

SCOPING HERITAGE IMPACT ASSESSMENT FOR THREE WIND ENERGY FACILITIES: POORTJIES WIND ENERGY FACILITY, KHAI-MA WIND ENERGY FACILITY AND KORANA WIND ENERGY FACILITY ON FOUR FARM PORTIONS SOUTH OF POFADDER IN THE NORTHERN CAPE PROVINCE

(Assessment conducted under Section 38 (8) of the
National Heritage Resources Act (No. 25 of 1999) as part of an EIA)

Prepared for

Savannah Environmental (Pty) Ltd

PO Box 148
Sunninghill, 2157
Phone (011) 2346621
Fax (086) 684 0547

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Prepared by

ACO Associates

8 Jacobs Ladder
St James
Cape Town
7945

Phone (021) 706 4104
Fax (086) 603 7195
Email: Tim.Hart@aco-associates.com

EXECUTIVE SUMMARY

ACO Associates was appointed by Savannah Environmental (Pty) Ltd to assess the potential impacts to heritage resources that might arise through construction the proposed Poortjies Wind Energy Facility, Khai-Ma Wind Energy Facility and Korana Wind Energy Facility on four farm portions south of Pofadder in the Northern Cape Province. The proposed projects will comprise of wind turbines and associated infrastructures.

This scoping report includes a desktop study as well as a one day field visit. The site lies in Bushmanland and is very flat. Small hills do occur and occasional pans and dry stream beds are present.

The desktop study revealed that palaeontological sensitivity is low on the flat plains. Fossils are known from certain formations (apparently not in the study area) with a dinosaur having been named from a find at Kangnas 120 km to the west. Most archaeological resources are scatters of stone artefacts, often close to water sources such as pans and rivers. While Later Stone Age material is more likely to be found near pans and rivers, earlier material from the Early and Middle Stone Age is more widely dispersed. Rock art is also known to occur in Bushmanland. The farms in the area were generally granted very late, in the late 19th or early 20th centuries.

The brief scoping level survey revealed much Late Stone Age material around the pan at Poortjie and only very scattered material elsewhere. The sites around the pan are of high significance while the background scatter over the remainder of the area is of very low significance. The built environment is generally of medium significance but some aspects and the graveyard are of high significance. Dams and other similar structures carry low-medium significance. It is noted that all these features will be protected through the institution of buffers around them. Further details will be needed to be obtained in the EIA phases of the projects.

Scenic impacts will be high due to the remoteness of the area, however there are very few visual receptors in this remote area.

This heritage scoping study concludes that the impact assessment phase should continue as to date no fatal flaws have been identified. It should be noted that the access road to the site must also be considered as there are areas outside the study area that might be sensitive in this regard.

Contents

1. INTRODUCTION	4
2. HERITAGE LEGISLATION	5
2.4. Heritage authorities	7
3. METHODS	7
3.1. Literature survey	7
3.2. Field survey	8
3.3. Impact assessment.....	8
3.4. Limitations.....	8
4. DESCRIPTION OF THE AFFECTED ENVIRONMENT	8
5. HERITAGE CONTEXT	9
5.1. Palaeontology	9
5.2. Archaeology	10
5.3. History	12
6. FINDINGS	12
6.1. Stone Age archaeology	12
6.2. Built environment	13
6.3. Cultural landscape, sense of place, visual impacts	15
7. Potential Impacts associated with wind energy facilities.	15
7.1. Impacts expected during the construction phase of the wind energy facility	15
7.2. Operation of the wind energy facility	16
7.3. Mitigation and Management	17
8. CONCLUSIONS	17
9. RECOMMENDATIONS	17
10. REFERENCES	18
APPENDIX – Site listing	20

1. INTRODUCTION

ACO Associates was appointed by Savannah Environmental (Pty) Ltd to assess the potential impacts to heritage resources that might arise through construction of three wind energy facilities (WEF's) on four farm portions south of Pofadder in the Northern Cape Province (Figure 1). Pofadder lies approximately 21 km north-north-east of the study area while Aggeneys is 38 km to the west. The affected farm portions are:

- Namies South 212/portion 1;
- Namies South 212/portion 2;
- Poortje 209/remainder; and
- Poortje 209/portion 1 (Figure 2).



Figure 1: Aerial view of the general vicinity of the study area showing the relationship between it and the two nearest towns. The N14 national road runs east to west through Pofadder and Aggeneys and the R358 runs south through Pofadder.

The proposed project entails the establishment of three wind energy facilities and associated infrastructure within a site of 175 km². The site is located 22 km southwest of Pofadder.

The proposed wind energy facilities are:

Project 1: Poortjies Wind Energy Facility- 140MW;
Project 2: Khai-Ma Wind Energy Facility- 140MW; and
Project 3: Korana Wind Energy Facility- 140MW.

The proposed activities will involve construction of:

- Wind turbines (each turbine between 1.5 MW - 4MW in capacity);
- Foundations to support both the turbine towers;
- Cabling between the project components, to be lain underground where practical;
- A 400 kV substation and satellite 132 kV substations to facilitate grid connection via a loop-in loop-out connection to the existing Eskom Aggenys Aries 400kV power line which traverses the site;
- Internal access roads; and
- Workshop area for maintenance and storage.

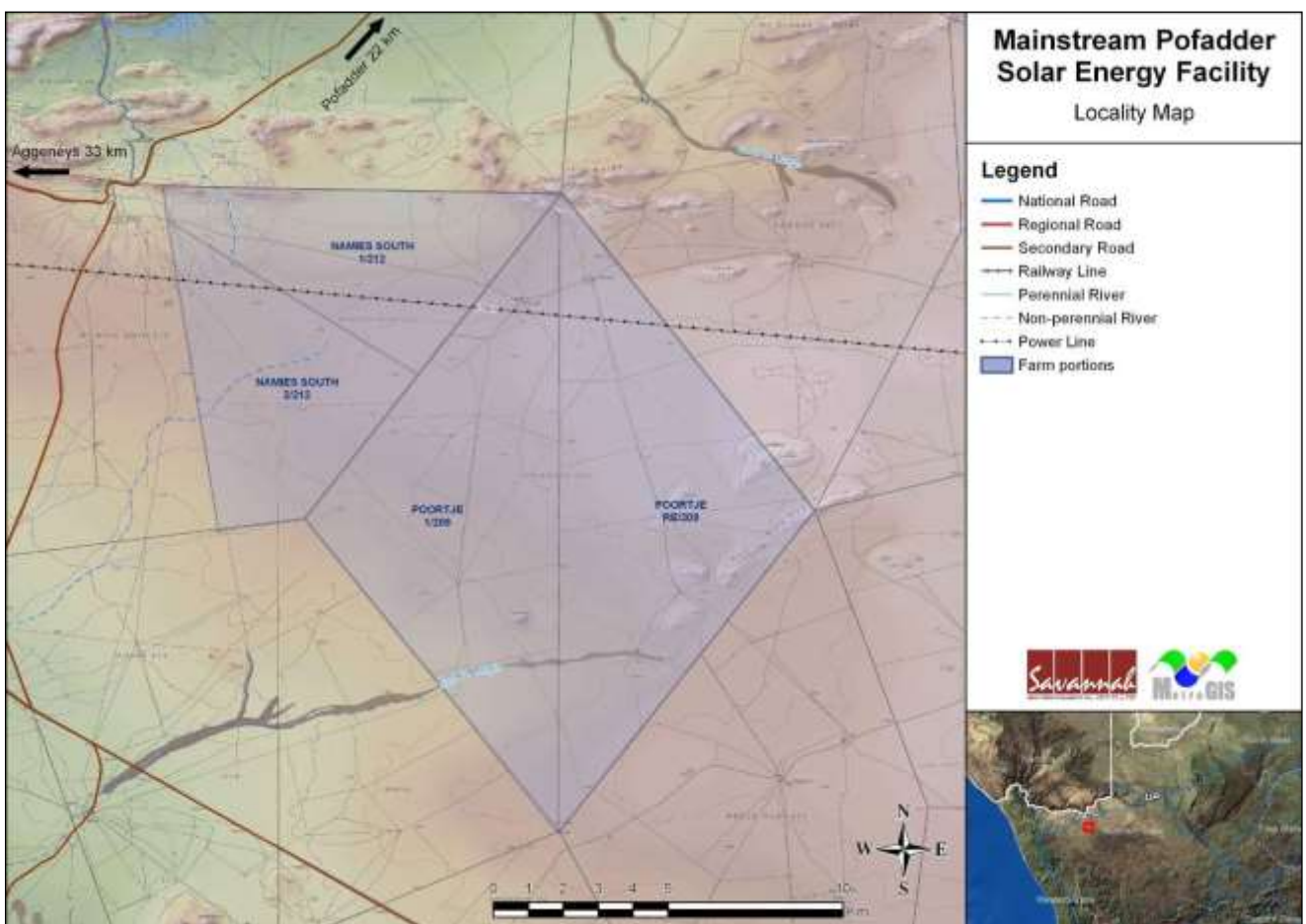


Figure 2: Map showing the affected farm portions.

2. HERITAGE LEGISLATION

The basis for all HIA is the NHRA, which in turn prescribes the manner in which heritage is assessed and managed. The NHRA has defined certain kinds of heritage as being worthy of protection, by either specific or general protection mechanisms. In South Africa the law is directed towards the protection of human made heritage, although places and objects of scientific

importance are covered. The National Heritage Resources Act also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage, which must be considered in any heritage assessment, includes:

- Any place of cultural significance (described below);
- Buildings and structures (greater than 60 years of age);
- Archaeological sites (greater than 100 years of age);
- Palaeontological sites and specimens ;
- Shipwrecks and aircraft wrecks; and
- Graves and grave yards.

Section 38 of the NHRA stipulates that HIAs are required for certain kinds of development such as rezoning of land greater than 10 000 m² in extent or exceeding 3 or more sub-divisions, linear developments in excess of 300 m or for any activity that will alter the character or landscape of a site greater than 5000 m². Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

- a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- b) the construction of a bridge or similar structure exceeding 50 m in length;
- c) any development or other activity which will change the character of a site--
 - i) exceeding 5 000 m² in extent; or
 - ii) involving three or more existing erven or subdivisions thereof; or
 - iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- d) the re-zoning of a site exceeding 10 000 m² in extent; or
- e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

2.1. Cultural Landscapes (places of cultural significance)

Section 3(3) of the NHRA, No 25 of 1999 defines the cultural significance of a place or objects with regard to the following criteria:

- a) its importance in the community or pattern of South Africa's history;
- b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g) its strong or special association with a particular community or cultural group for social cultural or spiritual reasons;
- h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- i) sites of significance relating to the history of slavery in South Africa.

2.2. Scenic Routes

While not specifically mentioned in the NHRA, No 25 of 1999, Scenic Routes are recognised as a category of heritage resources. Baumann & Winter (2005) comment that the visual intrusion of development on a scenic route should be considered a heritage issue.

2.3. Heritage Grading

A key tool in the assessment of heritage resources is the heritage grading system which uses standard criteria. In the context of an EIA process, heritage resources are graded following the system established by Winter & Baumann (2005) in the guidelines for involving heritage practitioners in EIA's (Table 1). The system is also used internally within Heritage Authorities around the country for making decisions about the future of heritage places, buildings and artefacts.¹ Presently Heritage Western Cape has a good guide to grading which is nationally applicable, on their website (<http://www.westerncape.gov.za/public-entity/heritage-western-cape>).

Table 1: Grading of heritage resources (Source: Winter & Baumann 2005).

Grade	Level of significance	Description
1	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
2	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
3A	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3A heritage resources.
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.
3C	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources.

Heritage specialists use the grading system to express the relative significance of a heritage resource. This is known as a field grading or a recommended grading. Official grading is done by a special committee of the relevant heritage authority, however heritage authorities rely extensively on field gradings in terms of decision making.

2.4. Heritage authorities

Since the study area will take place in the Northern Cape a provincial heritage authority will be involved – namely Ngwao-Boswa Jwa Kapa Bokone (Northern Cape Heritage Authority). Ngwao-Boswa Jwa Kapa Bokone is assisted by SAHRA on an agency basis as it is a small organisation with limited capacity. Heritage resources are graded following the system established by Winter & Baumann (2005) in the guidelines for involving heritage practitioners in EIA's (Table 1).

3. METHODS

3.1. Literature survey

¹ http://www.westerncape.gov.za/other/2012/9/grading_guide_&_policy_version_5_app_30_may_2012.pdf

A survey of available literature was carried out to assess the general heritage context into which each development was to be set. This literature included published material and unpublished commercial reports. The information so gained was used to inform the field survey.

3.2. Field survey

One day of fieldwork was conducted at the scoping stage in order to identify the kinds of environments that would be most sensitive in terms of impacts to heritage resources. This would in turn guide the layout design before the EIA phase of the project. The survey was done by driving around the site and walking certain areas as appropriate to record heritage resources or conduct sample transects of the landscape. Due to the very large size of the study area binoculars were used to try to identify landscape features that might have attracted prehistoric settlement.

3.3. Impact assessment

No formal assessment of impacts is conducted at the scoping phase, but a sensitivity map has been generated to delimit those areas expected to have the greatest potential impacts to heritage.

3.4. Limitations

The field study was brief and aimed only to target areas most likely to contain heritage resources. Consequently, there are likely to be many archaeological sites that were not identified at the scoping stage.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The site lies on a wide plain between low rocky hills. A very light covering of vegetation with small bushes and grass tufts exists over most of the area but bare patches are present. Some of these are sandy and due to deflation or perhaps are the result of being an ephemeral pan (Figure 3) but other bare areas are gravel-coated and located around the quartzite hills (Figure 4). The site is mostly very flat but short ranges of hills or isolated rocky outcrops do occur in places (Figures 4 & 5). Occasional pans and dry stream beds occur in places.



Figure 3: View across the study area showing typical environment on the plains with rocky hills in the background.



Figure 4: View from a rocky hill over the valley (poort) after which the farm was apparently named.



Figure 5: View across the plains showing grasslands and sporadic rocky hills.

5. HERITAGE CONTEXT

5.1. Palaeontology

ACO Associates does not have a specialist palaeontologist but nonetheless, certain significant fossil finds can be commented upon. The Karoo is well known for its fossil deposits but being on the very edge of the Karoo the fossil potential here will be lower. The SAHRA palaeontological sensitivity map (figure 6) shows the area to be in a blue zone of low sensitivity – only a protocol for accidental finds is required. Fossils have been found at Kangnas and Areb some 120 km even further to the west – possibly related to a particular geological occurrence.. The most significant was a fossil believed to represent a dinosaur known as *Kangnasaurus coetzeei*. The fossil was named by Sidney Haughton in 1915, the generic name referring to the farm and the specific name to the farmer, Coetzee. It is based on holotype SAM 2732, a tooth found at a depth of 34 m in a well on the farm (Haughton 1915, cited in Wikipedia 2011).



Figure 6 Excerpt from SAHRA palaeo-sensitivity map showing regional low palaeontological significance (blue and grey zones).

5.2. Archaeology

Although little archaeological research has been conducted in the general area around Pofadder, several impact assessment studies have been conducted in recent years. These form the basis of the present background review.

Early (ESA) and Middle Stone Age (MSA) material, including manufacturing sites, have been found on the northern slopes of the Gamsberg, probably positioned so as to gain easy access to a source of stone material on the mountain. Suitable flaking rock is apparently not easily available on the plains (Morris 2010). Pelsner (2011) reported MSA and Later Stone Age (LSA) material in an area around the Paulputs substation near Pofadder, although his illustrations appear to be of LSA artefacts made on quartz. He also mentions the presence of ostrich eggshell. East of Aggeneys, Webley and Halkett (2012) found a background scatter of predominantly quartz, and some quartzite artefacts. The material is particularly prevalent in those areas where the soil surface is covered in quartz pebbles and cobbles. The size of the artefacts suggests that they pertain to the Middle Stone Age but diagnostic MSA features were absent. In general, the scatter of stone tools is very widely distributed and does not appear to be concentrated in any specific location.

According to Morris (2011a) LSA sites are the predominant archaeological trace noted in surveys in the Aggeneys-Pofadder region, although his survey of the northern slopes of the Gamsberg identified very few isolated LSA flakes (Morris 2010). However, on the plains below the mountain he did find three LSA settlements. To the northwest of the Gamsberg, he located two stone cairns which could represent graves, as well as a ceramic LSA site. These sites probably represent transient settlement by transhumant hunter-gatherers or herders that moved through the area. Beaumont *et al.* (1995:263) noted that most LSA sites then known in Bushmanland appeared to be ephemeral occupations by small groups of people in the hinterland both north and south of the

Orange River. This was in sharp contrast to the substantial herder encampments along the Orange River floodplain itself. Away from the river, LSA material, mainly quartz flakes, appears to often be focused around the base of granite hills (Morris 2011a, b & c; Pelsner 2011; Webley & Halkett 2011). (Beaumont *et al.* 1995) agree and add that red dunes and the margins of seasonal pans also served as foci for LSA occupation.

Despite the above observations, archaeological remains are likely to be patchy since, in a 15 km linear survey between Pofadder and Pella, Halkett (2010) failed to record any archaeological material. In general, Morris (2011c) notes that archaeological finds around Aggeneys and Pofadder are sparse.

Rock art is known from the region. Rudner and Rudner (1968) note the scarcity of suitable rock canvases and that art is sparsely distributed through the region. Engravings occur along the Orange River (Morris 1998) where suitable rock exists, while in the rocky areas away from the river there are rare rock paintings. Rudner and Rudner (1968:80-81) described the paintings on the farm Kangnas as follows:

"The paintings on this farm on the road to Pofadder are in a quartzite cave on the northern side of a ravine; on the sooty roof of the cave are crude black handprints and double-headed axe-like designs made in what appears to be black (burnt?) wax, which, when scratched, turned white. Where the pictures had weathered off, a greyish-white image remained. Grey designs are superimposed on red geometric designs.

"In a cave on the opposite side of the ravine are designs in white superimposed by red-brown ones. In this cave there is also an engraving of a wheel, which is probably of European origin as there are initials engraved next to it. A few stone implements were found in these caves, including a crescent in clear quartz, a few potsherds of thin Hottentot ware and some flakes in glass. (SAM 6753.) These caves were mentioned by W. C. Scully (Wilman, 1933), who stated that Bushmen were known to have lived there".

Further to the east, rock art occurs near the pan of Gobees. (We now know this to be the incorrect location – the art he describes is to the south of Kangnas on Koeris. There is also art at Gobees.) Rudner and Rudner (1968:81) described the art:

"In the southern corner of this farm near a small pan a large east-facing shelter contains paintings-crude gemsbok in faded red and some shield-like designs in maroon superimposed by white designs. The names of early visitors are pecked across the maroon pictures with the date 1879, providing us with an upper date for these paintings. Inside and outside this shelter we found a rich Wilton industry containing one large crescent and many small side-scrapers, some of them on reworked Middle Stone Age tools, two thumbnail scrapers, two small bead borers and a few potsherds of Hottentot-type, one with signs of an external lug (Namaqua pot?). (SAM 6751-2.) Some of this pottery has a coarse sand admixture (Rudner, in press)".

Historical accounts of travels through southern Africa frequently provide clues to the pre-colonial occupation of the land. In this case, two travellers, John Barrow and George Thompson, passed through this area leaving observations on the local population.

Barrow (1801:387) wrote of the plains between the Kamiesberg Mountains and the Orange River that:

"These plains are now desolate and uninhabited. All those numerous tribes of Namaquas, possessed of vast herds of cattle, are, in the course of less than half a century, dwindled away to four hordes, which are not very numerous, and in a great measure subservient to the Dutch peasantry, who dwell among them."

Thompson (1824:288) noted the following:

"The extensive plains, lying between the Gariiep and the Kamiesberg, are represented, by old writers, as occupied by a numerous race of people, possessed of large flocks and herds, and living in ease and abundance. Of these, the tribe now resident at Pella and its vicinity, is the only one remaining."

Both texts show that the area was well inhabited in the past but that colonial expansion was taking its toll on the indigenous inhabitants. Nevertheless, these observations suggest that archaeological remains, at least pertaining to the more recent prehistoric period, should be abundant on the landscape.

5.3. History

Three towns lie in an arc to the north of the site. While Aggeneys is modern and centred around the mining activities there, Pofadder was founded as a mission station in 1875 by Reverend Christian Schröder. It was named after a Koranna chief, Klaas Pofadder, who was shot by farmers. Colonists began settling around the perennial spring from 1889 but only in 1917 were the first residential plots surveyed (Northern Cape Tourism Board 2007).

Pella, to the north and closer to the Orange River, is also a mission station but it was founded far earlier. It was founded by the London Missionary Society in 1814 as a sanctuary for the indigenous people who were driven from Namibia. The mission was abandoned in 1872 because of drought but reopened by the Roman Catholic Church in 1878 (Northern Cape Tourism Board 2007).

The farms in this area were generally surveyed very late. Poortjie 212 was done in 1895 but no survey diagrams were listed on the surveyor general's website for Namies South 209.

6. FINDINGS

No detailed description of finds is provided here. However, basic information and photographs are provided to show what types of heritage are present on the farm. Full details will appear in the Impact Assessment report to follow. The appendix does, however, list those sites recorded to date.

6.1. Stone Age archaeology

Stone Age archaeology was uncommon and the little we saw during the brief scoping survey was clearly focused on the pan alongside the Poortjie farm werf. Here there were several bedrock outcrops with grooves ground into them (Figures 7 & 8). These grooves would have been used for grinding food (grass and other seeds) and perhaps also ochre. It is typical to find such grooves around water sources in Bushmanland.

A short way from the pan was a slight ridge forming the outermost limit of the hollow in which the pan is located. On this rise were two Later Stone Age occupation sites with stone artefacts, ostrich eggshell fragments, a bead and pottery (Figures 9 & 10). The occupants of these sites may well have made the grooves. These sites have high archaeological significance.

Elsewhere in the study area we located occasional isolated stone artefacts that are part of the background scatter of material that builds up through the many thousands of years that people have occupied the landscape. Many of these artefacts may pertain to the Middle Stone Age. One quarried quartz outcrop was also noted. Stone Age people used the outcrop as a source for rock for making stone artefacts. These finds are all of very low significance.



Figure 7: Grinding grooves in the granite/ gneiss bedrock in the pan close to the Poortjie farm werf.



Figure 8: Close up of one of the deeper grinding grooves in the pan near the Poortjie farm werf.



Figure 9: Stone artefacts and ostrich eggshell fragments (some burnt) from an occupation site close to the pan with the grinding grooves.



Figure 10: Ostrich eggshell bead and a pottery fragment with small impressed decoration just beneath the lip.

6.2. Built environment

The Poortjie farm werf is not very old and contains structures dating back to the 1930s or 1940s (Figure 11). A family graveyard is also present. More significant are the old school building (figure 12) and multiple ruins located immediately outside the entrance to the study area. The main school building is likely early 20th century, while the ruins may be older.

Also present on Poortjie is a stone kraal with dung piled on top of the walls (Figure 13). The kraal probably dates to the 1930s when the first buildings were erected. In the poort after which the farm was named there is an earth dam which has burst. The internal surface of this dam is stone lined (Figure 14). The dam is probably also from the same period as the other built structures on the farm.



Figure 11: The main farm house at Poortjie.



Figure 12: The old school building on Namies South (just outside of the study area).



Figure 13: The stone kraal with dung on top of the walls at Poortjie.



Figure 14: Earth dam with stone lining on the inner wall in the “poort” of Poortjie.

The werf was placed in an area where water was most easily available. Two hand dug wells were present at the werf, though one has been filled in. These could have been dug in the early 20th century. The pan fills up after rains and during the 1930s a dry-stone wall was built along the edge of it to increase its capacity (Figure 15). The farmer informed us that after heavy summer rain the pan can get deep enough to swim in.



Figure 15: The pan alongside the farm werf at Poortjie. The pan has been 'enlarged' through the addition of stone walling.

6.3. Cultural landscape, sense of place, visual impacts

Given that the farm was only granted in the early 20th century and that all the structures date to this time and later, there are few, if any, cultural landscape elements of concern. The site is very remote and does, as a result, have a distinct sense of place. This pertains to the vast open spaces of Bushmanland which stretch as far as one can see without man-made interruptions. Visual impacts will be high due to the remoteness of the area, there are very few visual receptors. The R358 is has scenic qualities but, being a gravel road, carries far less traffic. It lies some 13 km to the east.

7. Potential Impacts associated with wind energy facilities.

Wind energy facilities are big developments that can produce a wide range of impacts that will affect the heritage qualities of an area. Each turbine site needs road access that can be negotiated by a heavy lift crane(s) which means that in undulating topography deep cuttings and contoured roads will have to be cut into the landscape to create workable gradients. During the construction phase each of the turbine sites will have to be leveled off to create a solid platform for cranes as well as a lay-down area for materials. This will involve earthmoving and road construction, followed by the bringing in of materials and plant. The actual construction of the turbines will involve excavation into the land surface to a depth of 3 m and over an area of 400 m² for the concrete base. The pre-fabricated steel tower is bolted on to the base and erected in segments. The nacelle containing the generator is finally attached followed by the rotors. The turbines are connected to underground cables to a sub-station(s) (positioned to be determined) where after the generated current will be fed to the national grid via transmission lines.

7.1. Impacts expected during the construction phase of the wind energy facility

During the construction phase the following physical impacts to the landscape and any heritage that lies on it can be expected:

- Bulldozing of roads to turbines sites with a possibility of cut and fill operations in places;
- Upgrading of existing farm tracks;
- Creation of working and lay-down areas close to each turbine site;
- Excavation of foundations for each tower;
- Excavation of many kilometers of linear trenches for cables;
- Erection of a 132 kV power line (pole design or route not finalised); and
- Construction of electrical infra-structure in the form of one or more sub-stations.

In terms of impacts to heritage, archaeological sites which are highly context sensitive are most vulnerable to the alteration of the land surface. The best way to manage impacts to archaeological material is to avoid impacting them. This means micro-adjusting turbine positions where feasible, or routing access roads around sensitive areas. If primary avoidance of the heritage resource is not possible, then some degree of mitigation can be achieved by systematically removing the archaeological material from the landscape. This is generally considered a second best approach as the process that has to be used is exacting and time-consuming, and therefore expensive. Furthermore the NHRA requires that archaeological material is stored indefinitely which has cost implications and places an undue burden on the limited museum storage space available in the province.

Although indications are that impacts to archaeological material are likely to be of low significance, it must be noted that it has not been possible to assess the potential impacts of road construction on archaeological sites. Furthermore, turbine positions provided are preliminary.

It is recommended that the following mitigation measures are implemented.

- Existing farm tracks be re-used or upgraded to minimise the amount of change to un-transformed landscape; and
- During the detailed planning phase, drawings of proposed road alignments, infrastructure and near-final turbine positions should be submitted to an archaeologist for review and field-proofing. Micro-adjustment of alignments and turbine positions is likely to be sufficient to achieve adequate mitigation.

7.2. Operation of the wind energy facility

During the operational life of the wind farm, it is expected that physical impacts to heritage will diminish or cease. Impacts to intangible heritage are expected to occur. Such impacts relate to changes to the feel, atmosphere and identity of a place or landscape. Such changes are evoked by visual intrusion, noise, changes in land use and population density. In the case of this project, impacts to remote and rural landscape and wilderness qualities are possibly of greatest concern. The point at which a wind turbine may be perceived as being "intrusive" from a given visual reference point is a subjective judgment, however it can be anticipated that the presence of such facilities close to (for example) wilderness and heritage areas will destroy many of the intangible and aesthetic qualities for which an area is valued. The fact that turbines are continuously revolving results in a visual impact that can be very disturbing and destructive to the sense of serenity of a place.

- Due to the size of the turbines the visual impacts are largely not easily mitigated (they are easily visible from 10 km) in virtually all landscapes (personal observations), however indications are (PGWC, 2006) that they are perceived to aesthetically/artistically more acceptable in agricultural or manicured landscapes;
- The fact that the turbines are in continuous motion creates a visual impact more severe than that caused by static objects and buildings;
- Shadow flicker – an impact particular to wind turbines, comprises very large moving shadows created by the giant blades when the sun is low on the horizon. Such shadows can extend considerable distances from the turbine. Continuous shadow flicker will have a serious impact on the sense of place of a heritage site;
- Visual impact of road cuttings into the sides of slopes will affect the cultural, natural and wilderness qualities of the area; and
- Residual impacts can occur after the cessation of operations. The large concrete turbine bases will remain buried in the ground indefinitely. Bankruptcy or neglect by a wind energy company can result in turbines standing derelict for years creating a long term eyesore.

While it is not expected that physical impacts will result, changes to the way in which the area is used by people can result in impacts. If the intangible qualities of a place are affected in such a way that it becomes an undesirable place to visit or reside, the sustainable use of the buildings

will diminish. There is merit in making sure that no structures are affected by shadow flicker or noise which may result in them being uninhabitable.

Not implementing the proposal will result in no impacts to heritage, apart from those impacts caused by natural forces such as erosion, weathering and natural decay.

7.3. Mitigation and Management

The amount, size and placement of turbines will influence the degree to which they impact on the intangible qualities of an area. Mitigation of visual impacts is not feasible; however some measures can be taken to avoid impacts to the farm houses and their surrounds. It is recommended that the following mitigation measures are implemented.

- Turbines must be positioned in such a way that they are as far as is feasible out of view of buildings or collections of buildings with heritage significances.
- Turbines should be kept out of view of places of high aesthetic significance.
- Road alignments must be planned in such a way that the minimum of cut and fill operations are required;
- Guarantees for demolition of turbines after their useful life must be in place as a condition of approval.

8. CONCLUSIONS

Given that buffers are likely to be established around the farm werf, and water features (pans and streams), it is highly unlikely that significant archaeology or other above ground heritage material will be impacted.

The only major impact that will be experienced is that to the sense of place. This impact is likely to be high, however the remoteness of the site and the lack of visual receptors in the area lessen the severity of the impact.

The scoping study concludes that the proposed site is suitable for the intended use and the Environmental Impact Assessment Phase should continue. No red flag issues have been identified.

Two areas of high sensitivity are identified. These are around the structures and ruins at Namies South and the farm werf and pan at Poortjie.

9. RECOMMENDATIONS

The planned impact assessment phase should proceed. The heritage studies should include assessment of archaeological and built environment resources as well as cultural and scenic value of the landscape. In addition to the standard components of the facility, particular attention should also be paid to the alignment of the access road to the site (the buildings and ruins at Namies South are sensitive).

10. REFERENCES

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APPENDIX – Site listing

Site Name	GPS #	Co-ordinates	Description
PTJ2012/001	002	S29 19 09.2 E19 19 51.4	Poortjie farm werf on eastern side – 1940s to 1960s buildings.
PTJ2012/002	003	S29 19 15.4 E19 19 49.4	Grooves in bedrock near pan. Three rocks with 7, 1 & 3 grooves respectively. Some old bottle glass around the area.
	004	S29 19 16.2 E19 19 48.9	Ground surface on bedrock.
	005	S29 19 16.4 E19 19 48.1	Light groove on bedrock.
	006	S29 19 15.2 E19 19 50.2	Grooves in bedrock – 2 grooves.
	008	S29 19 14.2 E19 19 48.5	Grooves and ground patches in bedrock (at least 14) in pan.
	009	S29 19 13.8 E19 19 49.4	Grooves and ground patches in bedrock (at least 6) in pan.
	010	S29 19 15.8 E19 19 52.2	Grooves and ground patches in bedrock (2 grooves and two ground areas).
	011	S29 19 15.4 E19 19 53.5	Grooves and ground patches in bedrock (at least 5 grooves and ground areas).
	012	S29 19 12.0 E19 19 52.2	Two boulders with 1 groove each. (apparently there were more grooves before they built the “dam” around the pan but pan has silted up a bit.
PTJ2012/003	006B	S29 19 13.8 E19 19 49.4	Pan has a stone and earth wall built around it that was built in the 1930s/1940s to increase water catchment.
PTJ2012/004	007	S29 19 18.8 E19 19 46.4	Occupation site on a very low rise a short way from the pan – OES (lots), clear quartz, milky quartz, fine-grained black rock, CCS, broken and flaked crystals, clear and green glass. Quartz scraper. Site occurs on softer where animals have been digging.
PTJ2012/005	013	S29 19 06.3 E19 20 01.2	Van Niekerk family graveyard. * graves with deaths occurring between 1924 and 1994.
PTJ2012/006	014	S29 19 20.7 E19 19 51.3	Occupation site on a very low rise a short way from the pan – OES (lots), clear quartz, milky quartz, fine-grained black rock, CCS, bone fragment, tortoise carapace fragment, an OES bead of c. 8 mm, decorated pottery rim (typical 2 nd millennium AD impressed style), UG/HS, LG, glass fragments. CCS endscraper. Site occurs on softer where animals have been digging.
PTJ2012/007	015	S29 19 47.9 E19 19 52.6	Quarried quartz outcrop. A few flakes are identifiable among the very dense quartz gravel.
PTJ2012/008	018	S29 23 41.7 E19 21 40.8	Light scatter of quartz and OES in river sand in the Poortjie.
PTJ2012/009	019	S29 23 38.3 E19 21 42.6	Stonelined earth dam in the Poortjie – it has burst.
PTJ2012/010	020	S29 19 10.1 E19 19 42.8	Stone kraal with dung on top of the walls.
PTJ2012/011	021	S29 19 26.9 E19 18 42.7	Farm werf on west half – mostly modern but southern house is probably 1940s.
PTJ2012/012	L001	S29 19 21.9 E19 19 51.3	A very dense scatter of quartz artefacts (cores and flakes) made on quartz crystal and some OES frags
PTJ2012/013	L002	S29 25 12.1 E19 19 21.7	A scatter of about 20 vein quartz artefacts (cores and flakes) over an area of about 3m ² , on the edge of a dried river bed.
NMS2012/001	001	S29 18 11.3 E19 12 36.9	Namies – school building and many ruins nearby.
NMS2012/002	024	S29 19 55.4 E19 15 32.1	Quartz flakes among the gravel on the hill.
NMS2012/003	025	S29 18 54.6 E19 14 27.6	Rock with two ground areas immediately next to a river channel.