

**A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED 75 MW BRAKFRONTEIN PHOTOVOLTAIC SOLAR FARM, VICTORIA WEST, NORTHERN CAPE PROVINCE.**

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## **A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED 75 MW BRAKFORTEIN PHOTOVOLTAIC SOLAR FARM, VICTORIA WEST, NORTHERN CAPE PROVINCE.**

**NOTE:** This report follows the minimum standard guidelines required by the South African Heritage Resources Agency (SAHRA) for compiling a Phase 1 Archaeological Impact Assessment (AIA).

### **1. EXECUTIVE SUMMARY**

#### **1.1. Purpose of the Study**

The purpose of the study was to conduct and compile a phase 1 archaeological impact assessment (AIA) for the proposed establishment of the Brakpoort 75 MW photovoltaic solar farm on the Farm Kliphokkies 3/173, near Victoria West, Northern Cape Province. The survey was conducted to establish the range and importance of the exposed and *in situ* archaeological heritage material remains, sites and features; to establish the potential impact of the development; and to make recommendations to minimize possible damage to the archaeological heritage.

#### **1.2. Brief Summary of Findings**

Surface scatters of weathered and patinated Middle Stone Age stone artefacts were observed within the area proposed for development. The stone artefacts were manufactured on a fine-grained raw material (hornfels) and comprised of flakes and blades with some edge-damage and secondary retouch. Denser scatters of Middle Stone Age artefacts occurred in three areas within the proposed area. No other organic or material archaeological remains were observed in association with the stone artefact surface scatters. The remains of a dry stone packed corbelled building were documented near the southern boundary of the development adjacent to the railway line. Dry packed stone walling resembling an entry way was documented near to the remains of a stone packed corbelled building. Broken glass and ceramics, as well as fragments of metal and tin presumably of both recent and later origin occur all along the extent of the southern boundary of the proposed development adjacent to the railway line. A *koppie* (hillock) situated within the centre of the proposed area yielded some Later Stone Age stone artefacts and worked glass, as well as four circular dry packed stone features. Fragments of glass and ceramics were also documented within this area of the *koppie*.

### 1.3. Recommendations

1. A 100m diameter protection perimeter around the archaeological site (Brakfontein3) on the rocky outcrop must be established before and during all construction and development activities to avoid negative impact.
2. The southern development boundary should be shifted 200m inwards to avoid impact to the denser scatters of the stone artefact scatters, the corbelled building, stone walling and other artefact scatters.
3. A 100 m diameter perimeter boundary should be established around Brakpoort 4 before and during all construction and development activities to avoid negative impact
  - 3.1. If the abovementioned recommendation cannot be fulfilled a destruction permit must for to destroy the site for development to take continue.
4. A professional archaeologist (with an already authorised collection permit) must be appointed during all construction and development activities including vegetation clearing and the excavation activities to monitor and identify possible archaeological material remains and features that may occur below the surface and make further appropriate recommendations on removing and / or protecting the archaeological material remains and features.
5. If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.
6. Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

## 1.4. SIGNIFICANCE RATINGS

TABLE 1.4.1.SIGNIFICANT RATINGS OF IMPACTS.

Impact	Consequence	Probability	Significance	Status	Confidence
Impact 1: The Destruction Sites BSite1, BSite2, and BSite4.	Very High	Definite	High	-ve	High
With Mitigation	Very Low	Possible	Insignificant	-ve	High
Impact 2: The Destruction of Stone Artefact Surface Scatters.	Very High	Definite	High	-ve	High
WithMitigation	Very Low	Possible	Insignificant	-ve	High
Impact 3: The Destruction of the remains of the corbelled building.	Very High	Definite	High	-ve	High
With Mitigation	Very Low	Possible	Insignificant	-ve	High
Impact 4: The Destruction of the stone walling.	Very High	Definite	High	-ve	High
With Mitigation	Very Low	Possible	Insignificant	-ve	High
Impact 5: The destruction of the <i>koppie</i> site and associated artefact scatters and stone features.111	Very High	Definite	High	-ve	High
With Mitigation	Very Low	Possible	Insignificant	-ve	High

## 2. BACKGROUND INFORMATION

Af-Rom Energy proposes to establish a 75 MW photovoltaic solar farm in the Cradock region in order to supply electricity to Eskom via the REBID program.

SRK Consulting applied for a downscaling of the process from a S & EIR process to a Basic Environmental Assessment process based on:

- The comparatively low impacts associated with a PV Solar Farm compared with impacts typically associated with the listed activities in EIA regulations; and
- The basic assessment obtaining specialist input to address potential authority and stakeholder issues.

The phase 1 archaeological impact assessment (AIA) report has been prepared as part of the Basic Environmental Assessment phase.

The proposed activity includes the development of a 75 MW photovoltaic solar farm that would comprise the following infrastructure:

- Up to 75 MW (depending on the environmental and technical constraints associated with the site) of photovoltaic (PV) panels.
- PV panels are anticipated to be constructed in rows (along and east/west axis). The bottom edge of the PV panel will be no closer than 300m from natural ground level, and the top edge is likely to be no higher than 2000m from natural ground level;
- PV panels in a single row are anticipated to be no more than a few centimetres apart, creating an approximation of a solid row of PV panels, and reducing the extent of the area required;
- Rows of PV panels will be separated to ensure that one row of panels does not create shadows on the row behind. The precise spacing must still be determined;
- PV panels will either be fixed (no adjustment of angle, or orientation possible), or will be able to be tilted on a north/south axis to improve energy production. The ability to tilt the panels will reduce the spacing of rows of panels;
- Anchoring of the PV panels to the ground will be by means of an innovative anchoring system that involves drilling a 64mm diameter hole, to a depth of approximately 1200mm, and inserting a 1500mm long galvanised steel post;
- Construction of inverter substations - Clusters of PV modules will be connected with underground cables to inverter substations;
- Construction of a Step-up Substation - The substation will have transformers to step up the medium voltage (either 22 kV or 33kV) to High Voltage (HV) 132kV. Switchgear and metering will also be found in the substation;
- Internal cabling - medium voltage (MV) underground power lines will be installed from the inverter substations to a central collector/step-up substation;
- Construction of a 132 kV overhead power line - an overhead line of approximately 1 km (length) to be confirmed) will run from the step-up substation to the Eskom Substation (attached to the Beaufort West to De Aar) electric rail line);
- Internal roads will be required and are likely to be either natural tracks, or potentially gravel. A short accessroad to the site will be required. The precise location is still to be determined;
- For safety and security reasons, a security fence and a fire break would be required around the perimeter of the site. the area to be fenced is expected to be between 150 and 150 ha;
- Construction of Control room - a control room may be required for the operation and maintenance personnel. Some equipment may also be stored in the control

room. The control room is anticipated to include limited ablution facilities linked to a septic tank;

- A water reservoir for cleaning panels. The capacity of the reservoir has not been determined, but is likely to be approximately 50 000 litres;
- Water for cleaning panels, and for limited domestic use, is anticipated to be from existing boreholes.

The site was chosen based on its favourable climatic conditions for a solar farm and close proximity of existing Eskom 132 kV substations for connection to the grid. The plant is expected to have a lifespan of approximately 25 years after which the plant will be decommissioned.

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**Terms of Reference (ToR)**

- Provide an indication of the methodology used in determining the significance of potential environmental (archaeological heritage) impact by conducting and compiling the phase 1 archaeological impact assessment (AIA);
- Describe all environmental issues (archaeological heritage) that were identified during the phase 1 archaeological impact assessment (AIA) and;
- Assess the significance of direct, indirect and cumulative impacts on the environment (archaeological heritage) for Solar Park 1 and Solar Park 2 as separate entities.

### 3. BRIEF LEGISLATIVE REQUIREMENTS

Parts of sections 35(4), 36(3) and 38(1) (8) of the National Heritage Resources Act 25 of 1999 apply:

#### *Archaeology, palaeontology and meteorites*

35 (4) No person may, without a permit issued by the responsible heritage resources authority—

- (a) *destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;*
- (b) *destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;*
- (d) *bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.*

#### *Burial grounds and graves*

36. (3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

- (a) *destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- (b) *destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or*
- (c) *bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.*

#### *Heritage resources management*

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as -

- (a) *the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- (b) *the construction of a bridge or similar structure exceeding 50m in length;*



- (c) any development or other activity which will change the character of the site -
- (i) exceeding 5000m<sup>2</sup> in extent, or
  - (ii) involving three or more 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 resources authority;
- (d) the re-zoning of a site exceeding 10 000m<sup>2</sup> in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must as 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.

#### 4. BRIEF ARCHAEOLOGICAL BACKGROUND

Little is known about the archaeology of the immediate area, mainly because no systematic archaeological research has been conducted within the proposed area for the Brakpoort Renewable Solar Farm. Records of early travelers through the area as well as those of early settlers of the town of Victoria West and surrounds make mention of their interactions with San people who still inhabited the area during the latter half of the 1800's.

The Early Stone Age spans a period of between 1.5 million and 250 000 years ago refers to the earliest that *Homo sapiens sapiens* predecessors began making stone tools. The hallmark of the Acheulian Industry is its large cutting tools (LCTs or bifaces), primarily handaxes and cleavers. The most well know Early Stone Age site in southern Africa is Amanzi Springs, situated about 10km north-east of Uitenhage, near Port Elizabeth (Deacon 1970). In a series of spring deposits a large number of stone tools were found *in situ* to a depth of 3-4m. Wood and seed material preserved remarkably very well within the spring deposits, and possibly date to between 800 000 to 250 000 years old. Archaeologists such as A.H.J. Goodwin, during the mid-1920's, identified an exclusive stone tool industry as the Victoria West Industry which occurred around the town of Victoria West and along the Vaal River (Goodwin 1926, 1946).

The Middle Stone Age spans a period from 250 000-30 000 years ago and focuses on the emergence of modern humans through the change in technology, behaviour, physical appearance, art and symbolism. Various stone artefact industries occur during this time period, although less is known about the time prior to 120 000 years ago, extensive systemic archaeological research is being conducted on sites across southern Africa dating within the last 120 000 years (Thompson & Marean 2008). The large handaxes and cleavers were replaced by smaller stone tools called the Middle Stone Age flake and blade industries. Surface scatters of these flake and blade industries occur widespread across

southern Africa although rarely with any associated botanical and fauna remains. It is also common for these stone artefacts to be found between the surface and approximately 50-80cm below ground. Fossil bone may in rare cases be associated with MSA occurrences (Gess 1969). These stone artefacts, like the Earlier Stone Age handaxes are usually observed in secondary context with no other associated archaeological material.

The Later Stone Age spans a period from 40 000 years ago to the historical period (the last 500 years) until 100 years ago and is associated with the archaeology of San hunter-gatherers. The majority of archaeological sites found in the area would date from the past 10 000 years where San hunter-gatherers inhabited the landscape living in rock shelters and caves as well as on the open landscape. Documentation of interactions with San hunter-gatherers in the surrounding Victoria West regions are recorded as recent as the latter half of the 1800's (Green 1955, Rosenthal 1959).

The Later Stone Age archaeology of the Great Karoo stretching across the Eastern Cape, Northern Cape and Western Cape is rich and varied. Various studies (Beaumont & Morris 1990, Beaumont & Vogel 1984, Morris & Beaumont 1990, Sampson 1985), have shown that the general area surrounding the proposed area for the development has been relatively marginal regarding precolonial human settlement, but is in fact exceptionally rich in archaeological sites and rock art (paintings and engravings [to be discussed in the following section]). Previously conducted phase 1 archaeological impact assessments, namely the Hydra-Gamma 765kV transmission lines from near De Aar to Victoria West and closer to the N1 national route indicated that several Stone Age sites, surface assemblages, rock engravings and painted sites occurred within the area (Binneman *et al.* 2011; Morris 2006). In May 2010, archaeologists from the Albany Museum conducted a phase 1 archaeological impact assessment close to the area of the proposed Hydra-Gamma substation on the Farm Skietkuil (Binneman *et al.* 2010). It was observed that Later Stone Age stone artefacts predominantly made on a fine-grained black raw material (hornfels) and silcrete were observed closer to the small rocky outcrop within the area proposed for development. The stone artefacts included flakes, some showing an indication of utilisation and retouch, formal tools such as scrapers, as well as two lower grindstones. A piece of Khoekhoen pottery was also observed on the periphery of area surveyed.

Some 2 000 years ago Khoekhoen pastoralists entered into the region and lived mainly in small settlements. They were the first food producers in South Africa and introduced domesticated animals (sheep, goat and cattle) and ceramic vessels to southern Africa. Often, these archaeological sites are found close to the banks of large streams and rivers. Large piles of freshwater mussel shell (called middens) usually mark these sites. Precolonial groups collected the freshwater mussel from the muddy banks of the rivers as a source of food. Mixed with the shell and other riverine and terrestrial food waste are also cultural materials. Human remains are often found buried in the middens (Deacon and Deacon 1999).

Historical archaeology refers to the last 500 years when European settlers and colonialism entered into southern Africa. In the early days of colonialism the Karoo was still a sparse and unknown area. It was only until the early travelers and pioneer white farmers ventured into this harsh landscape and documented their encounters with the San hunter-gatherers and Khoekhoen that had originally inhabited the landscape. Therefore, the towns of the Great Karoo were established much later. The establishment of the town of Victoria West began during the 1840's, but by a proclamation issued, it was only on Christmas Eve, December 24 1955, that the District of Victoria West came into existence (Rosenthal 1959).

During the latter half of the 1800's, Xhosa-speaking people began migrating from the Ciskei-Transkei areas across the Karoo into the Northern Cape Karoo areas, owing to the influx of British forces, settlers and disruption of their settlement patterns (Anderson, nd). Historical archaeological research is currently being conducted approximately 70km to the north, north-west of the town of Victoria West on the historical remains of these Xhosa settlements (S. Hall pers. comm. 2010).

The district of Victoria West also played a small part in the Anglo-Boer War as well as World War 1. During 1902 it was written in *The London Gazette* that "a line of blockhouses has been commenced which will ultimately run from Lambert's Bay, by Calvinia to Victoria West, a distance of over 200 miles", this line of block houses was to curtail the freedom of movement of rebels that had been causing havoc within the greater Victoria West area. The map indicating the line of blockhouses can be found in Shearing and Shearing 2000 (p 150).

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## **5. DESCRIPTION OF THE PROPERTY**

### **5.1. Area Surveyed**

The area for the proposed Brakpoort 75 MW Photovoltaic Solar Farm is situated on the Farm Kliphokkies 3/173 and approximately 30 km east of Victoria West. The south-eastern boundary of the proposed development runs adjacent to the Beaufort West to De Aar electric railway line. The Brakpoort substation is situated within the proposed area and overhead power lines run the across the area. Only 400 ha of the total 3 636 ha area will be under lease for the proposed solar farm.

The proposed area is situated on the flat floodplains and comprises typical Karoo vegetation predominantly made up of Eastern Karoo vegetation. No waterways occur within the proposed area. A *koppie* (hillock) occurs in the centre of the proposed area and another *koppie* is situated outside the northern development boundary.

### **5.2. Map**

1:50 000 map: 3123AD BRAKPOORT

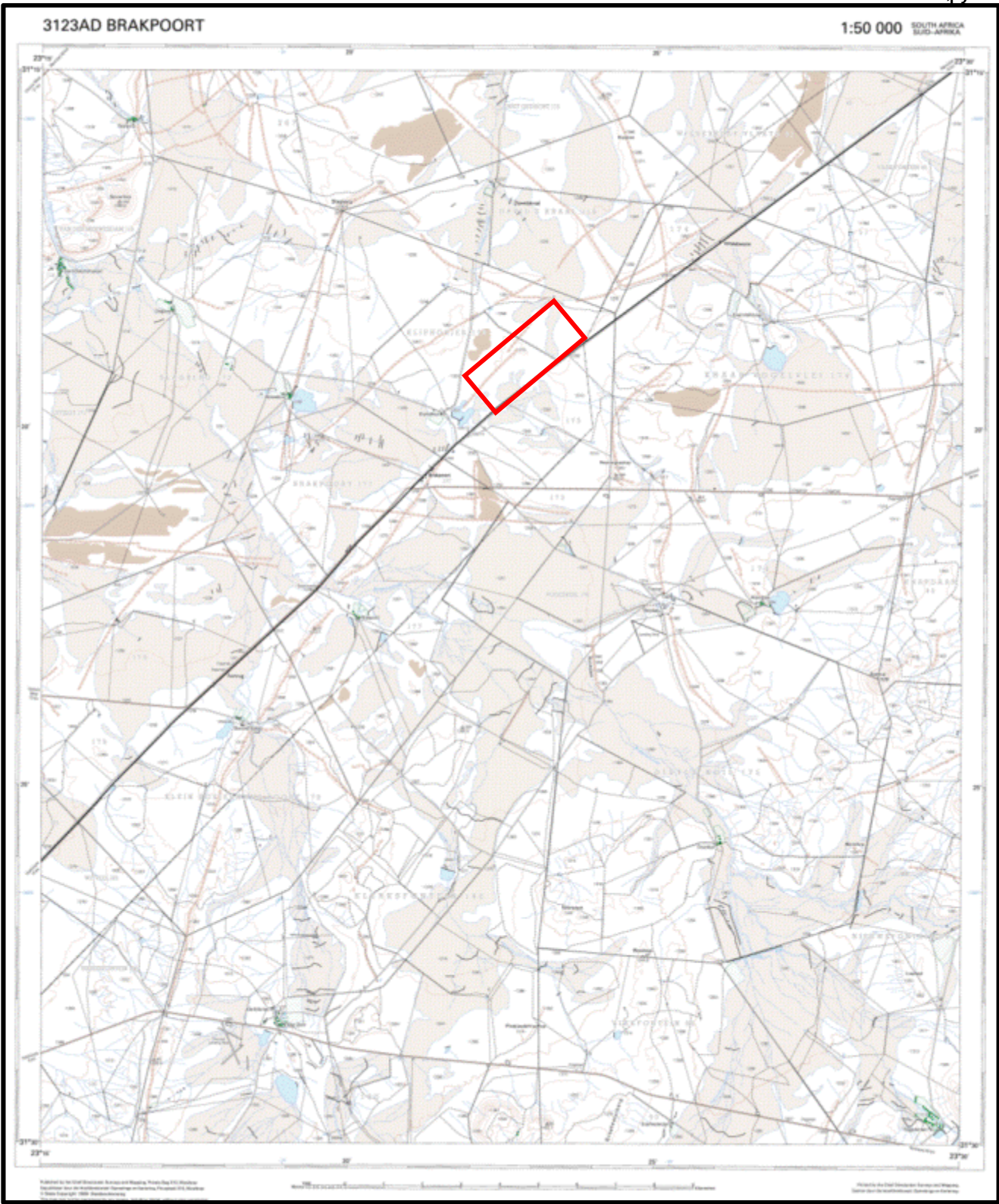


Figure 1. Map 1:1:50 000 topographic map showing the location of the proposed 75 MW Brakpoort Solar Farm.

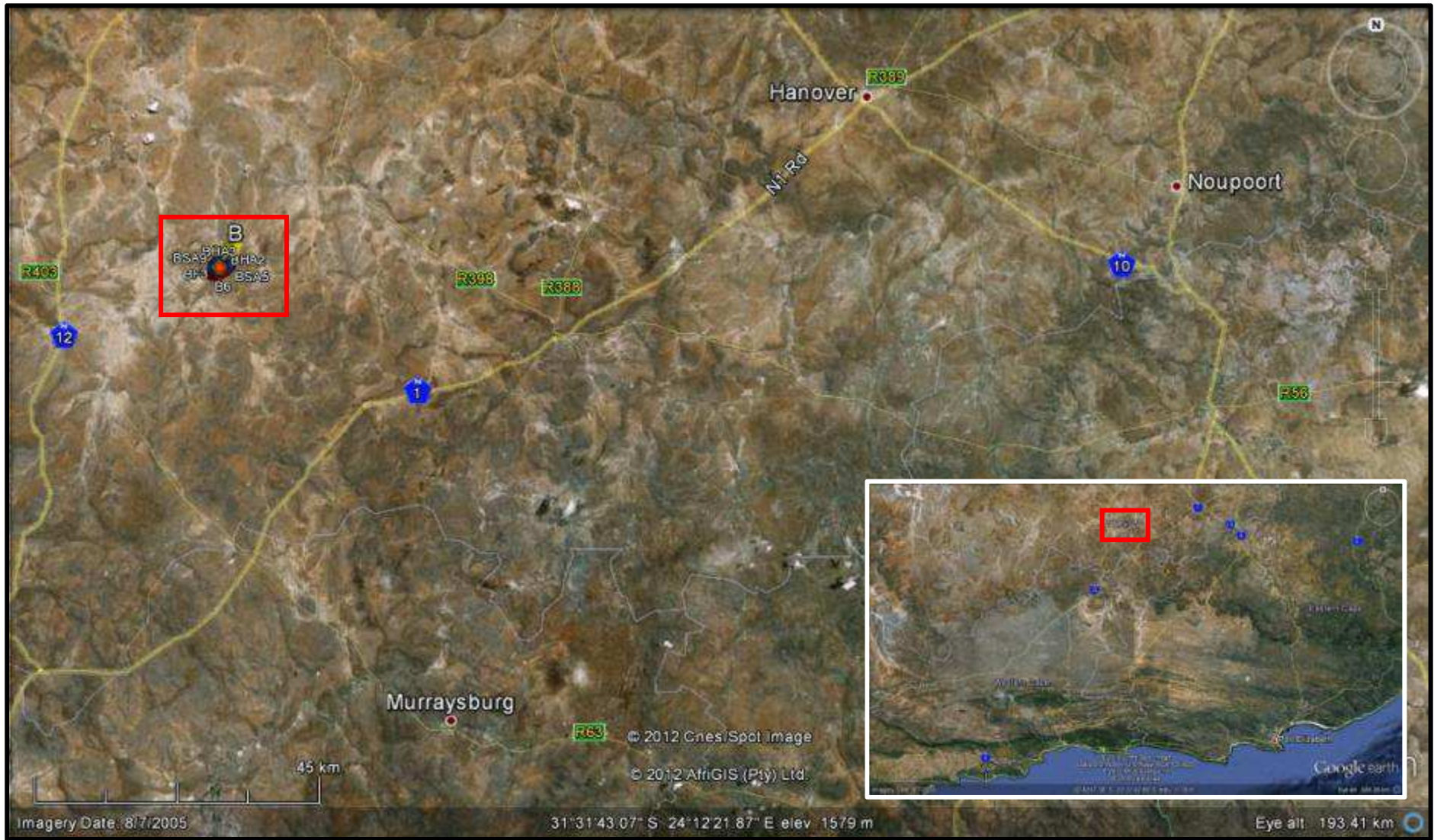


Figure 2. Map 2. Aerial view of the proposed area for the 75 MW Brakpoort Photovoltaic Solar Farm.

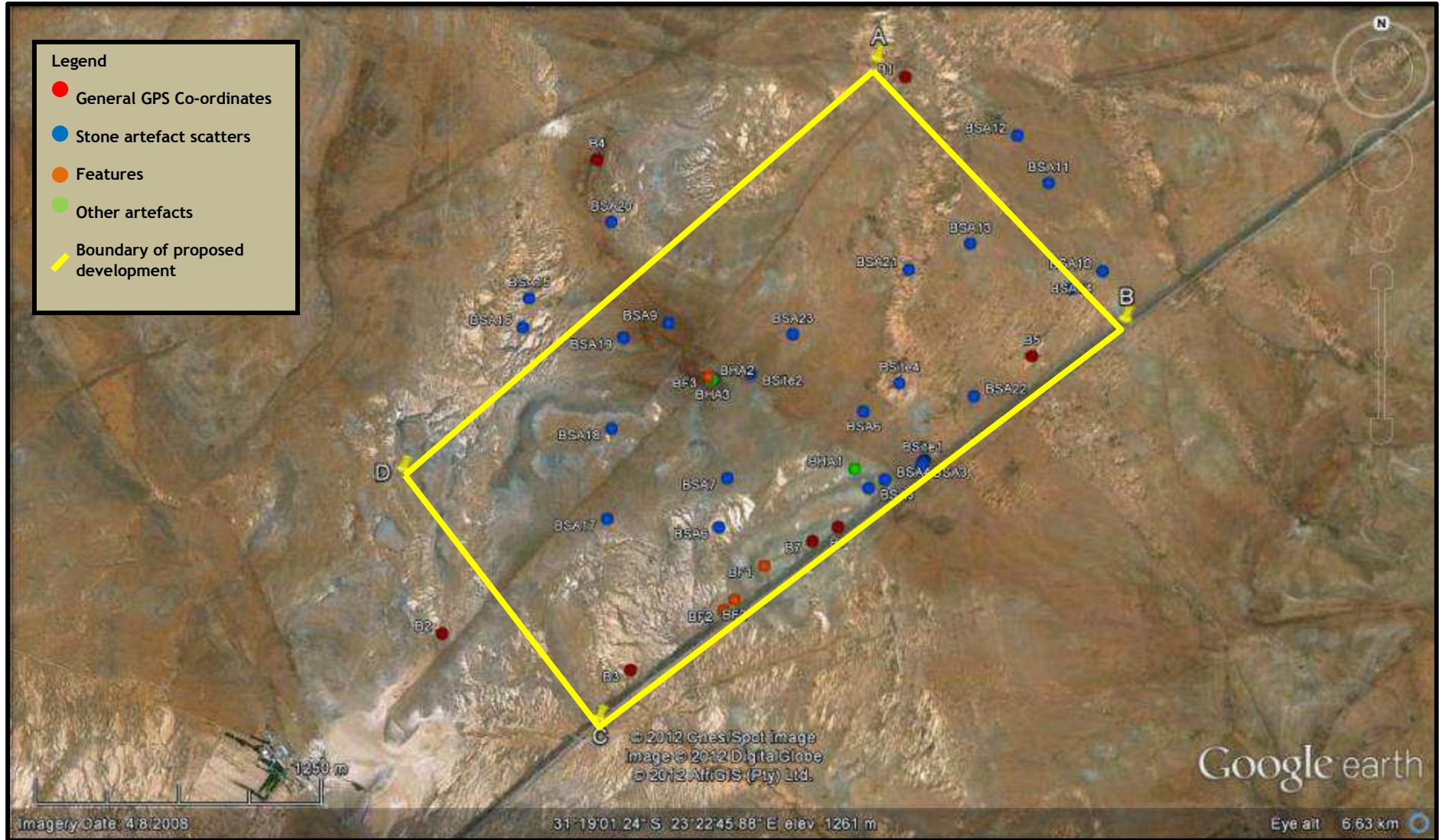


Figure 3. Map 3. Close-up aerial view of the area proposed for the 75 MW Brakpoort Photovoltaic Solar Farm.



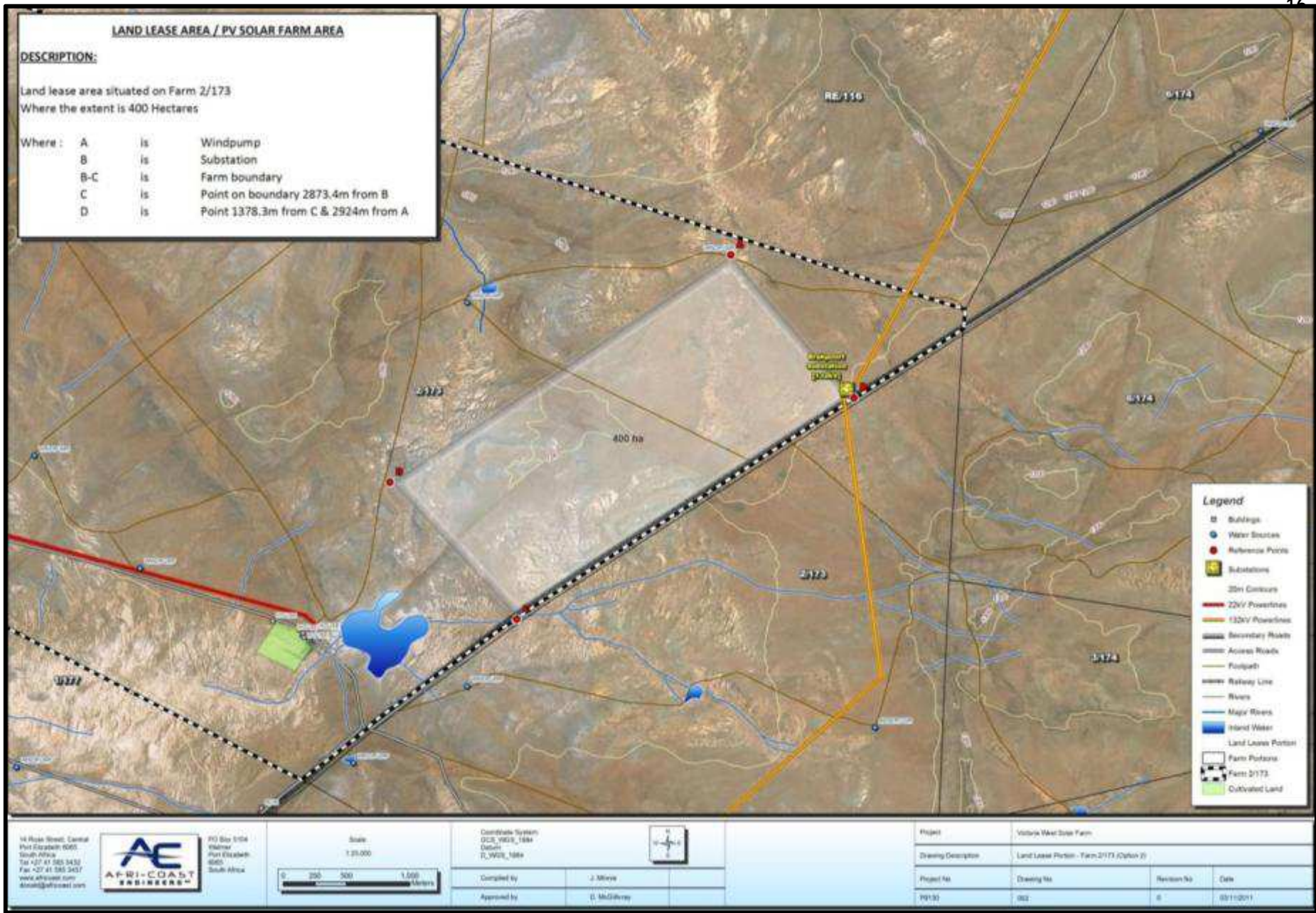


Figure 4. Map 4. Layout of the proposed 75 MW Brakpoort Photovoltaic Solar Farm (courtesy of SRK Consulting).

## 6. ARCHAEOLOGICAL INVESTIGATION

The archaeological investigation was conducted on foot focusing on the 400 ha area proposed for the 75 MW Brakpoort Photovoltaic Solar Farm. The GPS co-ordinate readings and photographs were taken using a Garmin Oregon 550 unit. The general GPS readings, artefact surface occurrences, and sites have been plotted on Map 5. Archaeological visibility was generally good throughout the proposed area except where dense grass and vegetation occurred. The exposed and disturbed areas were investigated for the possibility of archaeological remains, features, and sites (Figure 5-8).

The north-eastern corner of the proposed area has been disturbed by the construction of the Brakpoort substation and associated power lines that run to the north-west across the proposed area (Figure 9). The construction of the internal farm dirt roads, fences, reservoirs, and erosion add to the areas that have been disturbed and may therefore expose or move the archaeological heritage remains out of *in situ* context. The majority of the proposed area on the flat floodplains is relatively undisturbed having been used for stock grazing.



Figure 5. View of the landscape.



**Figure 6. View of the landscape.**



**Figure 7. View of the landscape and exposed area investigate for possible archaeological remains.**



Figure 8. View of the landscape and the substation and associated overhead powerlines.

#### 6.1. Middle Stone Age stone artefact scatters



Figure 9. Map 5. Close-up aerial view showing the location of the denser stone artefact scatters.

Three areas contained denser scatters of Middle Stone Age stone artefacts and these have been considered significant enough to be classified as sites (Brakpoort 1 [BSite1], Brakpoort 2 [BSite2], and Brakpoort 4 [BSite4]). The denser stone artefact scatter at Brakpoort 1 (BSite1) is approximately 100 m x 100 m in extent and is situated near to the eastern development boundary adjacent to the railway line. The stone artefact scatter at Brakpoort 2 (BSite2) is situated halfway on the slight gradient slope of the *koppie* in the centre of the development area and is approximately 100 m x 100 m in extent. Further surface scatters of stone artefacts triple out towards the internal farm dirt gravel road. Brakpoort 4 (BSite3) is situated within an exposed area extending into the denser vegetation area near the fence line close to the internal dirt road that runs north-south through the middle of the proposed area. The area is approximately 100 m x 100m in extent (Figures 10-12).

Isolated surface scatters of patinated and weathered Middle Stone Age stone artefacts were documented within the proposed area. The stone artefacts, including those documented at BSite1, BSite2, and BSite4) were mainly manufactured on a fine grained black (hornfels) raw material and included flakes, blades, and cores. Many of the stone artefacts contained cortex. Some of the stone artefacts showed evidence of secondary retouch and edge-damage, although some of the edge-damage is recent and may have been caused from trampling by humans and animals (Figures 13-18).

Although no other organic or material archaeological remains were observed in association with the denser scatters of stone artefacts (BSite1, BSite2, and BSite3) or the isolated surface scatters. The surface scatters of stone artefacts are probably not *in situ* and therefore occur in a secondary context. No other archaeological organic or material remains were observed in association with the stone artefacts. However, according to previous observations the stone artefacts may occur between the surface and 50-80 cm below ground.

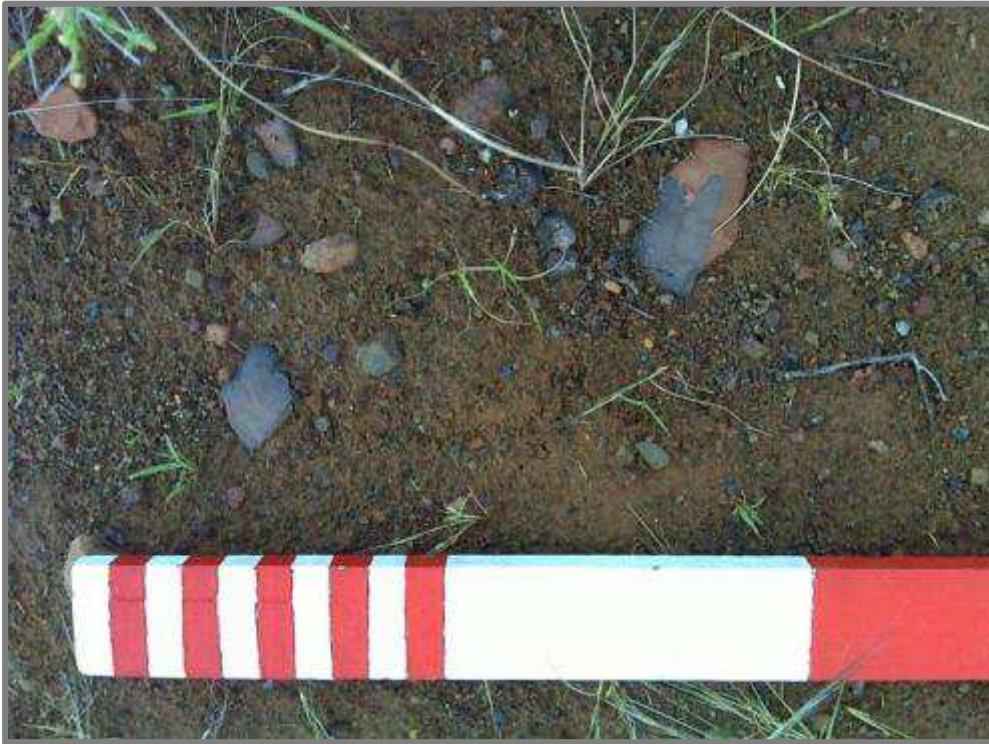


Figure 10. Stone artefact surface scatter at Brakpoort 1 (B Site 1).



Figure 11. Stone artefact surface scatter at Brakpoort 2 (B Site 2).

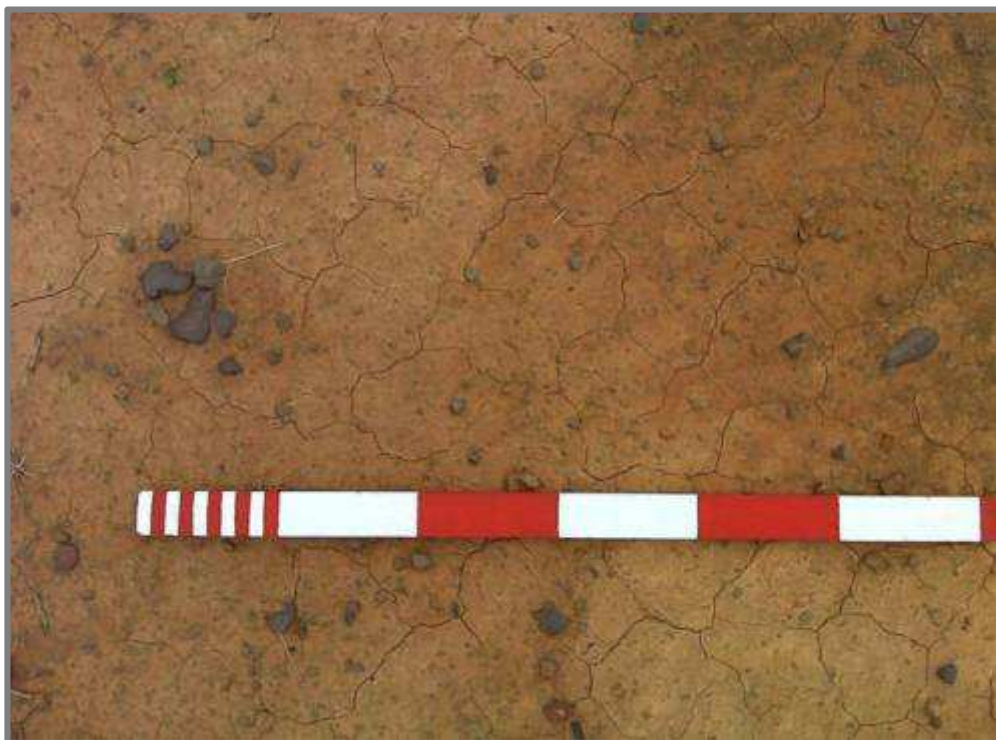


Figure 12. Stone artefact surface scatter at Brakpoort3 (BSite3).



Figure 13. Examples of stone artefacts.

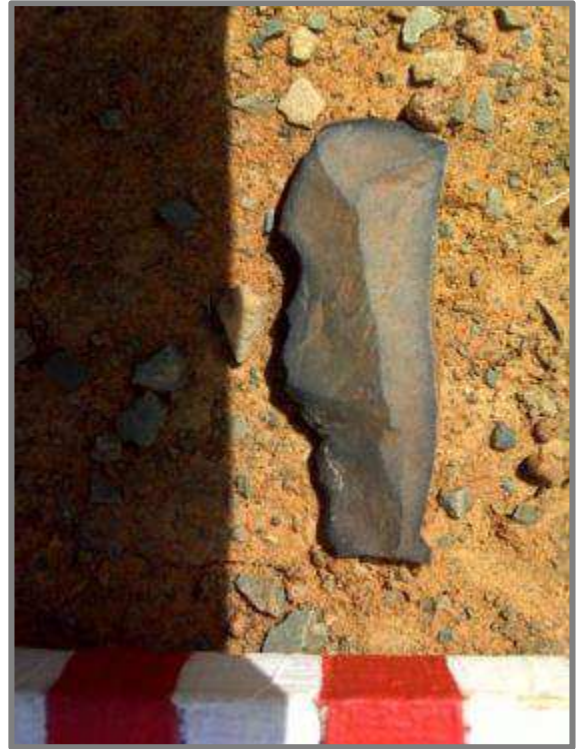


Figure 14. Examples of stone artefacts.



Figure 15-16. Examples of stone artefacts.





Figures 17-18.Examples of stone artefacts.

## 6.2. Stone walling features



Figure 19. Map 6. Close-up aerial view of the stone built features.

The remains of a stone packed corbel building was documented at the area marked BF1. The interior of the building seems to be raised within the main area and layered with two separate areas packed with stone walling (Figures 20-23). A raised and disturbed area situated a few metres to the north of the remains of the corbelled building was documented. The entire area is approximately 100 m x 100 m in extent. Several broken glass, ceramics, and fragments of metal and tin were observed around the area of the dwelling.

A dry packed stone walling was documented south of the remains of the corbelled building (BF2 (Figure 24)). The area of the stone wall is approximately 150 m in length and about 60 cm in width. The stone wall resembles an entry way by the space within the middle of the extent of the stone wall. The stone wall is situated adjacent to the eastern development boundary and railway line.



**Figure 20. View of the remains of the corbelled building.**



Figure 21. View of the remains of the corbelled building.



Figure 22. Close-up view of the corbelled building.



Figure 23. View of the raised disturbed area near to the corbelled building.



Figure 24. View of the dry packed stone wall.

### 6.3. Brakpoort Site 3 (BSite3)



Figure 25. Map 7. Close-up aerial view of the BSite3 on the *koppie*.

Brakpoort 3 (BSite3) is situated on the *koppie* (hillock/rocky outcrop) in the centre of the proposed development. Although the area contained a range of archaeological remains and stone features the area has been classified as one site for easier explanation and more comprehensive recommendation for the protection of the archaeological heritage. The archaeological heritage remains were limited to the southern portion of the rocky outcrop and only a few isolated stone artefacts were observed in the northern area. The area contained a few Later Stone Age stone artefacts, worked glass artefacts, circular stone features and scatters of broken glass and ceramics.

Only a few Later Stone Age stone artefacts were observed comprising formal tool manufactured on a fine-grained black (hornfels) raw material. Two worked glass artefacts resembling scraper retouch were also documented within the area (Figure 26). Four dry stone packed circular features were documented. The features were all similar in size, approximately 2 m x 2 m in extent. One circular stone feature occurred isolated to the east of the limited area and the remaining three were arranged vertically up the slope of the rocky outcrop (Figures 27-28). Broken glass and a variety of ceramics sherds were observed in association with the circular stone artefact (Figure 29).



Figure 26. Two scraper-shape worked glass artefacts.



Figure 27. One of the dry packed stone walling feature.



Figure 28. One of the dry packed stone walling circular features arranged upslope.

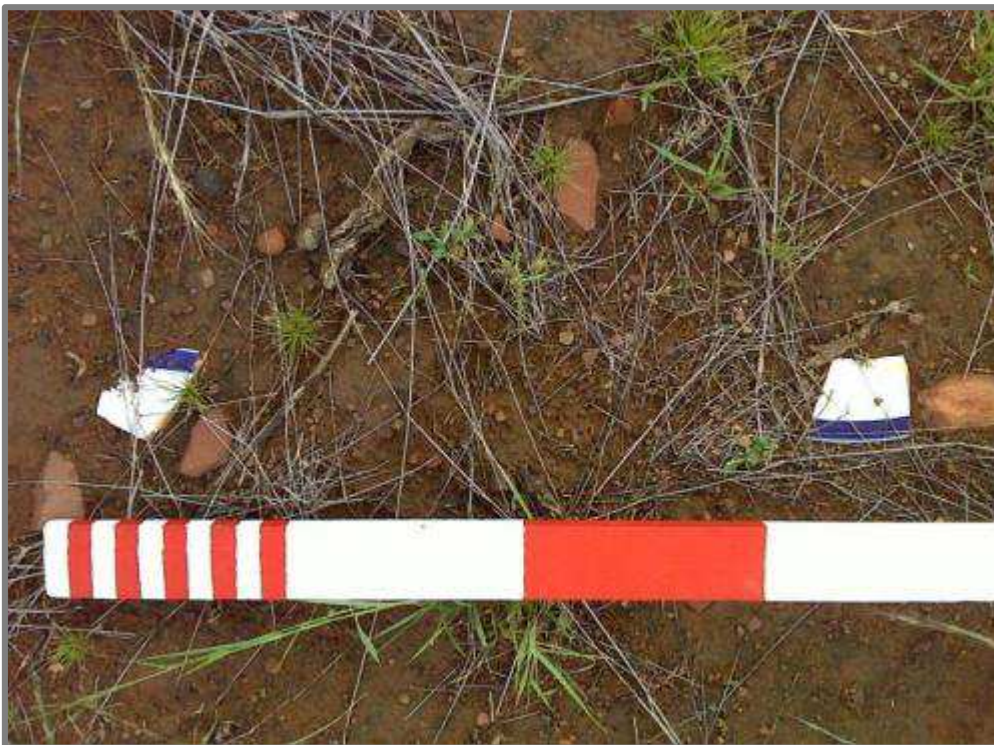


Figure 29. Example of broken ceramics sheds.

## 7. DESCRIPTION OF SITES

### 7.1. Stone Artefact Occurrences and Scatters:

Mainly isolated occurrences of Middle Stone Age (MSA) stone artefacts are distributed over the proposed area. Although, three areas, BSite1, BSite2, and BSite4, containing denser scatters of stone artefacts have been identified. Each area is approximately 100 m x 100 m. The stone artefacts comprise mainly flakes, blades, and cores manufactured on a fine-grained black (hornfels) raw material. It is unlikely that the surface exposed stone artefacts occur *in situ* and are considered to be in a secondary and disturbed context. No other organic or material cultural remains were documented in association with the stone artefacts.

The stone artefact occurrences and scatters are considered as having a medium cultural significance.

### 7.2 Brakpoort 3 (BSite3)

A rocky outcrop that occurs in the centre of the proposed area for development contained a range of archaeological heritage remains and features. Later Stone Age stone artefacts made on fine-grained raw materials (hornfels) as well scraper-shaped worked glass artefacts were identified within the area. Four dry stone packed circular features, 2 m x 2 m in extent, are situated within the southern portion of the rocky outcrop. Broken glass, a range of ceramic sherds and metal and tin were documented and could possibly be in association with the historical stone walling and glass artefacts.

The Brakpoort 3 site (BSite3) is considered as having a high cultural significance.

### 7.3. Ruins of the corbelled building (BF1) and dry packed stone walling (BF2).

Ruins of a stone packed corbelled building were documented near to the southern development boundary adjacent to the railway line. A raised and disturbed area was observed near to the corbelled building and may be associated. Broken glass, ceramics, metal and tin were observed on the surface surrounding the building.

Dry packed stone walling occurs south of the corbelled building and resembles a possible entry way. The stone walling extends for approximately 150 m and is about 60 cm wide.

The ruins of the corbelled building and stone walling are considered as having a high cultural significance.



## 8. CULTURAL LANDSCAPE

The cultural landscape spans the last 250 000 years showing evidence of Middle Stone Age (MSA), Later Stone Age (LSA), and historical communities' and people interaction with the landscape. The archaeological evidence shows that Middle Stone Age people passed through the area between 250 000 and 30 000 years ago and would have possibly occupied the nearby the rock shelters as recorded at Highlands Rock Shelter situated nearby. Surface scatters of Middle Stone Age stone artefacts are found throughout the wider region to Cradock and Middelburg. It is possible that these people may also have occupied the flat open areas, however, no associated archaeological material or organic remains suggests that more permanent occupation occurred within the proposed area for development.

The Later Stone Age (LSA) open surface scatter site (HF1) indicates that the area may have been an ideally located to observe herds of antelope for hunting. The now exposed area showing evidence of formal tools, flakes, and chips shows that the area was briefly occupied as a minor manufacture site. No other archaeological material or organic remains were observed within the area or any possible depth of archaeological deposit; however, people may have chosen to live in the open sites. The rock engravings also show that the area landscape was used as a canvas to express artistic value of their observances and spiritual and cultural beliefs. There is evidence of Later Stone Age communities occupying rock shelters and the banks of the Great Fish River. Therefore it can be established that people moved across and used the landscape within the last 20 000 years.

Historically the landscape was seen as a viable area to be settled by the incoming *trekboere* and European farmers. The Great Fish River provided sufficient water for the irrigation of agricultural lands. Evidence of the historical influence on the landscape is indicated by the stone wall features occurring within the area as well as some of the rock engravings that may have been made by young shepherds overseeing the domestic livestock.

Currently the landscape is still occupied by European farmers, however, the area has changed hands from the original settlers taking away the generational heritage of the "family farm", however, creating a new culture of farmers continuing the historical use of landscape. The landscape is currently being used for agricultural and domestic grazing purposes accentuated by the easy access to water and irrigation. The railway adds to the use of landscape, historically, as the mainline between Cradock and De Aar.

## 9. GPS CO-ORDINATES AND SITES

**TABLE 1: GPS CO-ORDINATES AND SITES FOR THE PROPOSED BRAKPOORT SOLAR FARM.**

REFERENCE	DESCRIPTION	CO-ORDINATES
BSA1	Middle Stone Age stone artefact surface scatter	31° 19' 06.30"S; 23° 23' 19.10"E
BSA2	Middle Stone Age stone artefact surface scatter	31° 19' 06.50"S; 23° 23' 18.90"E
BSA3	Bsite1; Middle Stone Age stone artefact surface scatter	31° 19' 07.10"S; 23° 23' 18.60"E
BSA4	Middle Stone Age stone artefact surface scatter	31° 19' 09.10"S; 23° 23' 12.60"E
BSA5	Middle Stone Age stone artefact surface scatter	31° 19' 10.30"S; 23° 23' 09.90"E
BSA6	Middle Stone Age stone artefact surface scatter	31° 19' 15.90"S; 23° 22' 45.30"E
BSA7	Middle Stone Age stone artefact surface scatter	31° 19' 09.00"S; 23° 22' 45.30"E
BSA8	Middle Stone Age stone artefact surface scatter	31° 18' 59.50"S; 23° 23' 09.00"E
BSA9	Middle Stone Age stone artefact surface scatter	31° 18' 47.20"S; 23° 22' 36.80"E
BSA10	Middle Stone Age stone artefact surface scatter	31° 18' 39.60"S; 23° 23' 48.30"E
BSA11	Middle Stone Age stone artefact surface scatter	31° 18' 27.20"S; 23° 23' 39.20"E
BSA12	Middle Stone Age stone artefact surface scatter	31° 18' 20.50"S; 23° 23' 34.20"E
BSA13	Middle Stone Age stone artefact surface scatter	31° 18' 35.80"S; 23° 23' 26.50"E
BSA14	Middle Stone Age stone artefact surface scatter	31° 18' 42.10"S; 23° 23' 43.10"E
BSA15	Middle Stone Age stone artefact surface scatter	31° 18' 43.80"S; 23° 22' 13.80"E
BSA16	Middle Stone Age stone artefact surface scatter	31° 18' 47.90"S; 23° 22' 12.80"E
BSA17	Middle Stone Age stone artefact surface scatter	31° 19' 14.80"S; 23° 22' 26.90"E
BSA18	Middle Stone Age stone artefact surface scatter	31° 19' 02.10"S; 23° 22' 27.50"E
BSA19	Middle Stone Age stone artefact surface scatter	31° 18' 49.30"S; 23° 22' 29.40"E
BSA20	Middle Stone Age stone artefact surface scatter	31° 18' 33.00"S; 23° 22' 27.30"E
BSA21	Middle Stone Age stone artefact surface scatter	31° 18' 39.50"S; 23° 23' 16.40"E
BSA22	Middle Stone Age stone artefact surface scatter	31° 18' 57.30"S; 23° 23' 27.20"E
BSA23	Middle Stone Age stone artefact surface scatter	31° 18' 48.70"S; 23° 22' 57.30"E
Bsite1	Middle Stone Age stone artefact surface scatter	31° 19' 06.70"S; 23° 23' 18.80"E
Bsite2	Middle Stone Age stone artefact surface scatter	31° 18' 54.30"S; 23° 22' 50.40"E
Bsite3	On koppie	31° 18' 55.00"S; 23° 22' 44.40"E
Bsite4	Middle Stone Age stone artefact surface scatter	31° 18' 55.50"S; 23° 23' 14.90"E

BF1	Corbelled building	31° 19' 21.30"S; 23° 22' 52.80"E
BF2	Stone walling	31° 19' 26.10"S; 23° 22' 47.90"E
BF2	Stone walling	31° 19' 27.60"S; 23° 22' 46.10"E
BF3	Stone walling	31° 18' 54.70"S; 23° 22' 43.40"E
BHA1	Ceramics and glass near railway	31° 19' 07.60"S; 23° 23' 07.60"E
BHA2	Ceramics; glass; metal; tin - next to stone walling feature	31° 18' 54.90"S; 23° 22' 43.40"E
BHA3	Worked glass scrapers	31° 18' 55.10"S; 23° 22' 44.10"E
B1	General reading	31° 18' 12.30"S; 23° 23' 15.70"E
B2	General reading	31° 19' 31.10"S; 23° 21' 59.70"E
B3	General reading	31° 19' 36.10"S; 23° 22' 30.80"E
B4	General reading	31° 18' 24.20"S; 23° 22' 24.90"E
B5	General reading	31° 18' 51.60"S; 23° 23' 36.70"E
B6	General reading	31° 19' 15.80"S; 23° 23' 04.90"E
B7	General reading	31° 19' 17.80"S; 23° 23' 00.70"E

## 10. RECOMMENDATIONS

The area is of a medium-high cultural sensitivity, the following recommendations must be considered:

1. The remains of the old railway and railway siding are situated outside of the border of the proposed development and must be protected during all construction and development activities to avoid negative impact.
2. A 50m diameter protection perimeter around the circular dry stone walling feature must be established before and during all construction and development activities to avoid negative impact.
3. A 100m diameter protection perimeter around the archaeological site on the rocky outcrop must be established before and during all construction and development activities to avoid negative impact.
4. The location of the undetermined brick feature must be noted and avoided during all construction and development activities.
5. A professional archaeologist (with an already authorised collection permit) must be appointed during all construction and development activities including vegetation clearing and the excavation activities to monitor and identify possible archaeological material remains and features that may occur below the surface and make further appropriate recommendations on removing and / or protecting the archaeological material remains and features.
6. If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.
7. Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

## 11. GENERAL REMARKS AND CONDITIONS

**NOTE:** This report is a phase 1 archaeological impact assessment (AIA) only and does not include or exempt other required specialist assessments as part of the heritage impact assessments (HIAs).

The National Heritage Resources Act (Act No. 25 of 1999, Section 35 [Brief Legislative Requirements]) requires a full Heritage Impact Assessment (HIA) in order that all heritage resources including all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic, or technological value or significance are protected. Thus any assessment should make provision for the protection of all these heritage components including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects.

It must be emphasized that the conclusions and recommendations expressed in this phase 1 archaeological impact assessment (AIA) are based on the visibility of archaeological remains, features and, sites and may not reflect the true state of affairs. Many archaeological remains, features and, sites may be covered by soil and vegetation and will only be located once this has been removed. In the event of such archaeological heritage being uncovered (such as during any phase of construction activities), archaeologists or the relevant heritage authority must be informed immediately so that they can investigate the importance of the sites and excavate or collect material before it is destroyed. The onus is on the developer to ensure that this agreement is honoured in accordance with the National Heritage Resources Act No. 25 of 1999 (NHRA 25 of 1999).

Archaeological Specialist Reports (desktops and AIA's) will be assessed by the relative heritage resources authority. The final decision rests with the heritage resources authority that may confirm the recommendations in the archaeological specialist report and grant a permit or a formal letter of permission for the destruction of any cultural sites.

## APPENDIX A: IDENTIFICATION OF ARCHAEOLOGICAL FEATURES AND MATERIAL FROM INLAND AREAS: guidelines and procedures for developers

### 1. Human Remains:

All human remains exposed during all the phases of the construction activities must be reported to the archaeologist, nearest museum or relevant heritage resources authority. Construction must be halted until the archaeologist has investigated and removed the human remains. Human remains may be exposed when a grave or informal burial has been disturbed. In general, the remains are buried in a flexed position on the side and may also be buried in a sitting position with a flat stone capping the location of the burial. Developers are requested to be aware of the exposing human remains.

### 2. Stone Artefacts:

Stone artefacts are difficult for the layman to identify. Large accumulations of flaked stones that do not appear to have been distributed naturally must be reported. If the stone artefacts are associated with bone / faunal remain or any other associated organic and material cultural artefacts development must be halted immediately and reported to the archaeologist, nearest museum or relevant heritage resources authority.

### 3. Large Stone Features:

Large stone features occur in different forms and sizes, however, are relatively easy to identify. The most common features are roughly circular stone walls (mostly collapsed), usually dry packed stone, and may represent stock enclosures, the remains of wind breaks or, cooking shelters. Other features consist of large piles of stones of different sizes and heights are known as *isisivane*. These features generally occur near river and mountain crossings. The purpose and meaning of the *isisivane* are not fully understood, however, interpretations include the representation of burial cairns and symbolic value.

### 4. Freshwater Shell Middens:

Accumulations of freshwater shell middens comprising mainly freshwater mussel occur along the muddy banks of rivers and streams and were collected by pre-colonial communities as a food resource. The freshwater shell middens generally contain stone artefacts, pottery, bone and, sometimes even human remains. Freshwater shell middens may be of various sizes and depths, an accumulation that exceeds 1m<sup>2</sup> in extent must be reported to the archaeologist, nearest museum or, relevant heritage resources authority.

### 5. Historical Artefacts and Features:

These are relatively easy to identify and include the foundations and remains of buildings, packed dry stone walling representing domestic stock kraals. Other items include historical domestic artefacts such as ceramics, glass, metal and military artefacts and dwellings.

#### 6. Fossil Bone:

Fossil bones may be embedded in geological deposits. Any concentrations of bone whether fossilized or not must be reported.