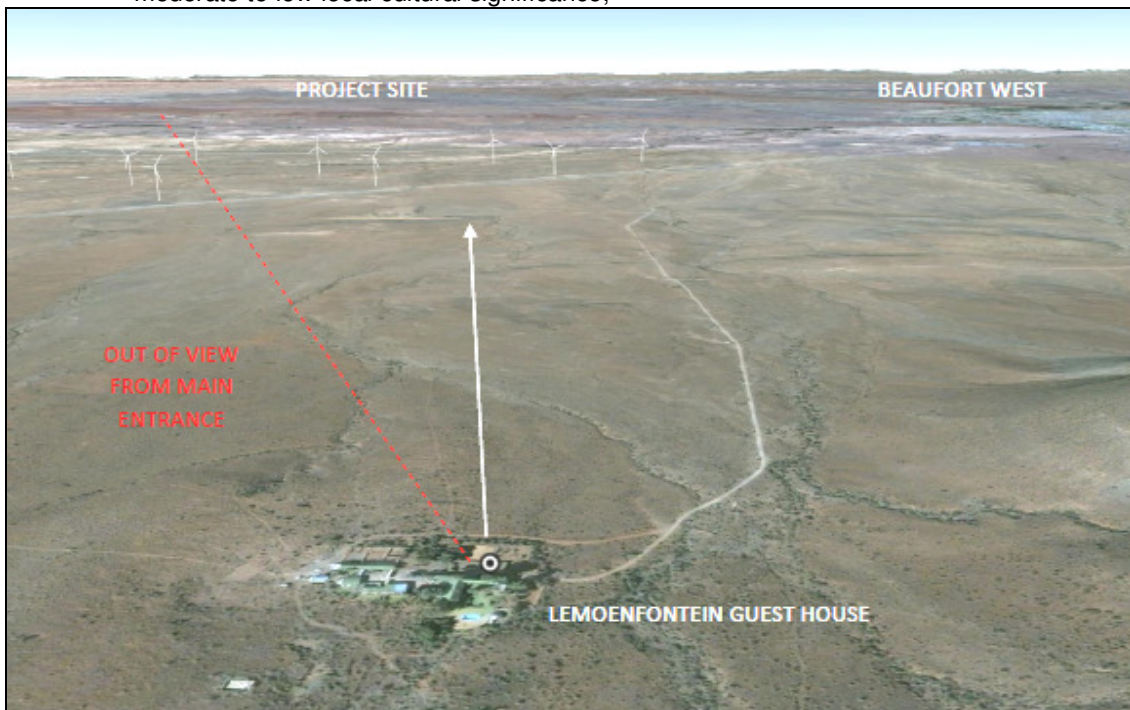


Figure 8: Perspective rendering of views from Lemoenfontein historic farmstead in context with Beaufort West town (Source: Plate 23, VIA, VRM Africa, 2011)

- With relation to the installation of a transmission power line linking the proposed control building to the new substation (beside the existing Noordeinde substation, over the N1), then to the existing Beaufort substation and finally the existing Droërivier substation (beside the N12), it is noted that this power line (c. 14.9km), will run within an existing servitude alongside an existing overhead power line. Therefore, given this context, we do not consider this component of the proposal to have a significant impact on the already-transformed landscape character of the area.

10.3 **Visual-spatial issues**

- Recommendations pertaining to visual buffer areas identified in Section 10.2 above should be implemented;
- Southwest-facing views along approximately 7,5km stretch of the De Jagers Pass Road across the site/ current Karoo landscape would be altered;
- As mentioned in Section 10.1 above, some of the turbines proposed on the westernmost portion of the proposed development site would affect existing views from the historic Lemoenfontein farmstead (an off-site resource) across the adjoining Karoo landscape (Figure 8, above). The farmstead is considered to be of moderate to high historical, architectural and aesthetic local cultural significance.

10.4 **Archaeology**

All recommendations contained in AIA, as summarised in Sections 9.4.2 and 9.4.3 of this HIA report shall be adhered to, subject to any amendments to the significance assessment and heritage indicators that may be required by the findings of recommended mitigation during archaeological monitoring.

10.5 **Palaeontology**

All recommendations contained in PIA, as summarised in Sections 9.5.2 and 9.5.3 of this HIA shall be adhered to, subject to any amendments to the significance assessment and heritage indicators that may arise from findings or recommendations arising through archaeological monitoring during construction/ excavations.

11. **PUBLIC PARTICIPATION**

Due to the fact that there are no known local conservation bodies (registered as such with Heritage Western Cape in terms of Section 25 of the National Heritage Resources Act, 1999 (Act 25 of 1999)) in the Beaufort West area, the Public Participation Process (PPP) for this HIA was coordinated with the PPP facilitated by *Cape Environmental Assessment Practitioners (Pty) Ltd* as part of the EIA Process in terms of the National Environmental Management Act, 1998 (Act 107 of 1998).

The NID submission and draft versions of various specialist reports (archival research, visual, archaeology and palaeontology) were made available as part of the Draft Scoping Report (DSR), circulated to Interested and Affected Parties (I&AP's) and stakeholders during March 2011. The DSR was placed at the Beaufort West Library, Mimosa/Rustdene Library and the Beaufort West Municipality – Electrical Department, and Advertisements were placed in the local (*The Courier*) and a provincial (*Die Burger*) newspapers, on Friday 11 March 2011 to invite public comment on the DSR (from 14 March 2010). The DSR was also made available on the *Cape EAPrac* website: www.cape-eaprac.co.za/project.htm. No heritage-related comments and/or concerns were made during this phase of the PPP.

The author met with Ms. Ingrid Koster (co-owner of the adjoining Lemoenfontein Game Lodge) on 23rd June 2011 to discuss the proposal and identify and possible heritage-related concerns. The I&AP explained that they, as adjoining landowners, do not have objections against the proposal as they are involved in another proposal ("Terra Firma project") for a substantial renewable energy facility directly north of the subject site.

Subsequently, the Draft Heritage Impact Assessment, including the final versions of all specialist reports (archival research, visual, archaeology and palaeontology) to the HIA was referred to all I&AP's and Stakeholders on 26th September 2011 as part of the Draft Environmental Impact report. Proof of postage of this report to I&AP's, Stakeholders and the Department of Environmental Affairs & Development Planning (PAWC) is attached as Annexure 11. No heritage-related comments and/or concerns have yet been made during this phase of the PPP.

Although a 30 day commenting period would end on c. 28th October 2011, we note that no heritage-related concerns or issues were identified or highlighted by any I&AP's or Stakeholders thus far. Having regard to the outcome of the Assessment of Impacts, discussed in detail in Section 12 below, we therefore kindly request that this application now be adjudicated and that Heritage Western Cape's Final Comments be forwarded to the National Department of Environmental Affairs at your earliest convenience.

12. ASSESSMENT OF IMPACTS

This Section serves to assess conformity of the proposal (Preferred Alternative) attached as Annexure 4 to the key heritage design informants and indicators identified in Sections 9 and 10 above. Where possible, each indicator is assessed individually for ease of reference. An comparative analysis of the perceived significance of impacts on heritage resources is attached as Annexure 10 to this report.

12.1 *Indicators relating to Built environment issues*

a.) INDICATOR BE-1: *Historic core of farmstead possibly older than 60 years. Four labourer's cottages, outbuildings (all not older than 60 years) remain.*

Assessment:

While remaining buildings are associated with former agricultural use of portions of the site, we could not identify any socio-historic significance to these – either from archival sources, oral history or fieldwork. Although some of the buildings are inhabited, they are clearly in poor state of repair and furthermore are not considered to be of any aesthetical, architectural or historic cultural significance.

Taken in conjunction with its limited cultural significance and current poor/ dilapidated condition, it is considered that the proposed development would not have a significant impact on the above (potential) heritage resource (No impact).

b.) INDICATOR BE-2: *Turbines proposed on westernmost portion of site would alter views from historic Lemoenfontein farmstead.*

Assessment:

The historic farmstead's elevated location results in extended views across the adjoining Karoo landscape with the town of Beaufort West in the Middle/ Background to the south (right) and westernmost portion of the subject site in the Middle ground to the southeast (left). Note that this southeast view is somewhat obscured by vegetation in a terraced garden directly in front of the farmstead. South-facing views from the farmstead currently includes the highly-trafficked N1 National Road as well as the De Jagers Pass road, though the latter to a lesser degree due to infrequent traffic volumes.

The westernmost portion of all proposed Turbine layout options would therefore alter existing (Middle ground) views from the historic farmstead. However, these views are likely to be viewed in context of existing urban development of the town of Beaufort West (Background). Furthermore we note that it would be the narrow section of the wedged-shape proposed development site that would be visible from the farmstead (as opposed to wider eastern section, the visual impact of which would have been more severe). Given the above, we are of the view that the 29 Turbine layout option should be considered instead of the 32 or 40 Turbine layout options. Also refer to significance ratings of anticipated impacts as described in Annexure 10 pertaining this aspect.

Having regard to the above; while we acknowledge that the proposal is likely to alter existing (Middle Ground) views from the historic farmstead, we recommend that the 29 Turbine layout option be considered (Mitigation measure/ Recommendation).

12.2 Indicators relating to Landscape issues

a.) INDICATOR L-1: *Some traditional (i.e. Pre-Modern) cultural landscape patterns, associated with agriculture/ limited cultivation was noted on the proposed development site.*

Assessment:

Traditional landscape patterns identified on the subject site as part of this HIA include the remaining farmstead, outbuildings, labourer's cottages, dam, animal enclosures, former cultivated fields now laying fallow, access tracks and linear loosely-packed stone features within natural drainage lines, all of which relates to former agricultural use on the site. From the limited extent of cultivated fields, it is probably that agricultural use mainly included livestock farming/ grazing, which may account to the fact that significant portions of the site are denuded of vegetation (i.e. partly due to overgrazing). While we consider these landscape patterns to be of low cultural significance, we have no objection should the proposal impact on these features.

The proposal would not have an impact on a significant cultural landscape (Neutral impact).

b.) INDICATOR L-2: *From a regional/ natural landscape context, the escarpment partly defined through the Nuweveld Mountains is considered to be of high significance.*

Assessment:

This escarpment and its slopes are important from scenic and tourism perspectives and form a backdrop when viewed from surrounding areas. No development/ landscape modification should therefore be permitted within the direct proximity of the escarpment.

It is therefore recommended that a two kilometre visual buffer, measured from the escarpment edge be defined, within which no development/ landscape modification may occur (Mitigatory measure).

b.) INDICATOR L-3: *Old "Main Road into Interior"/ De Jagers Pass road defines northwest site boundary.*

Assessment:

The proposed layout options would all inevitably alter current southwest-facing Karoo landscape views along an approximately 7,5km stretch of this road bounding onto the development site. This is partly due to the fact that Turbines would have to be set back from the highly-trafficked N1 National Road due to implementation of a visual buffer (see Indicator VS-1) and as a result, be located within closer proximity to the said northern site boundary/ road alignment. Existing north-facing views along this stretch of the road would however not be affected.

The road in question is significant in the sense that it historically served as route for travellers between the town of Beaufort West and the sparsely populated direct interior north of the town. Note however that another historic route, which had been replaced by the N1 National Road alignment served as primary route to northern parts of the country, which is considered of more significance. Given this overall context, we are of the view that this impact would therefore be acceptable and that implementation of a further visual buffer along this boundary would not be warranted.

The proposal would alter existing southwest-facing views along a c. 7,5km stretch of this gravel road (Negative impact), which given the overall context and other more significant development restrictions, are considered acceptable.

12.3 Indicators relating to Visual – Spatial issues

a.) INDICATOR VS-1: *Existing views along N1 National Road, a tourism route, are significant.*

Assessment:

While proposed layout options would alter existing (Foreground) north-facing views from the N1, we note that the proposed wind farm site excludes the eastern portion of the overall proposed development site (which is subject of separate EIA and HIA applications). This setback is due to requirements set by the Civil Aviation Authority given its proximity to the Beaufort West airfield as well as some environmental considerations.

The site is furthermore degraded in nature and its sense of place is strongly associated with the adjacent N1 with the movement / lights of the vehicles being the focus. Hence, the sense of place of this transition zone will not be significantly altered should the project be implemented. We note that the wedged-shape nature of the site result in a degree of "fit" within the context of the escarpment and N1

National Road alignment but support the VIA recommendation pertaining to a provision of a 750m wide visual buffer along the southeast/ N1 site boundary.

The Mitigated Layout (Preferred Alternative) makes provision that a 750m visual buffer be implemented along the N1 National Road alignment within which no development/ landscape modification may occur. This is considered acceptable. (Mitigatory Measure).

b.) INDICATOR VS-2: The Karoo National Park (KNP) is an important tourist destination, which has significant landscape character, which needs to be preserved.

Assessment:

Findings of the VIA include that potential exposure of the proposal as viewed from the KNP are low firstly due to the separation distance between the two areas and secondly as east-facing views from the Park (including game viewing roads open to public) is likely to be viewed in relation to existing urban development, which includes the town of Beaufort West and associated existing development such as industrial infrastructure (Noordeinde Sub-station), local airfield and existing agricultural smallholdings.

It is recommended that a two kilometre buffer be defined around the boundary to protect the visual resources of the Karoo National Park (Mitigatory measure).

c.) INDICATOR VS-3: Turbines proposed on westernmost portion of site would alter views from historic Lemoenfontein farmstead.

Assessment:

See Indicator BE-2 above.

12.4 Indicators relating to Archaeology

All recommendations contained in AIA, as summarised in Sections 9.4.2 and 9.4.3 of this HIA report shall be adhered to, subject to any amendments to the significance assessment and heritage indicators that may be required by the findings of recommended mitigation during archaeological monitoring.

12.5 Indicators relating to Palaeontology

All recommendations and mitigatory measures contained in PIA shall be adhered to, subject to any amendments to the significance assessment and heritage indicators that may arise from findings or recommendations arising through archaeological monitoring during construction/ excavations.

12.6 Summary of Mitigation measures/ Recommended conditions of approval

As illustrated through the perceived significance of potential impacts on heritage resources before and after mitigation (Annexure 10), we are of the view that the 32 Turbine layout, with some modifications as expressed through the conditions set out in the table below, would be acceptable.

<i>Indicator Ref</i>	<i>Recommended HWC Conditions of Approval</i>
BE-2	That the 29 Turbine layout (Mitigated layout/ Preferred Alternative) be considered.
L-2	Recommend that two kilometre visual buffer, measured from the escarpment edge be defined, within which no development/ landscape modification may occur.
VS-1	That the 29 Turbine layout (Mitigated layout/ Preferred Alternative), recommending that a 750m visual buffer be implemented along the N1 National Road alignment within which no development/ landscape modification may occur, be considered.
VS-2	Recommend that a two kilometre buffer be defined around the boundary to protect the visual resources of the Karoo National Park.
Archaeology	Refer Sections 9.4 and 12.4 of this report
Palaeontology	Refer Sections 9.5 and 12.5 of this report

13. RECOMMENDATIONS

Having regard to the above assessment, it is recommended:

- 13.1 That this report fulfils the requirements of a Heritage Impact Assessment (HIA);
- 13.2 That the recommendations set out in Sections 10 and 12 of this HIA be incorporated into the proposed development and that the National Department of Environmental Affairs (DEA) be informed accordingly.

PERCEPTION Heritage Planning
5th October 2011



SE DE KOCK

B-Tech(TRP) MIPi TRP(IRL) EIA Mgmt (IRL) APHP