

ERM appointed ACO Associates cc to conduct a heritage impact assessment, as part of the EIA process for the proposed Graspán PV Power Facility. The findings of this study are detailed in *Annex G* and summarised in this chapter. This chapter discusses the potential impacts on palaeontology, archaeology and cultural heritage resources resulting from the establishment of the PV power facility on the Graspán site. The potential impacts of this development are assessed and mitigation measures to reduce the impacts are outlined below.

Features of possible paleontological, archaeological and cultural heritage interest were found to exist on and near the site. These include a low potential for the presence of quaternary fossils, the actual discovery of stone artefacts from the Middle Stone Age (MSA) ⁽¹⁾ and Late Stone Age (LSA) ⁽²⁾, as well as the presence of the Graspán battlefield on the adjoining farm.

During site preparation works a number of project activities are likely to interfere with paleontological, archaeological and cultural heritage resources present within the site boundary. These include levelling and grading of areas where the PV arrays will be sited, although the extent of such earthworks is likely to be minimal given the flat nature of the terrain on the site. Additional site levelling is required in preparation for the, temporary laydown and storage areas. In addition, trenching activities required for drainage and cable routes and the installation of array structures into the ground have the potential to impact paleontological, archaeological and cultural heritage resources.

Table 11.1 *Impact Characteristics: Impacts on Archaeology, Palaeontology and Cultural Heritage Resources*

	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) Disturbance to sense of place associated with surrounding areas.
Impact Type	Direct	Direct

(1) Middle Stone Age: The archaeology of the Stone Age between 20-300 000 years ago associated with early modern humans.

(2) Late Stone Age: A period of the Stone Age between 200 AD and 20 000 years ago.

	Construction	Operation
Receptors Affected	(i) Archaeological and cultural heritage resources within site clearance areas. (ii) On-site fossils.	(i) Cultural heritage resources in neighbouring areas.

11.1 PALAEOLOGY

11.1.1 Construction Phase Impacts

Fossils are known to be present in the Ecca group as recovered from the underlying Whitehill formation. These include fish, crustaceans, deepwater marine reptiles and beetles. However, in the vicinity of the Project site, the fossil-bearing Ecca Group sediments are intruded by early Jurassic Dolerite, which is non-fossiliferous and no fossils were discovered during the site survey.

Furthermore, Quaternary fossils are usually found in gulleys and the absence of these potentially fossiliferous gulleys on the site suggest that fossils of this geological age are absent. Fossils from the Ecca Group are exceedingly rare, and only a small portion of the development will encroach into rocks of this age. Thus, considering the rarity of fossil-bearing sediments and lack of appropriate exposure (i.e. steep-sided gulleys) at the proposed site, the impact on paleontological material is considered *Minor*.

There are, however, a number of activities associated with the construction phase that may impact paleontological resources. These include drilling or screwing the solar frames into the substrate. No impacts on paleontological resources are expected to occur during operation, as no excavation, earthworks or manipulation of the infrastructure is expected.

Box 11.1 **Construction Impact: Damage to or Destruction of Paleontological Resources**

Nature: Construction activities such as drilling and screwing of PV panels into the ground have the potential to have a **direct negative** impact on the paleontological resources.

Impact Magnitude - Low

- **Extent:** The extent of the impact is **local**, as paleontological resources are of local importance and the extent of their disturbance is considered to be local.
- **Duration:** The duration would be **permanent**, as paleontological resources are irreplaceable and any loss would be permanent.
- **Intensity:** The intensity is **low** considering the extent of the proposed development.

Likelihood - It is **unlikely** that this impact will occur, as there is a very low potential of fossil materials being present on the Project site.

IMPACT SIGNIFICANCE (PRE-MITIGATION) - MINOR (-VE)

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

11.1.2 **Mitigation**

Construction

- During construction the Environmental Control Officer (ECO) should remain aware that all sedimentary deposits have the potential to contain fossils and he/she will monitor all substantial excavations into sedimentary bedrock for fossil remains. If any significant fossils are found (e.g. vertebrate teeth, bones, burrows, petrified wood), construction activities will be suspended and the South African Heritage Resources Agency (SAHRA) will be notified immediately.
- If significant fossils are found an appropriately qualified paleontological specialist will investigate, and if required a permit will be obtained to recover and preserve the paleontological resources for scientific purposes before work can be commenced again.

11.1.3 **Residual**

If the above-mentioned mitigation is adhered to, the residual impact significance on any paleontological resources is considered to be *Negligible*.

Table 11.1 **Pre- and Post-Mitigation Significance: Damage or Destruction to Paleontological Resources**

Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Construction: Palaeontology	MINOR (-VE)	NEGLECTIBLE

11.2 ARCHAEOLOGY

11.2.1 Construction Phase Impacts

A number of archaeological remains were discovered on the Project site. Pre-colonial evidence of human presence in the area included MSA (and possibly LSA) artefact scatters around koppies and pans as well as grinding surfaces on dolerite boulders on the southern koppie of the site.

Archaeological remains from the historical period included: graffiti on the northern koppie; a circular stone structure (possibly the remnant of an historical fortification from a period after the Anglo-Boer wars) next to the railway line; and historical 19th/early 20th century dumped material including tin cans and bottle fragments concentrated along the railway line. It seems likely that the historic material relates to the railway line. However, there is a small possibility that the material may date back to the South African War. The likelihood of this being the case is low as British soldiers are known to have buried all rubbish while in the field and Boer soldiers were unlikely to have camped in such an exposed area.

The above-mentioned remains may be negatively affected by construction activities associated with the project. However, their archaeological significance is considered to be low. The spatial extent of possible impacts on these remains during the construction phase of the Project is considered to be localised within the project site. The operational phase is not expected to impact on the archaeological resources of the Project site, as no excavation will take place, and therefore no operational impacts are considered here.

Box 11.2 *Construction Impact: Destruction or Disturbance to Archaeological Resources*

Nature: Site preparation activities associated with the development have the potential to have a **direct negative** impact on archaeological resources on the Project site.

Impact Magnitude - Low

- **Extent:** The extent of the impact is **on-site**, as impacts would be confined to the site.
- **Duration:** The duration would be **permanent**, as archaeological resources are irreplaceable and if destroyed the impact would be permanent.
- **Intensity:** The intensity is **low** considering the extent of the proposed development.

Likelihood - It is **likely** that this impact will occur.

IMPACT SIGNIFICANCE (PRE-MITIGATION) - MINOR (-VE)

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

11.2.2

Mitigation

The objective of mitigation is to minimise impacts on identified archaeological resources and to ensure that opportunities to identify further resources are maximised.

Design Phase

- The layout of the proposed facility should avoid the railway line and the koppies on the project site. Layout Alternative 2 avoids these areas sufficiently.

Construction Phase

- Should any archaeological resources (cultural artefacts such as historic glass, ceramics, etc., and sub-surface structures, etc.) be uncovered or exposed during earthworks or excavations, they will immediately be reported to SAHRA. After assessment, and if appropriate, a permit will be obtained from SAHRA or Heritage Northern Cape (HNC) to remove such remains.
- Avoid construction (including access roads, underground cabling and power lines) on low koppies to the north and south of the proposed facility, to avoid destruction of grinding surfaces and historical graffiti on dolerite boulders.
- In order to preserve the historical dump material and concentric stone structure recorded to the west of the railway line, an approximate 100 m buffer (where construction activities are not permitted) will be established on both sides of the railway.

11.2.3

Residual

Should the mitigation measures listed above be undertaken upon finds of archaeological interest (structures, artefacts, etc.), the impacts will be considered **positive** as the finds will be documented and the data can be added to the existing body of scientific knowledge of the region.

Although the archaeological features of the site will mostly be avoided if strict adherence to the above-mentioned mitigation is ensured, the scattered nature of MSA and LSA artefacts across the site will inevitably result in their disturbance or destruction. Therefore, the residual impact significance remains as *Minor*.

Table 11.1 Pre- and Post-Mitigation Significance: Damage or Destruction to Archaeological Resources

Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Construction: Archaeology (finds)	MINOR (-VE)	MINOR (+VE)
Construction: Archaeology (destruction)	MINOR (-VE)	MINOR (-VE)

11.3 CULTURAL HERITAGE

11.3.1 Construction Phase Impacts

The Graspan and Enslin battlefield, located north-east of the Project site, is considered a site of cultural importance. The battlefield extends from the railway up into the surrounding hills. It is possible that there may be human remains in the vicinity of the battlefield as, although the graves on the battlefield were exhumed in 1963, it is not clear whether or not all human remains were removed. Therefore, the possibility of finding human remains on the Project site should not be discounted.

Additionally, there were a number of calcrete cairns found on the Project site, to the west of the railway. The possibility of these being burial mounds was investigated, and it was determined that they were merely landmark cairns.

No buildings were identified on the Project site and therefore no impacts on the built environment are considered here.

Box 11.3 Construction Impact: Destruction or Disturbance of Cultural Heritage

Nature: Construction of the proposed development has the potential to have a **direct negative** impact on the burial sites of soldiers as well as landmark cairns.

Impact Magnitude - Medium

- **Extent:** The extent of the impact is **on-site**, as the destruction or disturbance of graves or cairns is only expected to occur within the boundaries of the Project site.
- **Duration:** The duration would be **permanent** as any disturbance or destruction to graves or cairns on site will be irreversible.
- **Intensity:** The intensity is **low** considering the extent of the proposed development as well as the small chance of discovering graves and the low importance of identified cairns.

Likelihood - It is **likely** that this impact will occur.

IMPACT SIGNIFICANCE (PRE-MITIGATION) - MINOR (-VE)

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

11.3.2 *Operation Phase Impacts*

The cultural sense of place, although not unique to the Karoo region, is considered important to preserve. In this case, the sense of place can be described as an open Karoo landscape interrupted by koppies, anthills and shrubs with no buildings present. As the site is close to a known battlefield approximately seven kilometres from the project site, the cultural landscape also relates to this. The development of the proposed facility could have a negative visual effect on this battlefield if it were visible. The proposed facility could also have a negative impact on the area's rural and remote sense of place.

Box 11.4 *Operation Phase Impact: Sense of Place*

Nature: Visual presence of the proposed development has the potential to have a **direct negative** impact on the landscape and sense of place of the Project site and the surrounding area.

Impact Magnitude – Medium

- **Extent:** The extent of the impact is **local** as the proposed facility may impact on the sense of place over an area in a radius of less than 20 km from the site.
- **Duration:** The duration would be **long-term** as the sense of place would only be resorted on the decommissioning of the facility.
- **Intensity:** The extent of the developments, and thus the intensity, is considered as **low**.

Likelihood – It is **likely** that this impact will occur, although a thorough visual analysis is required.

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

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

11.3.3 *Mitigation*

The mitigation measures described here are developed with a view to reduce the visual impact of the facility on the nearby battlefield and the negative impacts associated with the damage to or destruction of possible human remains on site.

Design Phase

- The proposed facility should not be visible from the koppies of the Graspan and Enslin battlefield, on the adjoining farm. Other considerations include visibility from the N12.

Construction Phase

- If any human remains are uncovered during the construction of the site, development should cease and SAHRA and HNC should be notified. SAHRA or HNC will investigate and propose a way forward.

11.3.4

Residual

The proposed PV power facility is approximately seven kilometres from the Graspán and Enslin battlefield site. According to the visual specialist study undertaken, the PV power facility will be *Hardly Visible* from more than four kilometres away (see *Annex H*). Considering that the Graspán battlefield is approximately seven kilometres from the PV power facility it is unlikely that the PV power facility will be visible. It is not definite that the PV power facility will be hidden from all areas of the battlefield and there will be some impact on the general sense of place of the area. Therefore, the residual impact significance remains *Minor*.

If human remains are discovered on the Project site during construction, and the mitigation described above is followed, SAHRA will decide on appropriate action and the resulting residual impact significance is considered *Negligible*.

Table 11.1 Pre- and Post-Mitigation Significance: Damage or Destruction to Cultural Heritage

Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Construction: Cultural Heritage (disturbance/destruction)	MINOR (-VE)	NEGLIGIBLE
Operation: Cultural Heritage (sense of place)	MODERATE (-VE)	MINOR (-VE)