

This chapter discusses the potential impacts on archaeology, palaeontology and heritage resources resulting from the establishment of the Wind Farm at the Roggeveld site including physical effects on sites and features of cultural heritage interest and broader landscape and visual effects on the site setting. ERM appointed ACO Associates to undertake the required specialist study of the archaeology, palaeontology and cultural heritage of the proposed development, which is appended to this report as *Annex J*. The potential impacts are assessed and mitigation measures to reduce the impacts are outlined below.

The study area is relatively austere in terms of both colonial and pre-colonial heritage. There are several distinguishable cultural landscapes that have been the focus of early colonial period settlement, in all likelihood by *trekboere*. These consist of collections of ruined stone and mud buildings, threshing floors and kraals located exclusively in the valley areas between the high longitudinal ridges that characterise the study area. There is a number of existing farm houses that contain 19<sup>th</sup> century fabric, however very few of these have anything more than moderate heritage significance. Parts of the study area enjoy very high aesthetic qualities hence the significance of the study area lies mainly with its undeveloped wilderness qualities. Pre-colonial or stone age heritage and archaeology is extremely scarce in the areas that were investigated.

The proposed Wind Farm is likely to have a negative effect on cultural heritage resources during the construction and operational phases of the development as summarised in *Table 13.1*. All the geological horizons in the study area are potentially fossiliferous, possible fossil findings during the construction phase may cause a positive impact and contribution to the body of scientific knowledge, if mitigation measures are applied correctly. Potential impacts include direct and indirect effects. The direct effects would be physical effects on sites and features of cultural heritage interest within the site and would be associated with the construction phase. Indirect effects incorporate visual effects on the settings of sites in the broader landscape and would continue during the operational phase of the facility.

**Table 13.1** *Impact characteristics: Impacts on Archaeology, Palaeontology and Cultural Heritage*

Summary	Construction	Operation
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Summary	Construction	Operation
Project Aspect/ activity	(i) Disturbance of or damage to archaeological, cultural heritage sites or palaeontology resources associated with site preparation and construction activities.	(i) Visual or sense of place impact on cultural heritage features.
Impact Type	Direct	Indirect
Receptors Affected	(i) Archaeological and cultural heritage interests within site clearance areas.  (ii) On-site fossils.	(i) Historic structures or features and the heritage value associated with the scenic value and farming history of the area.

### 13.1 *DISTURBANCE OR DAMAGE TO ARCHAEOLOGY, PALAEOLOGY AND CULTURAL HERITAGE RESOURCES*

#### 13.1.1 *Impact Description and Assessment*

##### *Construction Phase Impacts*

The excavation of the turbine and substation foundations, road construction and installation of cables has the potential to destroy or damage archaeological and palaeontological resources. If appropriate mitigation is implemented, potentially positive impacts may be caused with new palaeontological discoveries.

##### **Palaeontology**

All the geological horizons in the Study Area are potentially fossiliferous. Consequently, all excavations, whether for road cuttings or foundations, may reveal fresh fossiliferous rock. There is a low but significant likelihood of important new discoveries in the Abrahamskraal Formation.

The proposed activity is likely to impact fossil bearing rock. Without mitigation this would constitute a negative impact, however if mitigation is carried out a positive impact of potentially moderate to major significance could result, particularly if rare specimens are encountered and described thus making a contribution to the body of locally scientific information. Without mitigation, irreversible losses could result. Considering the above, there is a definite likelihood rating given for potential paleontological resources impacts.

Paleontological material may be impacted by the proposed construction of underground electrical lines connecting the turbines, and there is a possibility that human remains and lost graves may be encountered.

At any point where access roads will require cuttings into rock, impacts could be expected. Although some tracks would require upgrading, use of existing tracks is preferred as this would go some way to minimizing a variety of potential heritage related impacts.

The extent of the potential impact on paleontological resources would be considered a local impact as similar paleontological resources may not occur within a 20 km radius of the site. Any potential negative impacts would be permanent, as these resources are non-renewable, and the loss of paleontological resources is predicted to be of medium-high intensity. Taking into account the local extent, permanent nature and medium-high intensity of palaeontological impacts, the magnitude of the potential impact is regarded as medium.

Given the medium intensity and fact that palaeontological impacts are likely to occur, the overall significance of potential direct negative impacts on paleontological resources is considered moderate-high. Note that if proper palaeontological surveys are conducted during excavation the potential finding of palaeontological resources for furthering scientific knowledge could have a positive impact

### **Box 13.1**

#### ***Construction Impact: Destruction or Disturbance of Palaeontology***

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**Nature:** Construction activities would result in a **negative direct** impact on paleontological interests on the Wind Farm site. However, with mitigation the activities would result in a **positive direct** impact.

#### **Impact Magnitude – Medium**

- **Extent:** The extent of the impact is **local**.
- **Duration:** The duration would be **permanent** as these resources are non-renewable and once destroyed, they can not be replaced.
- **Intensity:** Loss of heritage resources would be permanent, so the intensity of the change would be **medium-high**.

**Likelihood** – It is **likely** that localised paleontological resources could be lost.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MODERATE (-VE)**

**Degree of Confidence:** The degree of confidence is **medium to high**.

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#### **Archaeology**

The pre-colonial heritage of the area as evident by archaeological traces is extremely sparse. The colonial archaeological heritage of the study area is also sparse, but forms two distinct clusters. Areas along river banks, and valleys appear to have been the focus of settlement during the last two centuries (see *Table 13.2*). The most important colonial archaeological sites in the study area are associated with Ekkraal (*See section 6.1.3*) where an access road is proposed

up the valley. This area must be subject to a detailed archaeological survey, important sites flagged and the road routed to avoid impacts.

**Box 13.2**      ***Construction Impact: Destruction or Disturbance of Pre-colonial and Colonial Archaeology***

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**Nature:** Construction activities could result in a **negative direct** impact on archaeological interests on the Wind Farm site.

**Impact Magnitude – Medium**

- **Extent:** The extent of the impact is **local**.
- **Duration:** The duration would be **permanent** as these resources are non-renewable and once destroyed, they can not be replaced.
- **Intensity:** Loss of heritage resources will be permanent, so the magnitude of the change will be **medium-high**.

**Likelihood** – It is **likely** that localised archaeological resources would be lost.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MODERATE (-VE)**

**Degree of Confidence:** The degree of confidence is **medium to high**.

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### **Built Environment**

The built environment of the study area is limited to farms, farm houses, stone walls, walled kraals and secondary roads. Given the remoteness of this area, even these are sparsely distributed. Virtually all farm infra-structure is situated in the low lying areas between the ridges. Most are several kilometres from proposed turbine locations which mean that direct impacts are not expected.

The existing Ekkraal Farm is of importance as it has corrugated iron roofed building which dates from the 19<sup>th</sup> century which could be worthy of Grade IIIC status. The structure is not under threat and evidently well maintained. The closest turbine are well in excess of 1 km distant which means that no direct impacts will result from the turbines themselves. Other elements of the built environment at Ekkraal Farm consist of dams, kraals and two out-buildings, one of which is built from stone and has a Dutch hearth. The existing vehicle track up the valley will be upgraded and widened to allow heavy vehicles to pass. Since many of the ruined features lie very close to this track, impacts could occur. The pattern of kraals, farm buildings, artefact scatters and walling remains highly legible. The area can be considered to be archaeologically sensitive and worthy of preserving in terms of its research potential.

It is acceptable to utilise farm buildings for the project, however if renovation or changes to structures is envisaged, a heritage professional with experience in historical structures should be consulted to assist with sensitive re-adaptation or restoration. Kraals, walls, stone features and ruins must be left in-tact on the landscape.

Potential impacts to cultural heritage would be of local extent, and since cultural heritage resources are considered non-renewable, impacts would be of a permanent nature. Due to any loss being permanent, the intensity of potential impacts to existing heritage structures is considered medium-high.

If heritage structures were impacted, considering the local extent of importance, the permanent loss of the resource and the medium-high intensity of the potential impact, the magnitude of the potential impact is considered to be medium. Unless mitigated and heritage structures set aside as no-go areas, there is a definite likelihood that cultural heritage resources could be impacted. Taking into account the medium magnitude and the likely potential impact, the overall significance of the potential direct negative impact on cultural heritage resources is considered to be moderate.

### **Box 13.3**      ***Construction Impact: Destruction or Disturbance of the Built Environment***

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**Nature:** Construction activities would result in a **negative direct** impact on built environment of the Study Area.

**Impact Magnitude – Low**

- **Extent:** The extent of the impact is **local**.
- **Duration:** The duration would be **permanent** as these resources are non-renewable and once destroyed, they can not be replaced.
- **Intensity:** Loss of heritage resources will be permanent, so the magnitude of the change will be **low**.

**Likelihood** – It is **unlikely** that localised cultural heritage resources could be lost.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MODERATE (-VE)**

**Degree of Confidence:** The degree of confidence is **medium to high**.

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### **Buried Graves**

Human remains can occur at any place on the landscape, but are particularly likely to be found on or close to archaeological sites and settlements. In addition to the identified ones with typical surface identifiers such as cairns and/or head stones, there are likely to be others that never had any, or which have been lost over time. The single identified formal cemetery will not be affected by the proposed activity. However human remains are usually exposed during construction activities. Such remains are protected by a plethora of legislation including the Human Tissues Act (Act No 65 of 1983), the Exhumation Ordinance of 1980 and the National Heritage Resources Act (Act No 25 of 1999). Ekkraal valley is a particular area of concern where a collection of stone piles were recorded. In the case of unmarked graves, work in the immediate area should cease and the find reported to the heritage authority and an archaeologist. Human remains must not be removed from the find site, but the area cordoned off until a formal exhumation and investigation can be put in place.

Taking into account the local importance of buried graves, the permanent nature of any loss of human remains and the potential impact's medium-high intensity, the magnitude of loss of human remains through buried grave discovery is considered medium.

Although the overall significance in the heritage specialist report (see *Annex J*) for the potential impact on buried graves is rated as major, with regards to the principle of decision making of approval for the proposed project as well as considering the existence of adequate mitigation measures as outlined in this chapter, ERM considers the overall significance of the potential direct negative impact of destruction or disturbance of buried graves to be moderate.

#### **Box 13.4**      *Construction Impact: Destruction or Disturbance of Buried Graves*

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**Nature:** Construction activities would result in a **negative direct** impact on cultural heritage of the Study Area.

**Impact Magnitude – Medium**

- **Extent:** The extent of the impact is **local**.
- **Duration:** The duration would be **permanent** as these resources are non-renewable and once destroyed, they can not be replaced.
- **Intensity:** Loss of heritage resources will be permanent, so the intensity of the change will be **medium-high**.

**Likelihood** – It is **likely** that buried graves will be damaged or disturbed.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MODERATE (-VE)**

**Degree of Confidence:** The degree of confidence is **medium to high**.

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#### **13.1.2**      *Mitigating for Damage or Destruction of Archaeology, Palaeontology and Cultural Heritage Interests*

The objective of mitigation is to minimise impacts on palaeontological, archaeological and heritage resources and ensure opportunities to identify overall heritage interests are maximised.

*Design Phase*

- Mitigation of the colonial archaeology should involve a final walk down of the proposed route of the road alignment in the Ekkraal Valley. Heritage resources should be identified and flagged and avoided during construction activities.
- Substations should not be built in prominent positions or within sight of historic farms. These areas should be avoided for power line routes where possible.
- Mitigation of the built environment should involve micro siting turbine positions and associated infrastructure to avoid placing turbines or

infrastructure directly over built environment features and buildings or bisecting coherent settlement complexes.

*Construction Phase*

- Cuttings for the access roads should be inspected by a suitably qualified palaeontologist, as it would be an economical transect for representative sampling.
- Any substantial excavations, such as borrow pits, opened for road making, providing material for berms, footings of turbines or any other construction, similarly need to be checked by a qualified palaeontologist for material of potential scientific importance.
- Should any human burials, archaeological or palaeontological materials (fossils, bones, artefacts etc.) be uncovered or exposed during earthworks or excavations, they must immediately be reported to Heritage Western Cape. The developers, site managers, and any operators of excavation equipment, need to be alerted to this possibility. If fossil material is encountered, the palaeontologist must be given sufficient time and access to resources to recover at least a scientifically representative sample for further study. If it cannot be studied immediately, the costs of housing the material should be borne by the developers. In the event of human bones being found on site, SAHRA must be informed immediately and the remains removed by an archaeologist under an emergency permit. This process will incur some expense as removal of human remains is at the cost of the developer. Time delays may result while application is made to the authorities and an archaeologist is appointed to do the work.
- The sensitive reuse of vacant buildings is encouraged (as long as advice is sought on heritage sensitivities) as this will help sustain them.

**13.1.3 Residual Impacts**

Should the construction phase mitigation measures be implemented into the revised Wind Farm layout, the Final Layout (Alternative 2) (see *Figure 13.10*), the significance of the residual impacts associated with damage or destruction to archaeology, palaeontology and cultural heritage resources would be reduced (see *Table 13.2*).

**Table 13.2 Pre- and Post-Mitigation Significance: Damage or destruction to cultural Archaeology, Palaeontology and Cultural Heritage interests**

Phase	Significance (Pre-mitigation)	Residual Impact Significance
Construction - Palaeontology	MODERATE-HIGH (-VE)	MODERATE (+VE)
Construction - Archaeology	MODERATE (-VE)	MINOR (-VE)
Construction - Built Environment	MINOR (-VE)	MINOR (-VE)
Construction - Buried graves	MODERATE (-VE)	MINOR (-VE)

## 13.2 VISUAL OR SENSE OF PLACE HERITAGE IMPACT

### 13.2.1 Impact Description and Assessment

It should be noted that this section deals with Visual Impacts from a Cultural Heritage perspective only, while Chapter 12 deals with visual impacts on a broader scale.

#### *Operational Phase Impacts*

The impacts of clusters of massive wind turbines on cultural landscape can be serious, both in physical terms and with respect to the intangible and aesthetic qualities of a given locality. Impacts of wind energy facilities can therefore cause direct physical damage to heritage resources through the establishment of infrastructure, and by their presence can change the aesthetic and intangible values of the broader cultural landscapes in which the heritage resources exist.

Within the study area there are a number of distinct cultural landscape areas that have been identified, i.e the Ekkraal Valley and Hartjieskraal to Barendskraal area which contains evidence of concentrations of historic farming activity. The Ekkraal Valley lies between 2 turbine rows. Although this is a highly scenic area, it is very remote and not celebrated as a place with visual heritage qualities. The Hartjieskraal- Barendskraal complex of heritage sites is situated in the deeper portions of valleys – the turbines will be mostly more than two kilometres from structures and sites, with the exception of the farm Hartjieskraal where they will be closer. This situation could be mitigated through the exclusion or re-siting of two turbines.

The proposed energy facility will not be visible from any major transport routes (N1) but there will be visibility from tertiary roads in the area and especially the R354 between Matjiesfontein and Sutherland, a scenic tourism route. This will affect the sense of wilderness of a large chunk of the region. Conservation-worthy buildings or places of celebrated heritage significance are limited.

In overall terms the study area represents a remote wilderness landscape, which even in prehistoric times appears to have been marginally inhabited. Colonial occupation of the area was also sparse being limited to valley bottoms. The predominant presence is that of open wilderness. While the area is highly scenic, within the project boundary there are no major tourism enterprises and is very seldom visited by persons other than those directly involved in farming. Taking into account the local extent, long-term duration and the medium intensity of the potential impact, the magnitude is rated as medium.

Given the medium-high magnitude and considering that the impact has a definite likelihood of occurring if the project were to go ahead, the overall



significance of the direct negative potential impact on visual or sense of place heritage is rated as moderate.

**Box 13.5**      *Operational Impact: Visual or Sense of Place Heritage Impact*

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**Nature:** Operation of the Wind Farm would result in a **negative direct** visual impact on cultural heritage sites of interest.

**Impact Magnitude – Medium**

- **Extent:** The extent of the impact is **local**, since the visual influence would extend beyond the site.
- **Duration:** The duration would be **long-term** as the visual character of the site would be altered at least until the project stopped operating.
- **Intensity:** The high visibility of the turbines along the ridge would result in a **medium** intensity.

**Likelihood –** There is a **definite** likelihood that the sense of place would be impacted by the presence of the turbines in the study area.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) MODERATE (-VE)**

**Degree of Confidence:** The degree of confidence is **high**.

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**13.2.2**      *Mitigation of Visual or Sense of Place Heritage Impact*

There is no mitigation possible for this potential impact. Even a reduction in the number of turbines would not significantly reduce the significance rating of this impact. Effective down lighters on the turbines could possibly reduce the night time impacts somewhat.

**13.2.3**      *Residual Impact*

As there is no mitigation possible for this potential impact, there would be no difference in the residual impact, and the potential impact would remain of major-moderate significance (see *Table 13.3*).

**Table 13.3**      *Pre- and Post- Mitigation Significance: Cultural Heritage Visual or Sense of Place*

Phase	Significance (Pre-mitigation)	Residual Impact Significance
Operation	<b>MODERATE (-VE)</b>	<b>MODERATE (-VE)</b>

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