

BASIC ARCHAEOLOGICAL ASSESSMENTS FOR THE PROPOSED:

- 1. GOLDEN VALLEY-POSEIDON 132 POWER LINES (3 POWER LINES),**
- 2. GOLDEN VALLEY-KOPLEEGTE POWER LINES (2 POWER LINES) AND,**
- 3. THE 132KV GOLDEN VALLEY SUBSTATION (250M X 250M) (2 OPTIONS),**

BEDFORD DISTRICT, BLUE CRANE ROUTE LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE.



Prepared for: Savannah Environmental (Pty) Ltd
P.O. Box 148
Sunninghill, 2157
Tel: (011) 234 6621
Fax: (086) 684 0547
Contact person: Ms Taryn Bigwood
Email: taryn@savannahsa.com

Prepared by: Dr Johan Binneman
On behalf of: Eastern Cape Heritage Consultants cc
P.O. Box 689
Jeffreys Bay 6330
Tel: 042 2960399
Cell: 0728006322
Fax: 042 296 0399
Email: kobusreichert@yahoo.com

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BRIEF SUMMARY/OVERVIEW

Background and type of development

Several comprehensive archaeological impact assessments and reports have been compiled for the proposed Terra Wind Energy Golden Valley and Amakhala Emoyeni Wind Energy Facility sites. ACO Associates cc have conducted extensive reconnaissance investigations during 2010 of both projects and adjacent areas (Webley et al. 2009; Hart and Webley 2010; Halkett et al. 2010). The author conducted a walkthrough of the Amakhala Emoyeni Wind Energy Facility turbine footprint and paid brief visits to the Poseidon Substation and Tarra Wind Energy Golden Valley areas (Binneman 2012a & b). All background information is included in these reports and will not be repeated here in any detail. Savannah Environmental (Pty) Ltd appointed Eastern Cape Heritage Consultants to provide Basic Archaeological Assessments for the following proposed projects (Map 1):

1. The Golden Valley-Poseidon132kV power lines (3 power lines – white, green and yellow lines),
2. The Golden Valley-Kopleegte power lines (2 power lines – white and purple lines) and,
3. The132kV Golden Valley Substation (250m x 250m) (2 options),

A large part of projects 2 was investigated during the walkthrough for the turbine footprint of the Amakhala Emoyeni Wind Energy Facility (Binneman 2012a), but projects 1 and 3 were part of the proposed Terra Wind Energy Golden Valley survey conducted by ACO Associates cc (Hart and Webley 2010). However, the layouts of the proposed power lines and the proposed locations for the substations were not available at the time the ground survey was conducted. The author briefly visited the Poseidon Substation area and the first part of the powerline (green line) which runs in a south-westerly direction. A brief drive through of the Eastern part of the site past the 132kv substation option 2 was also conducted.

Purpose of the Study

The purpose of these Basic Archaeological Assessments was to draw on all available information of previous investigations proposed Terra Wind Energy Golden Valley and Amakhala Emoyeni Wind Energy Facility sites, and first hand experience(s) of the region, to make predictions and assumptions in order to establish;

- the range and importance of possible exposed and *in situ* heritage remains and features within the servitude of the proposed developments,
- the potential impact of the developments on these heritage resources,
- to make recommendations to minimize possible damage to these heritage sites/materials,
- to nominated the most preferred powerline routes and substation site, and,
- to provide input into the Environmental Management Plans (EMP) for each of the projects.

The site and location

The proposed Terra Wind Energy Golden Valley Project site fall within the Bedford Magisterial District, Blue Crane Route Local Municipality of the Eastern Cape Province and is situated approximately 3 kilometres south-east of Cookhouse (nearest point) and some 15 kilometres south-west of Bedford. The site borders on the Great Fish River which is just east of the N10 main road connecting Paterson with Cookhouse. It is located south of the gravel road between Cookhouse and Bedford which also runs pass the Poseidon Substation (situated approximately 11 kilometres north-east of Cookhouse and 15 kilometres south-west of Bedford).

The proposed area for development is situated west and south-west of a raised plateau overlooking the Fish River Valley. The edge of the plateau is steep in the north, but less pronounced towards the south. The Fish River Valley is a rugged area with several short, deeply incised valleys and rolling hills especially towards the south and south-west. The dominant natural vegetation types are the Great Fish River Thicket and Bedford Dry Grassland (Mucina & Rutherford 2006). The Great Fish River Thicket vegetation type (woody trees, shrubs and succulents) covers most of the steep slopes and deeply incised river valleys of the western parts of the study area including the two proposed substation sites. The latter vegetation type (grassland and *Acacia karoo* woodland) covers large areas gentle undulating plains towards the east of the study area and the Poseidon Substation. The main activity in the study area is commercial small livestock farming and the land is used mainly for grazing of livestock.

Previous Investigations

The original ground survey for the proposed Terra Wind Energy Golden Valley Project proofed to be difficult due to logistical problems, the rugged terrain and the remoteness of many of the turbine localities (Hart and Webley 2010). Due to size of the study site, the fact that the proposed turbine locations were preliminary and that no information on the access roads were available, the investigation "focussed on carrying out a general survey of the study area focussing on determining the general density of heritage/archaeological occurrences and the relative sensitivity of the range of topography".

A large number of pre-colonial and colonial heritage sites have been recorded during the previous reconnaissance survey of the entire Amakhala Emoyeni Wind Energy Facility site (Halket et al. 2010). The bulk of the sites were historical heritage features of the European settlement in the region and included farm buildings, dry packed stone kraals, grave yards, graves and refuse dumps. These were mainly situated and concentrated close to, or near the main gravel roads and in valleys/drainage systems. A number of pre-colonial sites/materials were also observed during the reconnaissance survey with the older Earlier/Middle Stone Age material occurring along rocky ridges and the Later Stone Age in general concentrated close to drainage lines and in valleys (Halket et al. 2010).

The walkthrough mainly followed the crests of the hills, ridges and high ground and additional surveys were only conducted where these developments cross the open valleys and steep slopes (Binneman 2012a). A number of pre-colonial archaeological sites/materials were observed in these areas. Although the terrain was relatively easy to access, the archaeological visibility in general was poor to moderate due to the dense surface cover of grass and shrubs in places. Apart from large Middle Stone Age stone tools concentrations a number of dry packed stone kraals and walls were also observed on the high ground. Numerous other stone features were also observed throughout the study area, such as stone fence posts, erosion prevention wall, furrows and low walls, but although these features have everyday functional value, they have little heritage significance.

Cultural sensitivity

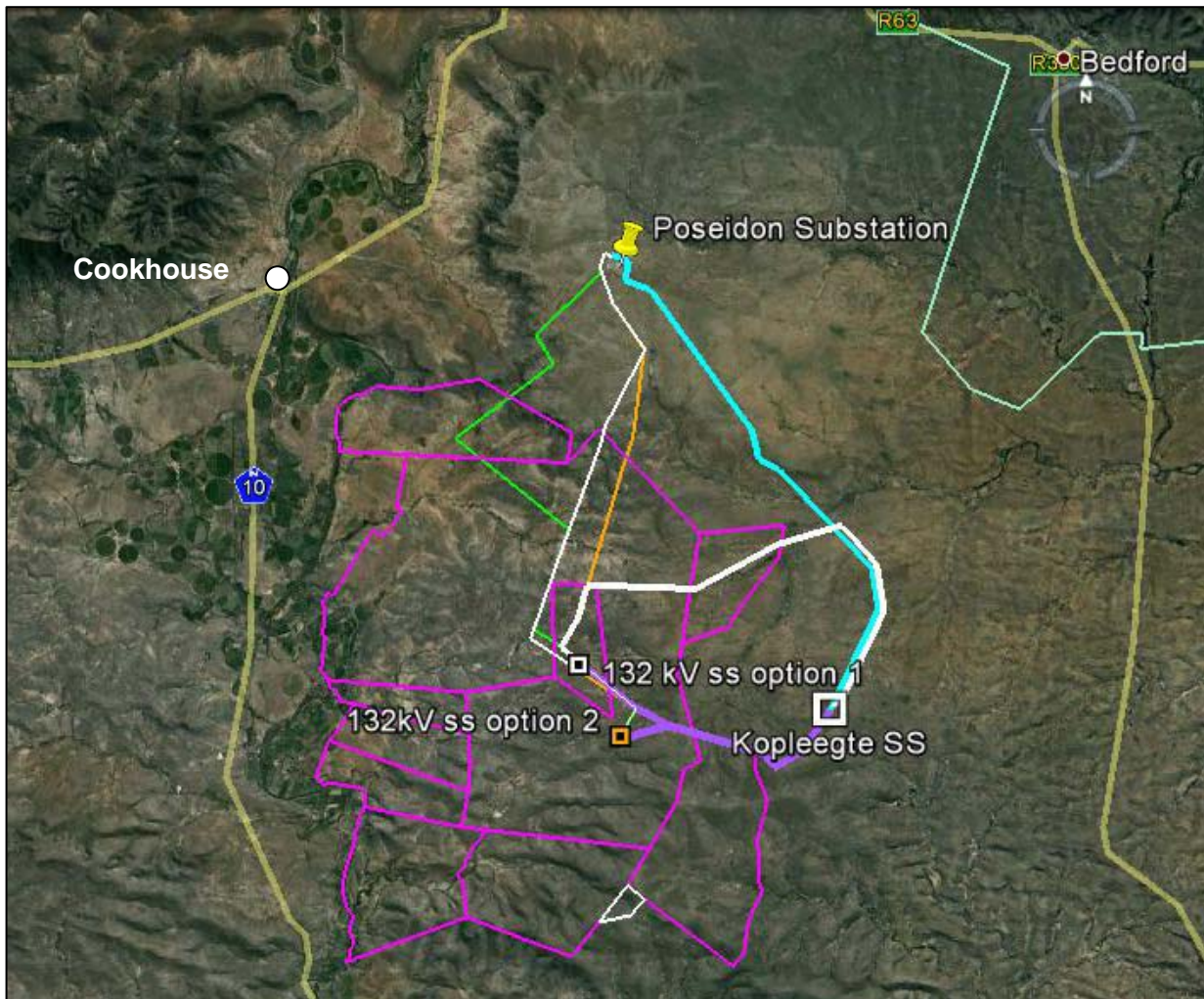
In general the area investigated during the walkthrough appears to be of low archaeological and historical (sites/materials) sensitivity and the impact of construction will be of low negativity. However, construction activities and the visual impact of the turbines will have a negative effect on the cultural landscape.

Preferred powerline routes and substation site

1. The Golden Valley-Poseidon132kV power lines: middle or west lines.
2. The Golden Valley-Kopleegte power lines: south line
3. The132kV Golden Valley Substation: south-east substation

Recommendations

1. An archaeologist/heritage practitioner must do a 'walkthrough' of the final layout of the power lines and the substation site before construction starts to establish what adjustments are required to mitigate possible impacts on pre-colonial archaeological and colonial period heritage sites/remains, as required by legislation.
2. Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter. It is suggested that a person be trained to be on site to report to the site manager if sites are found.
3. If the southern route from the Kopleegte Substation to the Golden Valley Substations becomes the preferred route, then the final design of the route must take into consideration that no development must take place within 50 metres from the dry stone packed wall. It must also be protected from possible damage during the construction phase.



Map 1. Locality map of the Terra Wind Energy Golden Valley Project site (outlined by the pink lines), the proposed Kopleegte and Golden Valley Substations, the Poseidon Substation and the proposed power lines. The three proposed powerline routes from the proposed Golden Valley Substations to the Poseidon Substation are marked by the green, white and yellow lines. The two proposed power line routes from the Kopleegte Substations to the proposed Golden Valley Substations are marked by the bold white and purple lines. The proposed powerline route from the proposed Kopleegte Substation to the Poseidon Substation is marked by the light blue line (not part of this assessment) (map supplied by Savannah Environmental (Pty) Ltd).

Brief archaeological background

The area has a rich documented historical past of conflict, change, adaptation and interaction between different groups and individuals (Mostert 1992). The pre-colonial archaeological history of the area is less clear, mainly because little field research has been conducted here. Several Heritage Impact Assessments conducted in recent years of the study area provide information on the different stone tool industries found in the area from eroded open sites (Webley, *et al.* 2009; Halket, D. & Webley, L. 2010; Halket, *et al.* 2010; Hart, T. & Webley, L. 2010; Booth 2011; Binneman 2012a). Nevertheless, there are a large number of reports, references and accessioned material in museums of the region and nationally which provide us with a general background. This information was compiled by R.M. Derricourt during the early 1970s and published in his book, *Prehistoric man in the Ciskei and Transkei in 1977*. He also conducted fieldwork at Middledrift and Ann Shaw close to the study area.

From the archival information and limited field work, it is evident that the area has an interesting and complex archaeological past. Earlier Stone Age (ESA) hand axes, cleavers and other stone tools, dating to approximately a million or more years old, were found on the slopes of the Thyume River around the University of Fort Hare in Alice. During a rescue excavation on the campus in 1974 thousands of ESA stone tools were recovered (Opperman 1979). The Albany Museum also houses a large collection of ESA material from the Grahamstown area. Large numbers of ESA stone tools were also found at Middledrift (Hewitt 1925; Burkitt 1928). These sites were regarded important at the time and were visited by A.J.H. Goodwin (Goodwin & Lowe 1929).

Both locations also yielded Middle Stone Age (MSA) stone artefacts dating between 200 000 and 30 000 years old. MSA artefacts can be found throughout the region, but carry little information because they are not associated with any other archaeological material. Excavations at MSA sites adjacent to the study area include the well-known type site for the Howieson's Poort Industry (rock shelter with the same name) near Grahamstown (Stapleton & Hewitt 1927) and Oakleigh Farm Shelter near Queenstown (Derricourt 1977).

Later Stone Age open sites, dating to the past 20 000 years are also widely scattered throughout the area. The bulk of information for the wider region comes from the Cape Fold Mountains to the south of the study area where several sites were excavated. Among these are Wilton Large Rock Shelter (Deacon 1972), Melkhoutboom Cave (Deacon 1976) and Uniondale Rock Shelter (Leslie-Brooker 1987). Two rock shelters, Edgehill and Welgeluk excavated by Hall (1990) in the Koonap River Valley close to the study area, provide an excellent archaeological record of exclusive subsistence and cultural risk management strategies during the past 5 500 years for Eastern Cape Midlands. Another small shelter at Adam's Kranz in the Great Fish River valley has also been excavated. A hafted arrowhead was recovered from the site (Binneman 1994). Further north in the southern Winterberg Mountains, research at Fairview Shelter (Robertshaw 1984) suggests mobile seasonal movements between the Winterberg and the Fish River regions during the Late Holocene. Derricourt (1977) excavated several mounds at Middledrift and Ann Shaw where he found a stone tool tradition in the bottom layers which he called the Middledrift Tradition, dating to some 5 000 years old. The origins of the upper deposits of these mounds are not clear, but it would appear that they were associated with pastoralist groups. Thin, fine, mainly undecorated pot shards, a KhoiSan burial and complete cow burials found in these mounds, would strongly suggest Khoi occupation. Early European travellers such as Beutler (Theal 1896) also found the Gonaqua Khoi in 1752 living here and along the Keiskamma River towards the nearby coast. The Eastern Cape Midland, Koonap River valley and the adjacent Winterberg Mountains to the north and Cape Fold Belt to the south are also rich in San and KhoiSan rock art.

Although there are no records of Early Iron Age (first farming communities) sites or material from this area, it is possible that such settlements may be present in the region (Maggs 1973). Evidence in the form of thick walled well-decorated pot shards is present along the coast (Rudner 1968) and the nearest settlement was excavated just west of East London (Nongwaza 1994). Research in the Great Kei River Valley indicates that the first mixed farmers were already settled in the Eastern Cape A.D. 600 - 700 (Binneman 1994).

In the same area at Ann Shaw, Derricourt also excavated a Late/Historical Iron Age settlement with grain pits and ash heaps. The grain pits were of typical Nguni type; jar-shaped with a small opening. The floor was lined with stones and sealed with a layer of clay.

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Relevant impact assessments

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ARCHAEOLOGICAL ASSESSMENTS

Methodology

The ground surveys for the proposed Terra Wind Energy Golden Valley Project (Hart and Webley 2010), Amakhala Emoyeni Wind Energy Facility site (Halkett et al. 2010) and the walkthrough investigation for the Amakhala Emoyeni Wind Energy Facility turbine footprint (Binneman 2012) were conducted on foot while spots checks and surveys were conducted from vehicles to investigate as much of the terrain as possible. GPS readings were taken and all important features were digitally recorded. Landowners were also consulted on possible locations of old buildings, historical features, cemeteries, graves, San rock paintings and archaeological sites.

1. The proposed Golden Valley-Poseidon 132kV power lines (3 power lines)

The three proposed powerline routes (green, white and yellow) run towards the two proposed Golden Valley Substations situated between 10-12 kilometres south-west of the Poseidon Substation (Map 1).

1.1. The western powerline route

The proposed western powerline follows a 'zig zag' route from the Poseidon Substation towards the proposed Golden Valley Substations. From the Poseidon Substation it follows an existing power line across the relatively flat plateau in a south-westerly direction (Fig. 1). It changes direction several times before it descends down the steep edge of the plateau into the rugged Great Fish River Valley en route to the proposed substations.

The immediate area around the Poseidon Substation is covered by dense high grass which restricted archaeological visibility and made it virtually impossible to observe heritage sites/materials. These areas most probably have been disturbed in the past by the construction of the substation, power lines and general farming activities. No pre-colonial archaeological or colonial period heritage sites/materials were observed during a brief investigation of the area and it would appear unlikely that any significant archeological material will be exposed during the development.

From the Poseidon Substation the proposed western powerline runs over farm land disturbed in the past by ploughing and general small scale farming activities to the edge of the plateau. It would appear unlikely that any significant archeological material will be exposed during the development in the above mentioned area or along the steep slopes of the escarpment.

The unknown area for archaeological site/materials is in the rugged Great Fish River Valley region, but no archaeological sites/materials or colonial period heritage sites were observed close to the proposed route during the survey for the proposed Terra Wind Energy Golden Valley Project (Hart and Webley 2010). However, archaeological sites/material of Earlier, Middle and Later Stone age origins were observed in the wider area exposed in river valleys/bottoms, streambeds, alluvial fans and erosion gullies.

1.2. The middle powerline route

From the Poseidon Substation the proposed middle powerline route follows several existing large power lines in a south-easterly direction along the high ground across the flat plateau towards the proposed Golden Valley Substations (Fig 2). Approximately 3 kilometres from the Poseidon Substation the route changes direction towards the south-west. From there, in an almost straight line, it follows the existing power lines across the flat plain to the edge of the steep plateau and continues across the Great Fish River Valley to the proposed substations.

The relatively flat plateau is covered with dense high grass and is physically similar to the adjacent areas surveyed for the 132kV power line from the Kopleegte Substation to the Poseidon Substation for the Amakhala Emoyeni Wind Energy Facility project. It would therefore appear unlikely that any significant pre-colonial archaeological or colonial period heritage sites/remains will be exposed during the development. However, sites/materials may be covered by soil and vegetation.

The unknown area for archaeological site/materials (as is the case for the green powerline route) is in the rugged Great Fish River Valley region. Archaeological sites and materials of Earlier, Middle and Later Stone age origin were observed in the wider area during the survey for the proposed Terra Wind Energy Golden Valley Project (Hart and Webley 2010). These were exposed in river valleys/bottoms, streambeds, alluvial fans and erosion gullies, but no archaeological sites/materials or colonial period heritage sites were observed close to the proposed route.

1.3. The eastern powerline route

The proposed eastern powerline follows the same route as the white powerline, but diverts from the latter at the point where it turns to the south-west. At the edge of the plateau it again turns slightly to the south-west and continues in a straight line following existing power lines parallel to the white powerline (some 2 kilometres apart) towards the proposed Golden Valley Substations.

The conditions for the eastern powerline regarding the pre-colonial archaeological and colonial period heritage sites/materials are similar to that of the white powerline route.

The preferred powerline route: middle or eastern

From the available archaeological information of previous investigations and first hand experience(s) of the region, it would appear that all three of the proposed power lines are of low cultural sensitivity and therefore the impact of construction on heritage remains will also be of low negativity. However, this can only be established by a ground survey. Due to the lack of convincing evidence one cannot recommend one powerline route above the other on the basis of heritage sensitivity. Nevertheless, under the circumstances the proposed middle or eastern lines will be the preferred route because they follow existing powerline routes where construction and access roads already disturbed the landscape physically and visually and also possible heritage site/materials as well. The western line will 'disturb' new areas and create a new visual impact on the cultural landscape, and therefore would be the least preferred route.

ASSESSMENT OF THE IMPACTS

It is assumed that the construction of the proposed 132kv power lines will consist of overhead cables suspended from wooden/metal structures placed a few hundred metres apart. These structures must be firmly positioned several metres deep in the ground. Although the placing of the structures will only affect a few square metres, it will be the additional activities such as the service roads for the construction vehicles and clearing of vegetation along the servitude which will disturb the land surface on a large scale.

These activities may have a negative effect on the above and below ground archaeological remains. The disturbances to the landscape may be rehabilitated over time, but the power lines, however, will have a long term visually impact on the general countryside.

Pre-colonial archaeology and colonial period heritage

Nature of the impacts

The main impact on the pre-colonial archaeological and colonial period heritage sites/remains (if any) will be the physical disturbance of the material and its context. The construction of the tower foundations for the powerline and service roads may expose, disturb and displace archaeological sites/material. Nevertheless, from the available information it would appear that the proposed 132kv powerline routes from the proposed Golden Valley Substations to the Poseidon Substation are of low archaeological sensitivity. However, sites/material may be covered by soil and vegetation.

Extent of the impacts

Construction of the powerline tower foundations and service roads may impact on remains which are buried, but these impacts will be limited and restricted to the local area. The construction of the tower foundations will also only disturb small areas and the negative impact on possible pre-colonial archaeology and colonial period heritage sites/materials may be relatively small. Other projects such as the construction of service roads will disturb larger areas and may expose sites/materials on a larger scale. In both cases further disturbances of sites/materials can be limited by mitigation.

Table 1. Impacts of the proposed 132kv power lines (3 lines) from the proposed Golden Valley Substations to the Poseidon Substation on the pre-colonial archaeology and colonial period heritage.

Nature: The potential impact of the construction of the powerline foundations and service roads on above and below ground pre-colonial archaeological and colonial period heritage sites/materials.		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Unlikely (2)	Unlikely (2)
Significance	Low (16)	Low (16)
Status (positive or negative)	Negative	Neutral
Reversibility	No	No
Irreplaceable loss of resources?	No, but in some cases, yes	No
Can impacts be mitigated?	Yes	
<p>Mitigation</p> <p>An archaeologist must do a 'walkthrough' of the final layout of the powerline to investigate the tower positions, construction of service roads, clearing of vegetation, campsites, workshop/administrative buildings and areas for maintenance activities and storage of equipment.</p>		
<p>Cumulative impacts: The number of tower foundations will determine the impact on the buried materials (if any), but in general it will be negligible.</p>		
<p>Residual impacts: Long term to permanent, especially in the case of human remains/graves.</p>		

Environmental management programme for the 132kV power lines from the proposed Golden Valley Substations to the Poseidon Substation.

Objective: To conserve the pre-colonial archaeological and colonial period heritage sites/remains of the 132kV powerline from the proposed Golden Valley Substations the Poseidon Substation as outlined in the National Heritage Resources Act of 1999.	
Project component/s	Construction of a 132kV powerline from the proposed Golden Valley Substations to the Poseidon Substation and associated infrastructure.
Potential impact	The physical disturbance and/or destruction of pre-colonial archaeology and colonial period heritage sites/remains.
Activity/risk source	Construction/excavation for tower foundations for the powerline, access roads for construction vehicles, clearing of vegetation and earthworks.
Mitigation: Target/Objective	An archaeologist/heritage practitioner must do a 'walkthrough' of the final layout of the powerline before construction starts to establish what adjustments are required to mitigate possible impacts on pre-colonial archaeological and colonial period heritage sites/remains, as required by legislation.

Mitigation: Action/control	Responsibility	Timeframe
Investigate the final layout of the powerline route which includes the tower positions, construction of service roads, workshops, site offices, areas for maintenance activities and storage of equipment and clearing of vegetation.	Proponent, consultant, contractor and the archaeologist/heritage practitioner.	Before the construction starts.
Compile a list of recommendations of adjustments to prevent impacts on pre-colonial archaeological and colonial period heritage sites/remains.	Archaeologist/heritage practitioner	After the walkthrough before the construction starts.
Compile a list and description of pre-colonial archaeological and colonial period heritage sites/remains that may potentially be impacted by the development	Archaeologist/heritage practitioner	After the walkthrough before the construction starts.
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.	Proponent, consultant, contractor and the archaeologist/heritage practitioner.	Before the construction starts.
If any human remains (or any other concentrations of heritage material) are exposed during construction, all work must cease and it must be reported immediately to the nearest museum/archaeologist or to the Eastern Cape Provincial Heritage Resources Authority, so that a systematic and	Consultant, contractor and the archaeologist/heritage practitioner.	Duration of the project

professional investigation can be undertaken. Sufficient time should be allowed to investigate and to remove/collect such material.		
Apply for permits from the Eastern Cape Province Heritage Resources Authority to collect and/or excavate sites/materials from archaeological sites identified to be impacted by the construction of the proposed powerline and access roads.	Proponent, Consultant and the archaeologist/heritage practitioner.	Before the construction starts and for the duration of the project

Performance indicator	All heritage sites/materials must be managed within the legislative guidelines. The success of the monitoring will be determined by the degree of damage/disturbance that can be avoided to heritage sites.
Monitoring	All construction activities must be monitored by the heritage specialist. A report and if required a list of recommendations, should be compiled and submitted to the Eastern Cape Provincial Heritage Resources Authority after the monitoring phase(s) for comment. A record must be kept of all accidental disturbances of heritage sites/material. All heritage sites/materials observed during any construction activity must be reported and recorded.

2. Golden valley-Kopleegte 132 kV power lines (2 power lines)

Both the proposed powerline routes (northern and southern) run towards the two proposed Golden Valley Substations situated between 7-8 kilometres west of the proposed Kopleegte Substation (Map 1).

2.1. The northern powerline

The proposed northern powerline follows the high ground in a 'circular' route from the proposed Kopleegte Substation to the two proposed Golden Valley Substations. It starts out in a north-easterly direction following the same route as the proposed 132kV powerline from the proposed Kopleegte Substation to the Poseidon Substation (Fig.3). At the location where the proposed northern powerline reaches the existing powerline from the Poseidon Substation (which runs in a south-easterly direction through the region) it changes direction and follows that powerline in a north-westerly direction to the Middleton gravel road. From there it runs in a westerly direction, crosses a drainage line, then changes direction sharply to the south-west and after a 90 degree turn to the south-west to reach the proposed Golden Valley substation.

The route from the Kopleegte Substation to the Middleton gravel Road has been investigated for the Amakhala Emoyeni Wind Energy Facility turbine footprint (Binneman 2012a) and has also been discussed in a basic archaeological assessment report for the region (Binneman 2012b). In general the archaeological visibility was poor to moderate due to the dense surface cover of grass and shrubs in places after good rains during the past two years. No pre-colonial archaeological or colonial period heritage sites/materials were observed and it would appear unlikely that any significant heritage remains will be

exposed during the development. However, sites/materials may be covered by soil and vegetation.

The area west of the Middleton road is unknown as far as archaeological site/materials are concerned, especially in the rugged Great Fish River Valley region. Archaeological sites and material of Earlier, Middle and Later Stone age origin were observed in the wider area during the survey for the proposed Terra Wind Energy Golden Valley Project (Hart and Webley 2010), but none were observed near the powerline route.

2.2. The southern powerline route

From the proposed Kopleegte Substation the proposed southern powerline follows the high ground in a south-westerly direction towards the proposed Golden Valley Substations (Fig. 4). At the western boundary of the Amakhala Emoyeni Wind Energy Facility site, it turns in a north-westerly direction towards the substations. It crosses a gravel road, a drainage line and at the gravel road to Middleton the proposed powerline split into two routes, one to the option1 substation and the other follows the gravel road to the option 2 substation.

The route from the Kopleegte Substation to the western boundary of the Amakhala Emoyeni Wind Energy Facility site (walkthrough) and the Middleton gravel Road past the proposed Golden Valley Option 1 Substation (drive through) has been investigated. The drainage line was also investigated some two kilometres north where the proposed southern powerline crosses it. No heritage sites/materials were observed. The area is covered by dense grass which made it difficult to locate archaeological sites/materials and in general it would appear unlikely that any significant remains will be exposed during the development. However, sites/materials may be covered by soil and vegetation.

A historical dry packed stone which mark farm boundaries is situated close to where the proposed southern powerline turns in a north-westerly direction towards the substations (GPS reading: 32.53.14,65S; 25.58.26,50E) (Fig. 5). It is recommended that no development takes place within 50 metres from the wall and that the feature be fenced-off to protect it from possible damage during construction of the proposed powerline (if this route is preferred).

The unknown area for archaeological site/materials is in the rugged Great Fish River Valley regions. Archaeological sites/material (of Earlier, Middle and Later Stone age origin) were observed in the wider area were these were exposed in river valleys/bottoms, streambeds, alluvial fans and erosion gullies. However, no archaeological sites/materials or colonial period heritage sites were observed close to the proposed route during the survey for the proposed Terra Wind Energy Golden Valley Project (Hart and Webley 2010).

The preferred powerline route: southern

Both powerline routes would appear to be of low cultural sensitivity, but the southern route is much shorter and will have less impact on possible heritage remains than the

northern route. It will also follow areas already disturbed such as the Middleton gravel road.

ASSESSMENT OF THE IMPACTS

It is assumed that the construction of the proposed 132kv power lines will consist of overhead cables suspended from wooden/metal structures placed a few hundred metres apart. These structures must be firmly positioned several metres deep in the ground. Although the placing of the structures will only affect a few square metres, it will be the additional activities such as the service roads for the construction vehicles and clearing of vegetation along the servitude which will disturb the land surface on a large scale.

These activities may have a negative effect on the above and below ground archaeological remains. The disturbances to the landscape may be rehabilitated over time, but the power lines, however, will have a long term visually impact on the general countryside.

Pre-colonial archaeology and colonial period heritage

Nature of the impacts

The main impact on the pre-colonial archaeological and colonial period heritage sites/remains (if any) will be the physical disturbance of the material and its context. The construction of the tower foundations for the powerline and service roads may expose, disturb and displace archaeological sites/material. Nevertheless, from the available information it would appear that the proposed 132kv powerline routes from the proposed Golden Valley substations to the Poseidon Substation are of low archaeological sensitivity. However, sites/material may be covered by soil and vegetation.

Extent of the impacts

Construction of the powerline tower foundations and service roads may impact on remains which are buried, but these impacts will be limited and restricted to the local area. The construction of the tower foundations will also only disturb small areas and the negative impact on possible pre-colonial archaeology and colonial period heritage sites/materials may be relatively small. Other projects such as the construction of service roads will disturb larger areas and may expose sites/materials on a larger scale. In both cases further disturbances of sites/materials can be limited by mitigation.

Table 2. Impacts of the proposed 132kv power lines (2 lines) from the Kopleegte Substation to the proposed Golden Valley substations on the pre-colonial archaeology and colonial period heritage.

Nature: The potential impact of the construction of the powerline foundations and service roads on above and below ground pre-colonial archaeological and colonial period heritage sites/materials.		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)

Probability	Unlikely (2)	Unlikely (2)
Significance	Low (16)	Low (16)
Status (positive or negative)	Negative	Neutral
Reversibility	No	No
Irreplaceable loss of resources?	No, but in some cases, yes	No
Can impacts be mitigated?	Yes	
Mitigation		
An archaeologist must do a 'walkthrough' of the final layout of the powerline to investigate the tower positions, construction of service roads, clearing of vegetation, campsites, workshop/administrative buildings and areas for maintenance activities and storage of equipment.		
Cumulative impacts: The number of tower foundations will determine the impact on the buried materials (if any), but in general it will be negligible.		
Residual impacts: Long term to permanent, especially in the case of human remains/graves.		

Environmental management programme for the 132kV power lines from the Kopleegte Substation to the proposed Golden Valley substations.

Objective: To conserve the pre-colonial archaeological and colonial period heritage sites/remains of the 132kV powerline from the Kopleegte Substation to the proposed Golden Valley Substations as outlined in the National Heritage Resources Act of 1999.	
Project component/s	Construction of a 132kV powerline from the Kopleegte Substation to the proposed Golden Valley Substations and associated infrastructure.
Potential impact	The physical disturbance and/or destruction of pre-colonial archaeology and colonial period heritage sites/remains.
Activity/risk source	Construction/excavation for tower foundations for the powerline, access roads for construction vehicles, clearing of vegetation and earthworks.
Mitigation: Target/Objective	An archaeologist/heritage practitioner must do a 'walkthrough' of the final layout of the powerline before construction starts to establish what adjustments are required to mitigate possible impacts on pre-colonial archaeological and colonial period heritage sites/remains, as required by legislation.

Mitigation: Action/control	Responsibility	Timeframe
Investigate the final layout of the powerline route which includes the tower positions, construction of service roads, workshops, site offices, areas for maintenance activities and storage of equipment and clearing of vegetation.	Proponent, consultant, contractor and the archaeologist/heritage practitioner.	Before the construction starts.
Compile a list of recommendations of adjustments to prevent impacts on pre-colonial archaeological and colonial period heritage sites/remains.	Archaeologist/heritage practitioner	After the walkthrough before the construction starts.

Compile a list and description of pre-colonial archaeological and colonial period heritage sites/remains that may potentially be impacted by the development	Archaeologist/heritage practitioner	After the walkthrough before the construction starts.
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.	Proponent, consultant, contractor and the archaeologist/heritage practitioner.	Before the construction starts.
If any human remains (or any other concentrations of heritage material) are exposed during construction, all work must cease and it must be reported immediately to the nearest museum/archaeologist or to the Eastern Cape Provincial Heritage Resources Authority, so that a systematic and professional investigation can be undertaken. Sufficient time should be allowed to investigate and to remove/collect such material.	Consultant, contractor and the archaeologist/heritage practitioner.	Duration of the project
Apply for permits from the Eastern Cape Province Heritage Resources Authority to collect and/or excavate sites/materials from archaeological sites identified to be impacted by the construction of the proposed powerline and access roads.	Proponent, Consultant and the archaeologist/heritage practitioner.	Before the construction starts and for the duration of the project

Performance indicator	All heritage sites/materials must be managed within the legislative guidelines. The success of the monitoring will be determined by the degree of damage/disturbance that can be avoided to heritage sites.
Monitoring	All construction activities must be monitored by the heritage specialist. A report and if required a list of recommendations, should be compiled and submitted to the Eastern Cape Provincial Heritage Resources Authority after the monitoring phase(s) for comment. A record must be kept of all accidental disturbances of heritage sites/material. All heritage sites/materials observed during any construction activity must be reported and recorded.

3. The 132kV Golden Valley Substation (250m x 250m) (2 options)

Both the proposed Golden Valley Substations are situated on high ground towards the centre of the proposed Terra Wind Energy Golden Valley Project site, overlooking the Great Fish River Valley (Fig. 6) (Map 1). The locations of the substations were not available during the heritage survey for the proposed Terra Wind Energy Golden Valley Project (Hart and Webley 2010). Although archaeological sites and material of Earlier, Middle and Later Stone age origin were observed in the wider area during the survey. None were found near the proposed substation sites.

Preferred substation site: south-eastern

The author has conducted a drive through of the area but did not physically investigate the proposed substation sites and therefore cannot recommend one site above the other on the basis of heritage sensitivity. Nevertheless, from the information of previous surveys and experience of the wider region it may be predicted with a high level of confidence that the heritage remains (if any) at both sites will be of low significance (excluding human remains). However, the fact that the proposed south-eastern substation site is situated close to the Middleton gravel road would make this the preferred site. The existing road can be used, which will have less impact on possible heritage sites/materials, where as major road making is needed to construction an access road to the south-eastern substation site.

ASSESSMENT OF THE IMPACTS

Although the area for each of the proposed Golden Valley Substations is only 250m x 250m, the additional activities such as the service road for the construction vehicles, clearing of vegetation and levelling of the site will disturb the land surface on a large scale. These activities may have a negative effect on the above and below ground archaeological remains. The disturbances to the landscape may be rehabilitated over time, but the substation and associated infrastructure, however, will have a long term visually impact on the general countryside.

Pre-colonial archaeology and colonial period heritage

Nature of the impacts

The main impact to pre-colonial archaeological and colonial period heritage sites/remains (if any) will be the physical disturbance and/or destruction of the material and its context. The construction of the substation and access road may expose, disturb, displace and destroy archaeological sites/material. However, no pre-colonial archaeology or colonial period heritage sites/remains were observed and it would appear that the proposed site for the construction of the substation is of low cultural significance. Notwithstanding, sites/materials may be covered by soil and vegetation.

Extent of the impacts

Construction of the substation may impact on remains which are buried, but these impacts will be limited and restricted to the local area. The construction activities will only disturb a small area and the negative impact on possible pre-colonial archaeology and colonial period heritage sites/remains may be relatively small. Other projects such as the construction of the access road and other infrastructure will disturb larger areas and may expose sites/materials on a larger scale. In both cases further disturbances of sites/materials can be limited by mitigation.

Table 3. Impacts of the construction of the proposed Golden Valley Substation (2 options) on the pre-colonial archaeology and colonial period heritage sites/materials (250m x 250m).

Nature: The potential impact of the construction of the proposed Golden Valley substations, access road and other infrastructure on the below and above ground pre-colonial archaeological and colonial period heritage sites/remains.		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Unlikely (2)	Unlikely (2)
Significance	Low (16)	Low (16)
Status (positive or negative)	Negative	Neutral
Reversibility	No	No
Irreplaceable loss of resources?	No, but in some cases, yes	No
Can impacts be mitigated?	Yes	
Mitigation An archaeologist must do a 'walkthrough' of the substation site to investigate the final layout of the construction site, service roads, areas to be clearing of vegetation, campsites, workshop/administrative buildings and areas for maintenance activities and storage of equipment.		
Cumulative impacts: The size of developments at the substation in the future will determine the impact on the buried materials (if any) and if these increase so will the impact.		
Residual impacts: Long term to permanent especially in the case of human remains/graves.		

Environmental management programme for the construction of the proposed Golden Valley Substation (2 options) on the pre-colonial archaeology and colonial period heritage sites/materials (250m x 250m).

Objective: To conserve the pre-colonial archaeological and colonial period heritage sites/remains of the construction of the proposed Golden Valley Substations as outlined in the National Heritage Resources Act of 1999.	
Project component/s	Construction of a substation and associated infrastructure.
Potential impact	The physical disturbance and/or destruction of pre-colonial archaeology and colonial period heritage sites/remains.
Activity/risk source	Large scale levelling, excavations, construction of substation and power lines and access roads for construction vehicles.
Mitigation: Target/Objective	An archaeologist/heritage practitioner must do a 'walkthrough' of the final layout of the substation site before construction starts to establish what adjustments are required to mitigate possible impacts on pre-colonial archaeological and colonial period heritage sites/remains, as required by legislation.

Mitigation: Action/control	Responsibility	Timeframe
Investigate the final layout of the substation site which includes the construction of service roads, workshops, site offices, areas for maintenance activities and storage of	Proponent, consultant, contractor and the archaeologist/heritage practitioner.	Before the construction starts.

equipment and clearing of vegetation.		
Compile a list of recommendations of adjustments to prevent impacts on pre-colonial archaeological and colonial period heritage sites/remains.	Archaeologist/heritage practitioner	After the walkthrough before the construction starts.
Compile a list and description of pre-colonial archaeological and colonial period heritage sites/remains that may potentially be impacted by the development	Archaeologist/heritage practitioner	After the walkthrough before the construction starts.
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.	Proponent, consultant, contractor and the archaeologist/heritage practitioner.	Before the construction starts.
If any human remains (or any other concentrations of heritage material) are exposed during construction, all work must cease and it must be reported immediately to the nearest museum/archaeologist or to the Eastern Cape Provincial Heritage Resources Authority, so that a systematic and professional investigation can be undertaken. Sufficient time should be allowed to investigate and to remove/collect such material.	Consultant, contractor and the archaeologist/heritage practitioner.	Duration of the project
Apply for permits from the Eastern Cape Province Heritage Resources Authority to collect and/or excavate sites/materials from archaeological sites identified to be impacted by the construction of the proposed powerline and access roads.	Proponent, Consultant and the archaeologist/heritage practitioner.	Before the construction starts and for the duration of the project

Performance indicator	All heritage sites/materials must be managed within the legislative guidelines. The success of the monitoring will be determined by the degree of damage/disturbance that can be avoided to heritage sites.
Monitoring	All construction activities must be monitored by the heritage specialist. A report and if required a list of recommendations, should be compiled and submitted to the Eastern Cape Provincial Heritage Resources Authority after the monitoring phase(s) for comment. A record must be kept of all accidental disturbances of heritage sites/material. All heritage sites/materials observed during any construction activity must be reported and recorded.

Cultural landscape and sense of place

Power lines and substations are an integral part of the South African landscape. This is especially the case for the wider Poseidon Substation area, where huge pylons and power

lines dominate the skyline in all directions. The proposed power lines and substation, however, are relatively small in comparison to the existing network of power lines and will probably have little impact in the short term on the cultural landscape.

Nature of the impacts

It is difficult to assess what impact the power lines will have on the cultural landscape in the short term because they will eventually be dwarfed by the huge wind turbines. Notwithstanding, the powerline from Kopleegte Substation and Poseidon Substation to the Golden Valley Substations will contribute to the cumulative impact of 'visual pollution' and the change of sense of place. Furthermore, the developments will also contribute to the transformation of a once rural agricultural environment to an 'industrial character' of the region. It will also add to a negative visual impact on the historical and natural landscape and character of the area.

Extent of the impacts

Due to the relatively small size of the proposed 132kv power lines and the substation the visual impact on the landscape may be not very prominent in the short term. Nevertheless, as an addition to an existing power lines in the area it will add a cumulative visual impact to the landscape, especially on the high lying areas. The main impact on the cultural landscape will be the extensive construction of roads and other activities which will leave permanent scars.

Table 5. Impacts on the cultural landscape.

Nature: The potential impact of the construction of the power lines and substation on the cultural landscape in terms of visual impacts and changes to 'sense of place'.		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (30)	Medium (30)
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	yes	
Mitigation The proposed power line should where possible follow the existing corridor and not create new visual impacts on the cultural landscape.		
Cumulative impacts: The construction of the power lines will slightly increase the visibility of these features on the high ground.		
Residual impacts: Disturbances to the landscape by the construction of the power lines and service roads will be long term.		

DISCUSSION AND MITIGATION

In general the proposed powerline routes from the Poseidon Substation and the Kopleegte substation and the Golden Valley Substation sites appear to be of low cultural significance. Although it would appear unlikely that any significant *in situ* sites/material will be exposed during these developments, sites/materials may be covered by soil and vegetation. It is recommended that before construction starts;

1. An archaeologist/heritage practitioner must do a 'walkthrough' of the final layout of the power lines and the substation site before construction starts to establish what adjustments are required to mitigate possible impacts on pre-colonial archaeological and colonial period heritage sites/remains, as required by legislation. Recommendations will follow from the walkthrough.
2. 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.
 - Alternatively a person must be trained as a site monitor to report to the foreman when archaeological sites are found. This person must monitor all activities during the construction phase.
3. If the purple route from the Kopleegte Substation to the Golden Valley Substations becomes the preferred route, then the final design of the route must take into consideration that no development must take place within 50 metres from the dry stone packed wall. It must also be protected from possible damage during the construction phase.

GENERAL REMARKS AND CONDITIONS

Note: This report is for a Basic Archaeological Impact Assessment only and do not include or exempt other required heritage impact assessments (see below).

The National Heritage Resources Act (Act No. 25 of 1999, section 35) (see Appendix A) requires a full Heritage Impact Assessment (HIA) in order that all heritage resources, that is, 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 emphasised that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/material and may not therefore, reflect the true state of affairs. Many sites may be covered by soil and vegetation and will only be located once this has been removed. In the event of such finds being uncovered, (during any phase of construction work), archaeologists 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).

It must also be clear that Phase1 Specialist Reports (AIAs) will be assessed by the relevant heritage resources authority. The final decision rests with the heritage resources authority, which should give a permit or a formal letter of permission for the destruction of any cultural sites.

APPENDIX A: 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 5000m² 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 000m² 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.*

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

Human Skeletal material

Human remains, whether the complete remains of an individual buried during the past, or scattered human remains resulting from disturbance of the grave, should be reported. In general human remains are buried in a flexed position on their side, but are also found buried in a sitting position with a flat stone capping. Developers are requested to be on alert for the possibility of uncovering such remains.

Freshwater mussel middens

Freshwater mussels are found in the muddy banks of rivers and streams and were collected by people in the past as a food resource. Freshwater mussel shell middens are accumulations of mussel shell and are usually found close to rivers and streams. These shell middens frequently contain stone tools, pottery, bone, and occasionally human remains. Shell middens may be of various sizes and depths, but an accumulation which exceeds 1 m² in extent, should be reported to an archaeologist.

Large stone cairns

They come in different forms and sizes, but are easy to identify. The most common are roughly circular stone walls (mostly collapsed) and may represent stock enclosures, remains of wind breaks or cooking shelters. Others consist of large piles of stones of different sizes and heights and are known as *isisivane*. They are usually near river and mountain crossings. Their purpose and meaning is not fully understood, however, some are thought to represent burial cairns while others may have symbolic value.

Stone artefacts

These are difficult for the layman to identify. However, large accumulations of flaked stones which do not appear to have been distributed naturally should be reported. If the stone tools are associated with bone remains, development should be halted immediately and archaeologists notified.

Fossil bone

Fossil bones may be found embedded in geological deposits. Any concentrations of bones, whether fossilized or not, should be reported.

Historical artefacts or features

These are easy to identify and include foundations of buildings or other construction features and items from domestic and military activities.

APPENDIX C
DIGITAL IMAGES



Fig. 1. The Poseidon Substation (main image) and views of the flat plateau the green powerline follows before it descends down the steep escarpment into the Great Fish River Valley (right insert).



Fig. 2. General views from the Poseidon Substation towards the proposed Golden Valley Substations (main image) and the existing power lines routes which the proposed middle and eastern power lines follow.



Fig. 3. General views of the proposed northern powerline route from the Kopleegte Substation towards the proposed Golden Valley Substations.



Fig. 4. General views of the proposed southern powerline route from the Kopleegte Substation towards the proposed Golden Valley Substations and the dry packed stone wall close to the route.

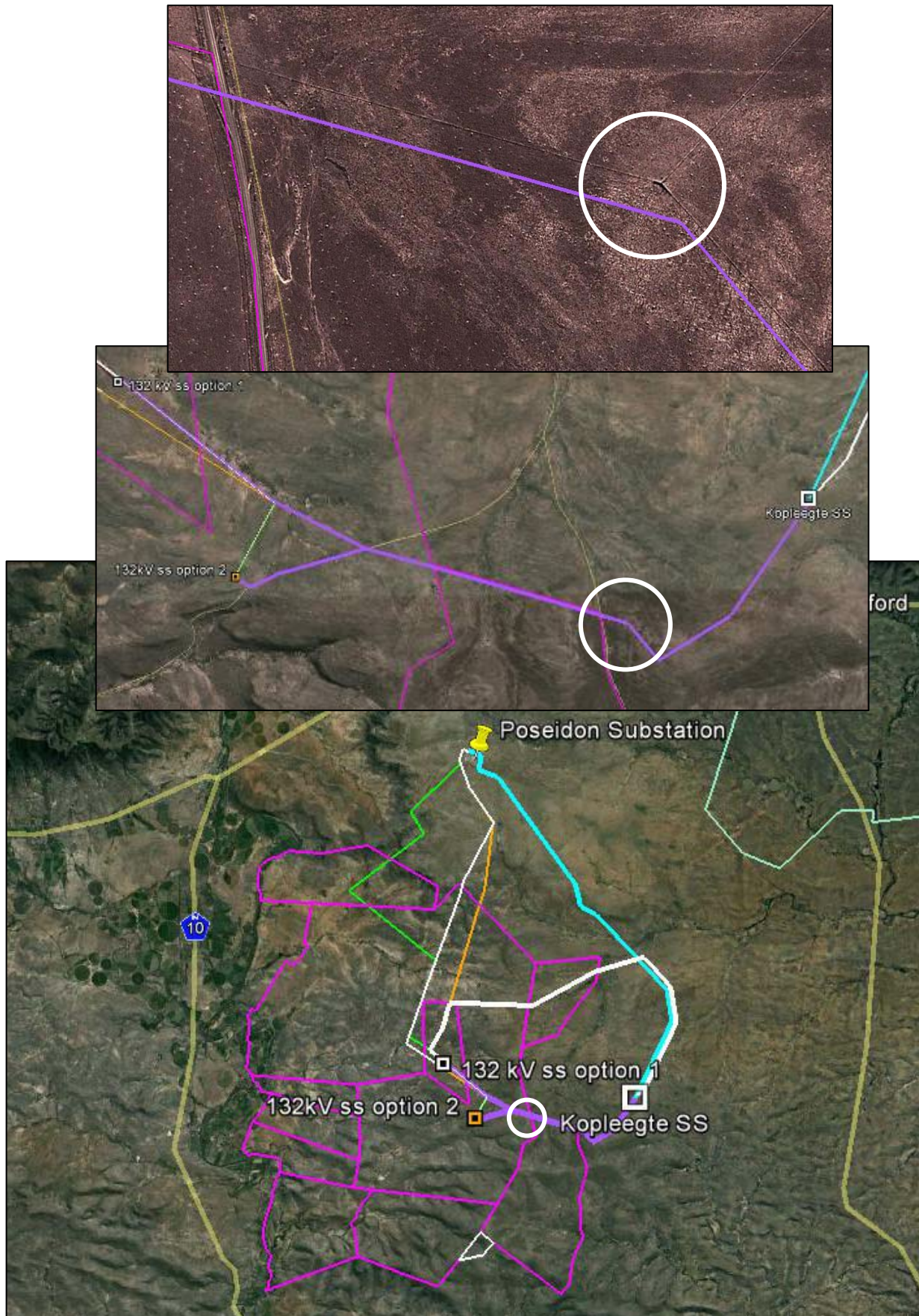


Fig. 5. Aerial maps of the location of the dry packed stone wall (marked with the white circle).



Fig. 6. General views of the proposed southern powerline route and the location of the proposed Golden Valley south-eastern substation the background (main image).