

**HERITAGE IMPACT ASSESSMENT FOR
PROPOSED CONSTRUCTION OF THE ESKOM GROBLERSHOOP
SUBSTATION AND THE GARONA-GROBLERSHOOP 132 kV POWERLINE,
GROBLERSHOOP, NORTHERN CAPE**

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

Prepared for
Landscape Dynamics Environmental Consultants
P O Box 947
Groenkloof
Pretoria
0027



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Prepared by

Lita Webley

ACO Associates

8 Jacobs Ladder

St James

Cape Town

7945

Phone (021) 706 4104

Fax (086) 603 7195

Email: lita.webley@aco-associates.com

EXECUTIVE SUMMARY

ACO Associates was appointed by Landscape Dynamics Environmental Consultants on behalf of the client, Eskom, to assess the impacts to heritage (excluding palaeontology) of the proposed construction of Eskom Groblershoop 132/22 kV substation and the Garona-Groblershoop 132 kV kingbird line of approximately 20 km. Groblershoop is 100 km south-east of Upington.

Two routes have been proposed. Both need to connect the Garona sub-station, located to the east of the Orange River, with the proposed Groblershoop sub-station to the west of the river. The preferred route will cross the river further south than the alternative route but both routes cross similar landscapes.

A number of CRM projects have been undertaken between the Garona sub-station and the Orange River in recent years. These projects have identified ephemeral scatters of Middle Stone Age material across the landscape but have concluded that the artefacts do not appear to be concentrated sufficiently to represent sites. They were rated of low significance and no mitigation was proposed.

A joint field survey was undertaken with staff from Landscape Dynamics, Eskom and other specialists on 18 and 19 February 2013. The survey was not comprehensive as it was not possible to drive along both routes. However, spot checks were undertaken at various locations along the routes to determine the impacts to heritage.

The fieldwork identified:

- Ephemeral scatters of MSA material made on banded ironstone on both sides of the river. These scatters appear to be denser on small quartz koppies;
- Ephemeral sites comprising flaked hornfels cobbles and quartz artefacts (which may represent Later Stone Age sites) along the loose river sands on the eastern margins of the Orange River;
- A single stone reservoir some 200 m east of the preferred powerline near Garona;
- No cemeteries or graves were recorded;
- No buildings or structures older than 60 years will be impacted either directly or indirectly;
- The Cultural Landscape consists of intensive agriculture in a narrow belt along the Orange River surrounded by the red Aeolian sands of the Kalahari.

Recommendations

There are no heritage issues with regard the proposed Groblershoop sub-station.

It is recommended that a targeted walk-down of short sections of the proposed powerline route is undertaken once the final route has been determined and the positions of the pylons towers have been finalised.

This would include the following *specific* sections of the proposed lines where they cross sensitive areas:

- The sandy banks to the east of the Orange River, up to a distance of 800 m along the preferred route;
- A short section (800 m) along the alternative route where it crosses the western margins of the Orange River;
- Sections of the powerline where it crosses the sand dunes, to the east of the Orange River (1.8 km) and near the Garona sub-station (1 km).

The areas which need to be targeted during the walkdown are indicated in Figures 5 - 8.

If buried archaeological remains, such as burials, are uncovered during construction these will have to be treated according to guidelines provided in the EMP.

Evaluation of powerline options

There are no grounds presently, based on heritage considerations, for deciding between the alternative routes at the northern and southern sections of the development and therefore no preference is expressed for either route.

The margins of the Orange River are considered the most sensitive in terms of both archaeology and the built environment.

In order to avoid impacts to potential sites along the River, it is recommended that the alternative route is selected. It crosses the River at right angles and avoids traveling along the River, which is the issue with the preferred route.

If the preferred route is selected, further mitigation may be required.

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1. INTRODUCTION

ACO Associates was appointed by Landscape Dynamics Environmental Consultants on behalf of client, Eskom, to assess the impacts to heritage (excluding palaeontology) of the proposed construction of Eskom Groblershoop 132/22 kV substation and the Garona-Groblershoop 132 kV kingbird line of approximately 20 km.

The location of the study area is shown on Figure 1. The proposed Groblershoop substation will be constructed 1.3 km to the north-west of the town. Two possible powerline routes are proposed to connect the Garona sub-station with the Groblershoop sub-station (Figure 2).

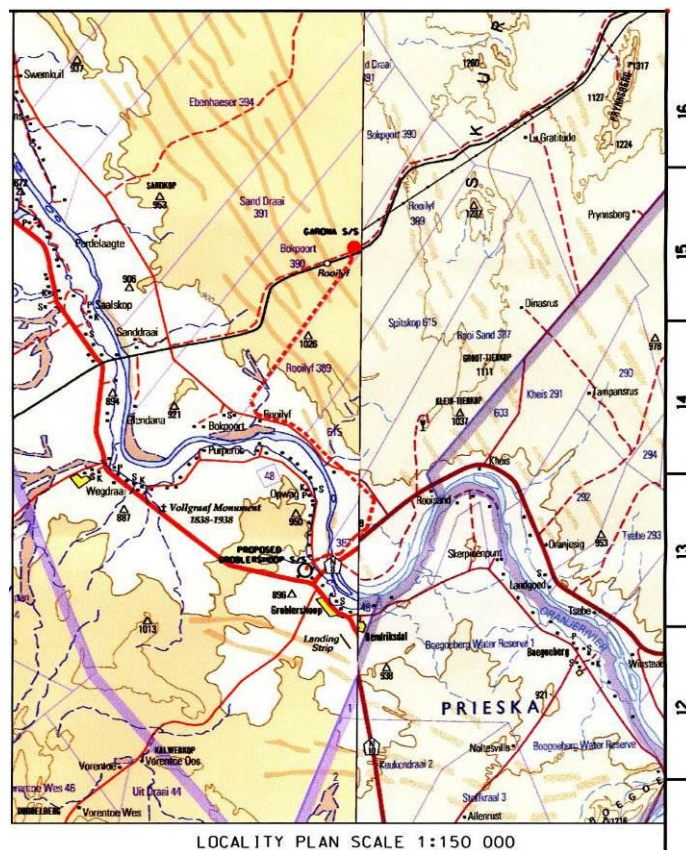


Figure 1: Location of the study area on map sheets 2822CC and 2821DD, map supplied by client.

2. HERITAGE LEGISLATION

The National Heritage Resources Act (NHRA) No. 25 of 1999 protects a variety of heritage resources including palaeontological, prehistoric and historical material (including ruins) more than 100 years old (Section 35), human remains older than 60 years and located outside of a formal cemetery administered by a local authority (Section 36) and non-ruined structures older than 60 years (Section 34). Landscapes with cultural significance are also protected under the definition of the National Estate (Section 3 (3.2d)). Section 38 (2a) states that if there is reason to believe that heritage resources will be affected then an impact assessment report must be submitted. This report fulfils that requirement.

The Palaeontological Impact Assessment will be undertaken as a separate desktop study.

3. THE PROPOSAL

Eskom proposes to construct:

- A new substation at Groblershoop and;
- To connect the Garona substation to the new proposed Groblershoop substation via a 132 kV Kingbird powerline. The new powerline will be approximately 20 km long and the servitude for the powerline will be a minimum of 31 m and a maximum of 40 m in certain places along the line.
- Extensions are proposed to the Garona sub-station.

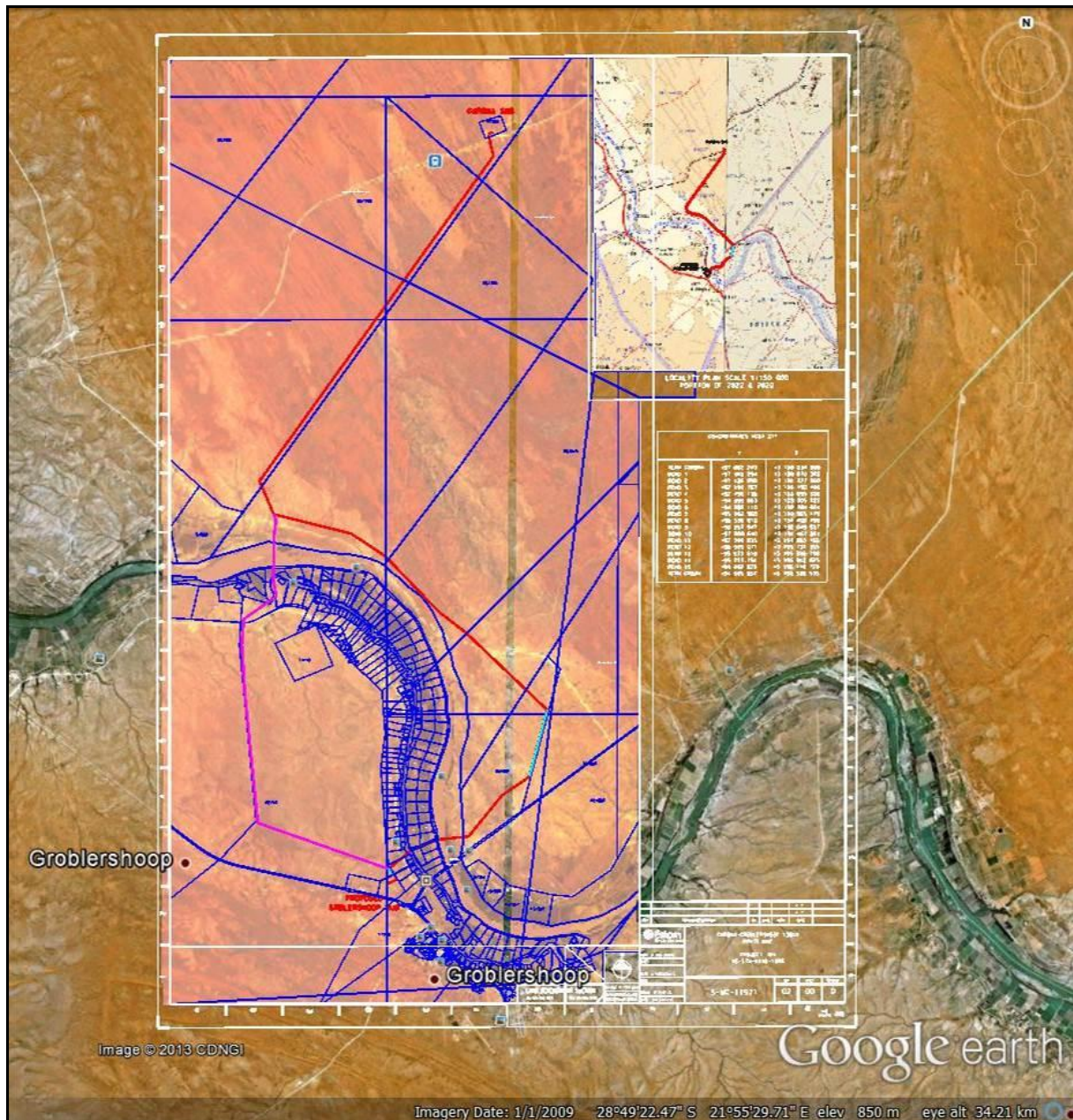


Figure 2: Overlay of the proposed routes on the aerial map for the study area. Both lines originate at the proposed Groblershoop sub-station. The preferred route (red) crosses the Orange River and follows the banks of the river before swinging in a north-easterly direction to connect with the Garona sub-station. The alternative route (pink) swings to the west, and crosses the Orange River further north, connecting with the preferred route to the east of the river.

4. METHODS

4.1. Literature survey

A survey of available literature was carried out to assess the general heritage context of the area. This literature included published material and unpublished commercial reports.

4.2. Field survey

One and a half days (18th and 19th February 2013) were spent on site. The landscape and heritage resources were recorded photographically and GPS co-ordinates were taken to locate the latter. The survey was thus aimed primarily at understanding the pre-colonial landscape but the built environment and cultural landscape was also assessed, where this was appropriate.

4.3. Limitations

A joint field excursion was undertaken to the study area with representatives of Landscape Dynamics Environmental Consultants, other specialists and staff of Eskom. This has its own inherent limitations as the survey time had to be split between the various specialists.

- The study area was very large and could not be examined comprehensively due to constraints of time;
- Staff of Eskom had indicated that they wanted to accompany the specialists and that it would be possible to drive the preferred and alternative routes. However, keys to the relevant private farms had not been arranged in advance, and sections of the route could not be assessed;
- Areas of potentially higher archaeological sensitivity were identified on aerial maps before the survey but it is likely that some “hot spots” were missed and this will only be discovered during the final walk down.

The following positive comments can be made about the survey:

- The landscape is sparsely vegetated thereby making any surface archaeological and other heritage resources highly visible;
- Given the nature of the landscape, it was found to be relatively easy to predict where significant resources (primarily archaeological sites) would be located;
- Despite not being able to assess the entire line, we were able to examine comparable terrain close to the proposed power line and extrapolate possible findings.

For the above reasons, it is concluded that the findings of this report are reasonably robust and reflect the nature and degree of potential impacts to heritage resources.

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The study area lies to the west and east of the Orange River. The western margins, along the river bank, are settled by numerous small holdings which are under intensive irrigation,

resulting in many fields of vineyards, maize and lucerne. This patchwork of fields extends up to 700 metres from the banks of the river. The western margins of the river have been highly disturbed and surveys along this strip are of limited value. The only area which has not been farmed lies to the west and south of the farm Hooggelegen.

Inland of the fields the landscape is fairly level with occasional small koppies. This area is sparsely vegetated with small shrubs.



Plate 1: View from the western side of the Orange River, looking in an easterly direction. The irrigated fields are in the foreground, the position of the River indicated by the line of trees.



Plate 2: View from the western side of the Orange River looking in a westerly direction.

Very little agriculture takes place on the eastern margins of the Orange River, and virtually no irrigated fields occur here. This area is more arid, and is characterised by a low ridge of hills which runs more or less parallel with the river, at a distance of 1.5 km from the banks of the river. This eastern side of the river is characterised by numerous red sand dunes which run along the base of the hill. The vegetation is quite different from the western boundary.



Plate 3: View from the eastern side of the Orange River, looking in an easterly direction toward the low hills and the vegetated red sand dunes in the foreground.



Plate 4: View of the Garona sub-station.

6. HERITAGE CONTEXT

6.1. Palaeontology

The palaeontology is the focus of a separate study by Dr John Almond.

6.2. Pre-colonial archaeology

Little is known about the archaeology along the Orange River with the exception of the Richtersveld and the Middle Orange River area. However, there have been some recent CRM studies in close proximity to the Garona sub-station to the east of the Orange River.

In his 2006 survey for the Solafrica Concentrated Solar Plant (CSP) located on Bokpoort 390 to the north and west of the Garona sub-station, Dreyer reported on a collection of stone flakes close to the existing power line (Figure 3). “Some of the flakes showed convergent flaking characteristic of the Middle Stone Age industry. Some lydianite cores were also found”. He considered them to be of low significance and no mitigation was recommended.

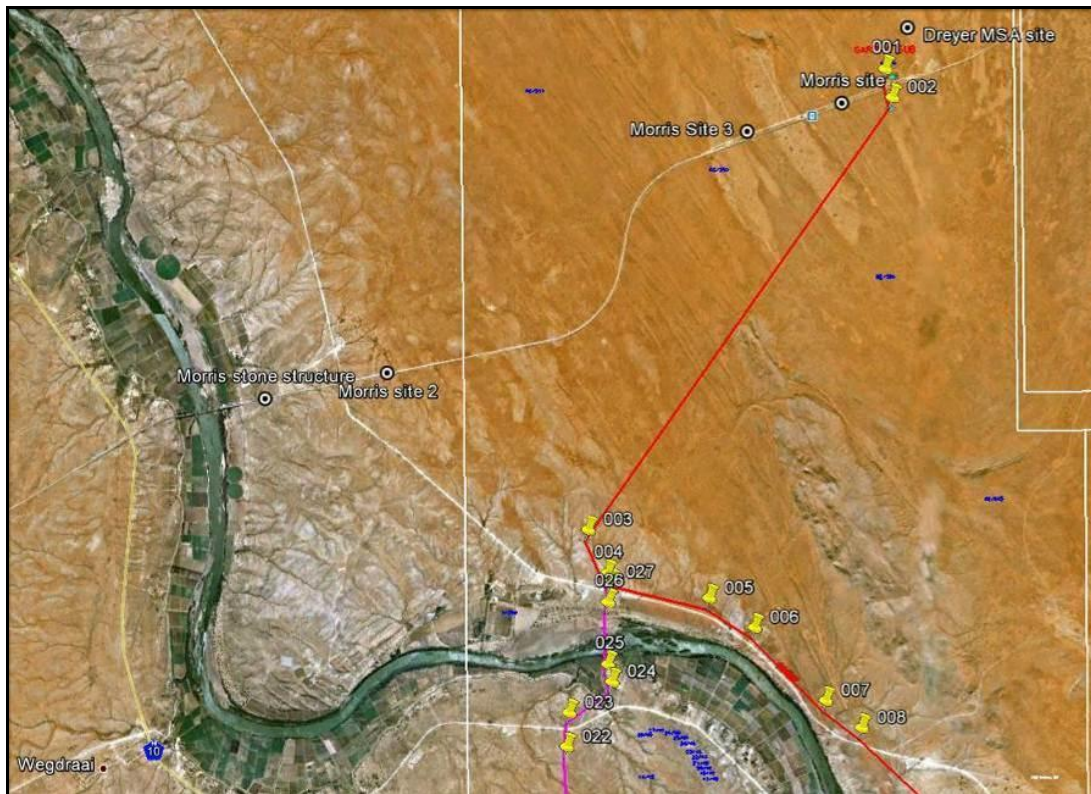


Figure 3: Map showing the northern section of the proposed line (in red) and the sites recorded by Morris and Dreyer situated to the west of the line.

In his 2006 survey for the proposed Aries-Garona Eskom transmission line and extensions to the Garona sub-station, Morris (2006) commented in general on the archaeology of the area but did not report specific sites.

Morris (2007) reported on Pleistocene material at the base of dune sands exposed at the edge of borrow pits associated with the expansion of Loop 16 on the Sishen-Saldanha line, on the northern edge of the present study area. In the dune-covered plain near to Garona substation the calcrete substrate is exposed in old borrow pits between the service road and the railway, where several jaspilite flakes, points and blades were located, “but in very low density scattered over a large area” (Morris 2007). These were taken to be probably representative of Middle Stone Age or Fauresmith industries. A very substantial existing borrow pit some kilometres down the line from Loop 16 itself, also close to the route of the proposed pipeline, had also been examined (Morris 2007). A low density scatter (up to, but mainly less than, about 1 artefact/m²) of possibly Middle Stone Age artefacts was found on the calcrete surface here and around the edges of the borrow pit.

In his 2012 survey for the construction of the a proposed water pipeline across sections of the farms Sand Draai 391 and Bokpoort 390, Morris (2012) recorded a single stone structure in the disturbed lands close to the Orange River (Figure 3). He notes that on the “slightly sloping calcrete capped plain extending eastward from the Orange River, there occurs a low “background scatter” of Stone Age traces. The material observed appeared to be consistently of Pleistocene age, mainly Middle Stone Age, and mostly utilizing jaspilite as raw material (probably derived from the Orange River gravels – some flaked nodules are river-rounded pebbles of jaspilite). Densities increase closer to the river from <1 per 10x10 m to up to >1 per m². Preservation context is poor – these are essentially lag deposits on eroding surfaces and hence of low significance”.

Closer to the Garona sub-station, the calcrete-capped plain is overlain by aeolian sands in linear dunes, sometimes with the older surfaces exposed between dunes and sometimes not. Occasionally, Later Stone Age is found on the dunes, particularly in situations of wind deflation. Morris recorded only one such occurrence was found, with just a few quartz flakes.

Dreyer's (2012) field survey for a proposed water pipeline following a section of the Sishen-Saldanha railway line identified a small stone tool assemblage near the Garona sub-station on the farm Bokpoort 390. The flake scars suggested that the stone tools were of Middle Stone Age origin and since there did not appear to be any focus to the distribution of stone tools, Dreyer (2012) did not recommend mitigation. Van Rhyneveld (2007) surveyed an area at Bokputs 118 some 40 km to the south-west of Groblershoop and recorded low density MSA artefact scatters at a number of quartz outcrops.

Morris (2012) characterizes the distribution of archaeological sites in the area as:

- A. Stone artefacts along the Orange River
- B. Stone artefacts on sloping calcrete plain east of the Orange River
- C. Stone artefact scatters between sand dunes

6.3. Graves and human remains

Many human skeletons have been excavated from along the Orange River between Augrabies Falls and Upington, both by Dreyer and Meiring (1937) and studied by Alan Morris (1995). The burial cairns and other information suggested Khoekhoen people, specifically the Einiqua, and historical data shows the majority of graves to date to the 18th and early 19th centuries (A. Morris 1995). While confirmed stone cairn graves have not been documented well downstream of Augrabies Falls, the possibility that these exist in the study area should nonetheless be borne in mind.

Morris (1992) also examined a collection of skeletons (excavated by Dreyer and Meiring) from Abrahamsdam just north-west of Niekerkshoop in the Prieska District, 100km to the south-east of the study area. The collection is small but in general, Morris remarks that the face and mandible appeared Khoisan while the vault of the skull was most similar to Negro morphology.

Farm graveyards and other historic graves are present on many farms in the rural parts of South Africa. The SA Military History website indicates that military graves are present on many farms in the Pofadder, Kakamas and Keimoes areas (The South African Military History Society n.d.). A large number of these graves probably pertain to the Anglo-Boer War and the later Boer Rebellion of 1914.

6.4. Colonial period and the built environment

The colonial footprint in this area tends to be extremely light with farm houses generally dating to the early 20th century. Most farms were only granted in the years just before or after 1900. A number of farms along the Orange River contain historic water turbines and pumps dating back to the turn of the 19th century.

Some 25 km from Groblershoop on the road to Griquastad are 7 graves dating from the Rebellion of 1914. Rebels who were not prepared to fight with the Union of South Africa on the side of the British during the First World War were active in the area under their

commander, the old Boer War leader, Manie Maritz. The Vollgraaf Monument, dedicated to the centenary of the Groot Trek, is located to the west of the study area (Figure 1).

The Boegoeberg Dam, built in 1929, is located to the south of Groblershoop. It was constructed as part of an economic upliftment programme to assist the poor Afrikaners at this time. One of the camps was situated on the farm Sternham, later re-named during the Great Trek celebrations (1939) to Groblershoop after the Minister of Land Affairs, Mr Piet Grobler.

7. FINDINGS

7.1. Palaeontology

No palaeontological material was observed during the fieldwork. See the PIA report.

7.2. Archaeology

A background scatter of Middle Stone Age artefacts was found throughout the study area. The artefacts were made on both quartzite and banded ironstone cobbles which were retrieved from the Orange River. Although randomly scattered across the landscape in low numbers, some denser scatters were recorded particularly on small koppies characterised by dense white quartz fragments.

7.2.1 Groblershoop Sub-station

Table 1 provides a full listing of heritage resources encountered during the survey.



Figure 3: The red rectangle indicates the outline of the proposed Groblershoop sub-station, the blue lines are recorded tracks and the green pins are archaeological sites.



Plates 5 & 6: Both sides of a bifacially worked banded ironstone artefact, possibly a “Fauresmith” handaxe.



Plate 7: A quartzite core.



Plate 8: Banded ironstone core.

There is a scatter of weathered MSA material in the area identified for the proposed Groblershoop sub-station.

7.2.2 Sites to West of Orange

Two further sites (40 & 41) were recorded to the west of the River. Site 40 consisted of a scatter of MSA artefacts on a low koppie, while Site 41 was a more ephemeral distribution of artefacts across the slopes leading down to a drainage area.



Plate 9: Site 40 to the west of the river;



Plate 10: Banded ironstone core.



Plate 11: Banded ironstone core from Site 41;



Plate 12: A quartzite core showing evidence of blade production.

7.2.3 Eastern margins of Orange River

A number of stone artefact scatters were identified on the eastern margins of the River, on the loose river soils. Two of the sites (35 & 36) consisted of informally flaked hornfels cobbles and quartz flakes, which may indicate Later Stone Age sites, such as those identified by Orton & Webley (2012) further north, along the banks of the Orange River at Kakamas. Only Site 37 is in close proximity to the preferred line, but the presence of the other sites nearby suggests that this strip of land, possibly up to 800 m from the River, may have been settled by LSA peoples. They seem to have preferred the shade of the trees found near the river.



Figure 4: View of the eastern margins of the Orange River. The proposed 132 kV powerline crosses the river just north of the N8. The blue line indicates our tracks and Sites 35, 36 and 37 are located in the loose river sands.



Plate 13: Flaked hornfels cobble from Site 35;



Plate 14: Quartz flake from Site 36.

7.3. Built Environment

A single square reservoir constructed of stone and plastered inside was found some 200 m to north-west of the proposed line.

This is the only structure found during the survey and suggests that settlement is sparse away from the River.

8. ASSESSMENT OF IMPACTS

8.1. Palaeontology

This will be addressed by the palaeontologist.

8.2. Archaeology

The survey suggests that that Middle Stone Age artefact scatters will be found across the study area and it is likely that artefacts will be disturbed during the construction of the pylon towers. However, the scatters are widespread and are considered of low significance. No further mitigation is required.

The quartz flakes and flaked hornfels cobbles found to the east of the Orange River may represent Later Stone Age settlement along the River (in line with similar stone age assemblages recorded further downstream near Kakamas). These sites are potentially interesting as they can inform us on hunter-gatherer and/or pastoralist settlement patterns along the River. They have a medium significance and they need to be avoided during the construction of the pylon towers.

No significant historical archaeological remains were identified. Settlement density is extremely sparse further away from the River. Impacts to historical archaeology are likely to be low.

Table 1: List of heritage resources. The short field numbers are indicated in the mapping for convenience, but official site numbers have been allocated here. An estimate of the time that would be required at each site for mitigation purposes is indicated in the significance column. This does not mean that all these sites require mitigation, but is merely there for indicative purposes.

Site number	Field number (Area)	Location	Type	Description	Significance MITIGATION
2642/2013/01	Site 32	S28 52.979 E21 58.326	MSA/LSA	A single large quartzite core and a broken thumbnail scraper made on banded ironstone (silcrete?). On the position of the sub-station	Low
2642/2013/02	Site 33	S28 52.975 E21 58.348	MSA	A small bifacially worked ironstone artefact. It resembles a "Fauresmith" handaxe but this needs to be confirmed. Scatter of quartzite discoid cores and flakes on ironstone.	Low
2642/2013/03	Site 34	S28 52.994 E21 58.384	MSA	Spread of at least 4 cores and flakes made on banded ironstone.	Low
RSD/2013/01	Site 35	S28 52.539 E21 59.372	LSA	On east banks of River. Flaked hornfels cobble and some flakes cores on banded ironstone. Possibly a mixed LSA/MSA site	Medium
RSD/2013/02	Site 36	S28 52.484 E21 59.387	LSA	A quartz flake and a flaked hornfels cobble on the loose sands of the Orange River.	Medium
RSD/2013/03	Site 37	S28 52.453 E21 59.418	MSA	A dense concentration (2-3 artefacts per square metre) of quartz, hornfels and banded ironstone artefacts on a small quartz koppie.	Medium
RLF/2013/01	Site 38	S28 46.484 E21 58.158	MSA?	A single banded ironstone flake in the red sand dunes on the edge of the ridge.	Low
RLF/2013/02	Site 39	S28 45.885 E21 58.494	Historic	A stone reservoir (25m x 25m) lined with plaster and with a stone gutter running around the margins to collect water. Various rusted farm implements nearby. At least 200 m west of the line.	Low
2642/2013/04	Site 40	S28 50.269 E21 56.417	MSA	Quartzite and banded ironstone flakes and cores on a small koppie to the west of the river.	Low
2642/2013/05	Site 41	S28 52.625 E21 57.535	MSA	Banded ironstone flakes and cores, a number of short, grey quartzite flakes and a single quartz blade core overlooking a drainage channel.	Low

Table 1: Assessment of archaeological impacts.

NATURE OF IMPACT: The potential impact to archaeological material includes destruction of the sites or loss of context.		
	Without mitigation	With mitigation
EXTENT	Local (1)	Local (1)
DURATION	Long term (5)	Long term (5)
INTENSITY	Low (1)	Low (1)
PROBABILITY	Low (2)	Improbable (1)
SIGNIFICANCE	Low	Very Low
STATUS	Neutral - negative	Neutral - positive
REVERSIBILITY	Non-reversible *	Theoretically reversible
IRREPLACEABLE LOSS OF RESOURCES?	No	No
CAN IMPACTS BE MITIGATED?	Yes	Yes
MITIGATION: Targeted walk downs of sensitive areas will ensure that no archaeological sites are destroyed.		
CUMULATIVE IMPACTS: N/a		
RESIDUAL IMPACTS: N/a		

8.3. Built Environment

The survey has not identified any buildings or structures older than 60 years which will be impacted by the proposed powerline or substation. This is confirmed by an examination of aerial photographs of the area.

8.4. Graves

The survey has not identified any cemeteries or graves/burial cairns which will be impacted by the proposed powerline or substation. However, in view of the presence of burial cairns further down river near Kakamas, it is recommended that a more detailed survey of the banks of the Orange River, specifically the eastern margins of the River, needs to be undertaken during the walk down phase (Figures 7 & 8). With respect to the western banks of the River, it is recommended that further field work is done to the south and west of the farm Hooggelegen (Figure 5).

8.5. Cultural Landscape

The landscape along the Orange River has been transformed by intensive agriculture. Further away from the River, the landscape is typical of the Kalahari, with large areas of level veld under short grass, and occasional red vegetated Aeolian dunes. This landscape stretches over many hundreds of kilometres and the proposed 132 kV powerline is unlikely to result in a significant impact on the landscape.

9. CONCLUSION AND RECOMMENDATIONS

Morris (2006) has commented elsewhere for this area that “archaeological sites in this environment are often highly localised and it is not cost-effective to scan the route and alternative corridors in great detail at this stage. It was recommended that once tower positions along the preferred route were known with certainty it would be feasible to carry out focused inspections or site visits in locales expected to be potentially more sensitive and to recommend mitigation measures, if and where necessary, in relation to findings made then”.

Experience has also shown that, fortunately, the impact of transmission power line development is minimal, unless of course, the pylon is placed directly on top of a localised archaeological site. Often the access roads result in more damage than the pylons.

Similar conclusions are presented here:

9.1. Archaeology and Graves

Once the final route is decided and tower positions known, it is recommended that targeted sections of the route are examined on foot to identify potentially more sensitive localities both in terms of pre-colonial archaeology, colonial archaeology and graves (including possible burial cairns).

There are a few locations which are particularly sensitive:

Section along the west bank of the Orange River (alternative route)



Figure 5: A section of around 800 m along the Alternative route for the powerline (Farm Hooggelegen) will need to be investigated further, if the alternative route is used. This particular area along the river

may have pre-colonial and colonial archaeological remains and/or graves. The blue line indicates the survey tracks.

In view of the presence of burial cairns further down river near Kakamas, it is recommended that a more detailed survey of the banks of the Orange River, specifically the eastern margins of the River, needs to be undertaken during the walk down phase (Figures 7 & 8). With respect to the western banks of the River, it is recommended that further field work is done to the south and west of the farm Hooggelegen (Figure 5).

Section through the Aeolian sand dunes near Garona

Both routes cross a section of Aeolian sand dunes near the Garona sub-station. Morris (2012) in his review of the archaeology of the area confirms that the crests of these dunes were used as “activity/dwelling locales in Later Stone Age times” and it is possible that archaeological remains may be found here. LSA sites may be found on the crest of the dunes or in the deflation hollows between the dunes and therefore the dune area needs to be examined more closely.



Figure 6: A short section of around 1 km of the proposed line crosses over some Aeolian sand dunes just before the Garona sub-station. This short section on the farm Rooilyf 389 needs to be assessed on foot. The blue line indicates the survey tracks.

Section of Preferred Route to East of Orange River



Figure 7: The section of the preferred route along the eastern banks of the Orange River, on the farm Rooisand 387 which needs more intensive investigation on foot. This section is 800 m long. The blue line indicates our survey tracks.

Eastern banks of the Orange River

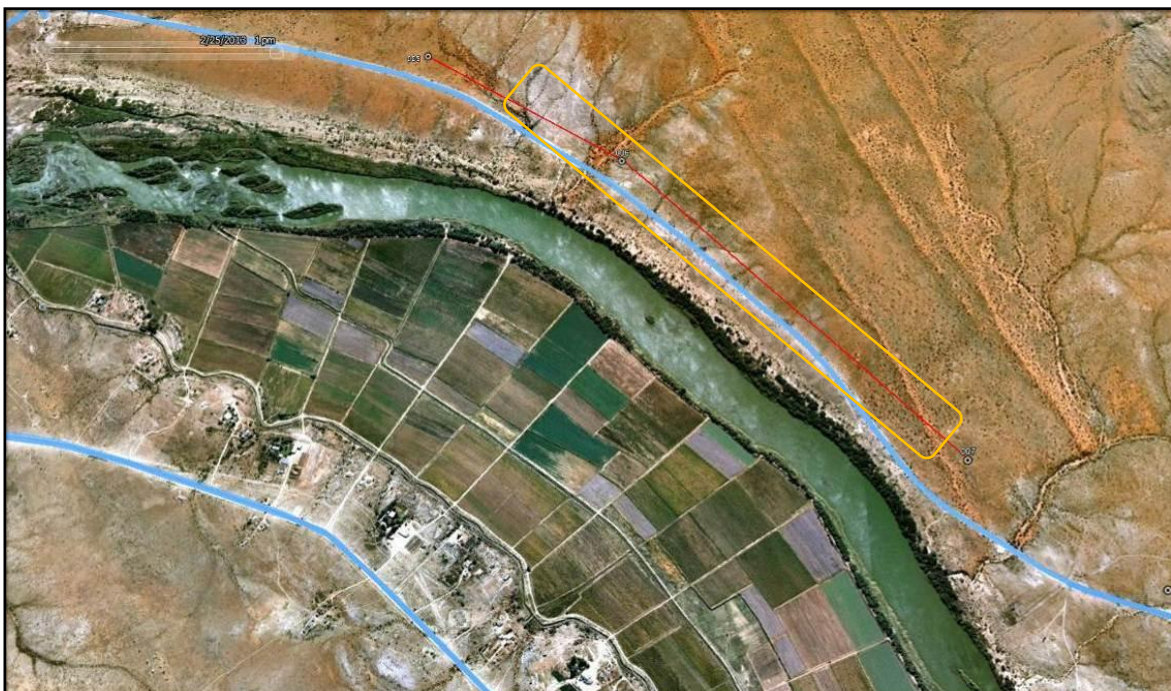


Figure 8: The preferred powerline runs parallel to the Orange River for about 1.8 km, at a distance of 300m from the River. The blue line indicates our survey tracks. The orange rectangle indicates the approximate area which should be subjected to a walk down.

A section of the preferred powerline runs parallel to the Orange River for about 1.8 km, at a distance of only 300 m from the River. This area needs to be examined in greater detail and on foot to determine possible impacts to pre-colonial archaeology, colonial archaeology and graves.

9.2. Built Environment

There are no anticipated impacts to the Built Environment.

9.3. Cultural Landscape

There are no anticipated impacts to the Cultural Landscape.

9.4. Evaluation of Powerline Options

There are no grounds presently, based on heritage considerations, for deciding between the alternative routes at the northern and southern sections of the development and therefore no preference is expressed for either route.

The margins of the Orange River are considered the most sensitive in terms of both archaeology and the built environment.

In order to avoid impacts to potential sites along the River, it is recommended that the alternative route is selected. It crosses the River at right angles and avoids traveling along the River, which is the issue with the preferred route.

10. REFERENCES

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