HERITAGE IMPACT ASSESSMENT

NAMAQUALAND REGIONAL WATER SUPPLY SCHEME – UPGRADE OF THE WATER SUPPLY PIPELINE FROM OKIEP TO CONCORDIA AND CAROLUSBERG NORTHERN CAPE PROVINCE

Concordia commonage (Rem Farm 21), Prt. 1 of Farm 132, Prt. 23 of Farm 132, Rem Farm 133, Prt. 9 of Farm 133, Re Farm 635, Springbok

Assessment conducted under Section 38 (3) of the National Heritage Resource Act (No. 25 of 1999)

Prepared for:

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EXECUTIVE SUMMARY

Introduction

ACRM was appointed by EnviroAfrica to conduct a Heritage Impact Assessment (HIA) for the proposed upgrading of the bulk water pipeline from Okiep to Concordia and Carolusberg, near Springbok in the Northern Cape Province.

The HIA forms part of a Basic Assessment process that is being conducted by EnviroAfrica cc.

The project entails the upgrading of the existing bulk water supply pipeline from the existing Okiep Reservoir, to the existing Concordia and Carolusberg Reservoirs. The proposed project will evaluate a number of different route options. Depending on which option is the most suitable, the project can be regarded as an expansion (i. e. replacing existing pipelines within the same footprint), or a new development if the preferred route does not follow the existing route.

The project is regarded as a high priority infrastructure upgrade by Sedibeng Water (the applicant), who is responsible for the management and maintenance of the whole of the Namaqualand regional water supply scheme.

Five route alternatives were investigated during the heritage field assessment; namely

- Concordia to Okiep (existing pipeline to be replaced)
- Carolusberg A1
- Carolusberg A2
- Carolusberg A3
- Carolusberg A4 (existing pipeline)

Carolusberg A1 is the preferred alternative.

Aim of the HIA

The overall purpose of the HIA is to assess the sensitivity of archaeological and other heritage resources in the alternative route options, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures.

Heritage resources identified

A field assessment of the five pipeline routes took place in September 2015 and in May 2016, in which the following observations were made:

Concordia to Okiep

No heritage resources were identified in the proposed (existing) route.

Carolusberg A1 (preferred route)

Two stone cairns/graves, a stone farm boundary, and a kraal were recorded close to the proposed route.

Carolusberg A2

An abandoned farm house, a few isolated stone tools, a stone kraal, a probable pre-colonial Khoekhoen kraal with associated scatters of Later Stone Age implements, a `Christian' grave, and the remains of a dwelling were recorded close to the proposed route.

Carolusberg A3

Two graves and two possible graves/alternatively stone cairns marking old copper prospecting sites were recorded close to the proposed route.

Carolusberg A4

No heritage resources were identified in the proposed (existing) route.

Anticipated Impacts

Overall, as long as the recommendations made in this report are adhered too, no significant impacts to heritage resources are anticipated. In Carolusberg A1 (the preferred route) for example, no heritage resources will be impacted by the proposed construction of the water pipeline.

According to the SAHRIS fossil sensitivity map, the Springbok area is rated as having, a low (i. e. insignificant/zero) fossil sensitivity.

Conclusion

The HIA has identified no significant impacts to heritage resources that will need to be mitigated prior to, proposed activities commencing.

Therefore, there are no objections to the authorization of the proposed project.

From a heritage perspective, Carolusberg A1 (i. e. the preferred route) is an acceptable alternative.

Recommendations

Concordia to Okiep

No mitigation is required.

Carolusberg A1 (preferred route option)

1. Construction of the water pipeline must avoid a stone kraal (Site 339) which is located about 15m from the proposed route.

Carolusberg A2

1. Construction of the water pipeline must avoid a possible Khoekhoen herder kraal (Site 661) which is located about 15m from the proposed route. The site has been graded as having *moderate-high* (Grade IIIb) significance. A 15m protective buffer is recommended.

2. Should any (unmarked) human remains or buried ostrich eggshell caches for example, be uncovered during excavations for the water pipeline, all work must cease and the remains and finds must be immediately reported to the South African Heritage Resources Agency (Ms Natasha Higgit 021 462 4502), or Jonathan Kaplan (082 321 0172).

3. The above recommendations must be included in the Environmental Management (EMP) Plan for the proposed project.

Carolusberg A3

1. No mitigation is required.

Carolusberg A4

1. No mitigation is required.

Table of Contents

1. INTRODUCTION

ACRM was appointed by EnviroAfrica, on behalf of Sedibeng Water to conduct a Heritage Impact Assessment (HIA) for the proposed upgrade of the bulk water supply pipeline from Okiep to Concordia and Carolusberg, near Springbok (Nama Khoi Municipality) in the Namaqualand region of the Northern Cape Province (Figures 1 & 2).

The HIA forms part of a Basic Assessment process that is being conducted by independent environmental consultants EnviroAfrica cc.

2. THE DEVELOPMENT PROOSAL

The project entails upgrading of the existing bulk water supply pipeline from the existing Okiep Reservoir to the existing Concordia and Carolusberg Reservoirs.

The project will evaluate a number of alternative route options. Depending on which option is the most suitable the project can be regarded as an expansion (i. e. replacing existing pipelines within the same footprint), or a new development if the preferred pipeline route does not follow the existing route.

The project is regarded as a high priority infrastructure upgrade by the applicant (i. e. Sedibeng Water) who is responsible for the management and maintenance of the whole of the Namaqualand regional water supply scheme.

Five route alternatives were investigated during the heritage assessment (Figure 3); namely

- Concordia to Okiep (existing pipeline to be replaced)
- Carolusberg A1
- Carolusberg A2
- Carolusberg A3
- Carolusberg A4 (existing line)

Carolusberg A1 is the preferred route.

The overall purpose of the HIA is to assess the sensitivity of heritage resources in the alternative route options, to determine the potential impacts on heritage resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures.

Figure 1. Locality map in a regional context. Red polygon indicates the study area

Figure 2. Locality map. The study area in a local context

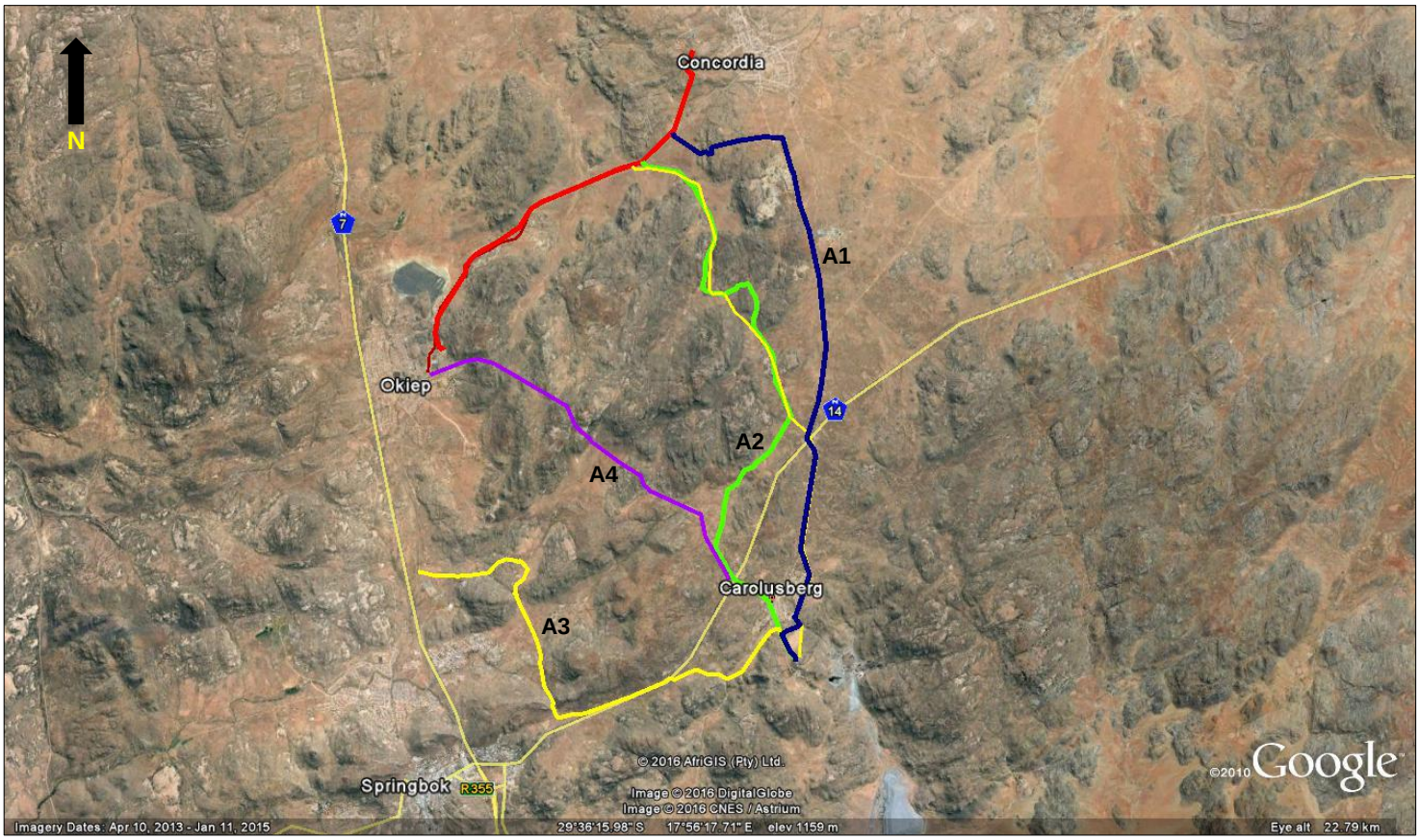

Figure 3. Google satellite map indicating the proposed alternative route options. The red and purple routes are existing lines

3. LEGAL FRAMEWORK

The National Heritage Resources Act (Act No. 25 of 1999) makes provision for a compulsory Heritage Impact Assessment (HIA) when an area exceeding 5000 m² is being developed. This is to determine if the area contains heritage sites and to take the necessary steps to ensure that they are not damaged or destroyed during development.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge

systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

Section 38 (1) (a) of the Act also stipulates that any person constructing a powerline, pipeline or road, or similar linear development or barrier exceeding 300m in length is required to notify the responsible heritage resources authority, who will in turn advise whether an impact assessment report is needed before development can take place.

4. TERMS OF REFERENCE

The terms of reference for the study were to:

- Determine whether there are likely to be any important archaeological and other heritage resources in the proposed route options that may potentially be impacted by the project, and

- Recommend mitigation action to minimise the impact of the project on heritage resources

5. DESCRIPTION OF THE RECEIVING ENVIRONMENT

Springbok (the study area) is located in the arid Namaqualand region of the Northern Cape Province, 550 kms north of Cape Town, on the N7 to Namibia. Okiep, Concordia and Carolusberg owe their origins primarily to the 19th century copper mining industry, and preserve extensive mining and Anglo-Boer War heritage (Smallberger 1995).

Okiep lies to the east of the N7 about 5kms north of Springbok. Concordia was originally established as a Rhenish mission station in 1852 before copper mining began there in 1853. During the Anglo Boer War, the Boers used Concordia as their headquarters whilst Okiep (some 10 kms away) was under siege. Carolusberg is located about 8kms northeast of Springbok, off the N14. The town was visited by Governor Simon van der Stel on his expedition to Namaqualand in 1685 (Waterhouse 1932).

In general, the study area is characterised by extensive, exposed bedrock granite rocks of various sizes, huge granite and gneiss domes, mountains, steep rocky slopes, and open veld with shallow soils colonized by shrubs and dwarf vegetation (succulents). The dry Eselfontein River and several ephemeral water courses originating from the surrounding high mountains intersect and drain the study area. There are no known pans or springs. Surrounding land use is agriculture (mainly sheep & goat grazing), with some local granite mining operations in the hills surrounding Okiep, Concordia and Carolusberg.

Figures 4-35 illustrate the nature of the receiving environment surrounding the proposed route options.

Figure 4. Pipeline from Okiep to Concordia (existing route)

Figure 6. Okiep to Concordia alongside the tar road (existing route)

Figure 5 Pipeline from Okiep to Concordia (existing route)

Figure 7. Concordia to Okiep (existing route), from below the existing Concordia Reservoir. View facing south west

Figure 8. Alternative A1 (the preferred route). View facing south east from the Concordia/Okiep tar road

Figure 9. Alternative A1 (the preferred route). View facing west. The Concordia/Okiep tar road can be seen in the distance

Figure 10. Alternative A1 (the preferred route). View facing east.

Figure 11. Alternative A1 (the preferred route). View facing east.

Figure 12. Alternative A1 (the preferred route). View facing east.

Figure 14. Alternative A1 (the preferred route). Carolusberg to the N14. View facing north east

Figure 13. Alternative A1 (the preferred route). View facing east to the Concordia/Carolusberg road. Thereafter, the route will be aligned directly alongside the gravel road to Carolusberg

Figure 15. Alternative A1 (the preferred route). View facing south to the existing Carolusberg reservoir

Figure 16. Alternative A2. Gravel farm road from Concordia to Carolusberg. View facing south

Figure 17. Alternative A2. Gravel farm road from Concordia to Carolusberg. View facing north

Figure 18. Alternative A2. Valley between Carolusberg and Concordia. View facing north to Concordia

Figure 19. Alternative A2. Route to Concordia. View facing north

Figure 20. Alternative A2. Gravel farm road to Okiep `Private' tar road View facing north west

Figure 21. Alternative A2. Gravel farm road to Concordia. View facing north east

Figure 22. Alternative A2. Route to Concordia. View facing north east

Figure 23. Alternative A2. View facing northeast

Figure 24. Alternative A3. N14 from Carolusberg to Springbok. View facing south west

Figure 25. Alternative A3. N14 from Carolusberg to Springbok. View facing south west

Figure 26. Alternative A3. Dam wall to N14 tar road. View facing south

Figure 27. Alternative A3. View facing north to Okiep

Figure 28. Alternative A3. View from Bergsig facing north to Okiep

Figure 29. Alternative A3. Arrow indicates road to Okiep

Figure 30. Alternative A4. `Private' road from Carolusberg to Okiep. View facing north

Figure 31. Alternative A4. `Private' road from Carolusberg to Okiep. View facing north

Figure 34. Alternative A4. View facing north over the mountains to Okiep

Figure 32. Alternative 4. Private road from Carolusberg to Okiep. View facing east

Figure 33. Alternative A4. Existing pipeline from Carolusberg to Okiep. View facing north

Figure 35. Alternative A4. Existing pipeline from Okiep to Carolusberg. View facing south

6. STUDY APPROACH

6.1 Method

The overall purpose of the HIA is to assess the sensitivity of archaeological and other heritage resources that may occur in the 5 proposed pipeline routes, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures.

A field assessment took place on the 1st and 2nd September, 2015 and on the 20th April 2016 (Carolusberg A1).

A Track path of the survey was created. Most of the survey was done on foot, but sections of the different routes were driven by vehicle; for example, between Okiep and Concordia (A4 existing route), between Concordia and Carolusberg (A1 preferred route), and between Springbok and Carolusberg (A3), where the proposed routes are located in the existing road reserve.

Heritage resources located during the study were recorded using a hand held GPS device set on the map datum wgs 84.

A desktop study was also carried out to assess the heritage context surrounding the study area.

It should be noted that a large part of the surrounding landscape (i. e. Okiep, Bergsig & Concordia), and the high granite mountainous areas surrounding Okiep and Springbok, were ground truthed during a HIA for the proposed Springbok Wind Energy Farm, which included the location positions of some 40 wind turbines, internal access roads, laydown areas, electricity substations and powerline routes (Kaplan 2010).

6.2 Constraints and limitations

There were no constraints or limitations associated with the study. Overall, ground visibility was very good.

A portion of the proposed (existing) pipeline between Okiep and Carolusberg (A4) was not searched due to the rugged nature of the receiving environment (refer to Figures 33-35).

6.3 Identification of potential risks

- There are no potential risks or fatal flaws associated with the proposed project.

- According to the SAHRIS fossil sensitivity map, the area is considered to have a very low (insignificant/zero) sensitivity.

6.4 Archaeological background

Historically, the interior of Namaqualand was occupied by the Little Namaqua, a Khoekhoen pastoralist group who herded sheep and cattle and lived in temporary

encampments of mat/grass huts. The Little Namaqua are known to have moved seasonally with their livestock and historical reports indicate that they may have followed a transhumance cycle between the Kamiesberg in the summer months and the Sandveld in the winter months (Webley 1992). Since the Little Namaqua had no clearly defined territorial boundaries, it was easy for the colonial Trekboers to settle in the area, when loan farms were granted after 1750. The Little Namaqua eventually retreated to so-called `reserves' such as Leliefontein, Steinkopf, Kommaggas, Carolusberg, Concordia and the Richtersveld (Webley & Halkett 2010).

Until recently, little archaeological work had taken place in the Springbok area, where most of the current studies have been surveys undertaken as part of the EIA process. Most of the archaeological research in the western part of the Northern Cape has tended to be concentrated on the Namaqualand coast, in the Richtersveld and the Kamiesberg area.

Archaeological surveys around Springbok have generated mixed results. For example, only three stone flakes were recorded during an HIA for a proposed Wind Energy Farm near Springbok, Okiep and Concordia, where some faded rock was also recorded (Kaplan 2010). A few stone flakes were also encountered in a powerline route between Springbok and Nababeep during scoping for the same project.

A low density scatter of Later Stone Age (LSA) flakes, chunks, cores and utilized pieces, in quartz and silcrete were recorded near Bulletrap (north of Springbok) during an assessment of several borrow pits (Kaplan (2008).

No pre-colonial resources were documented during a heritage scoping assessment for a proposed water pipeline between Rooiwinkel and Nababeep (Kaplan 2011a), and between Okiep and Bulletrap alongside the N7 (Kaplan 2011b), projects which are part of the current Namaqualand regional water supply scheme being administered by the applicant.

A few stone tools and a possible grave/grave marker were recorded by Smith (2013a) during a HIA for a proposed solar energy farm near Carolusberg, and dispersed scatters of stone tools, a stone kraal, colonial-era artefacts and a possible grave were also encountered by Smith (2013b) during a HIA for a proposed solar energy farm near Nababeep.

No archaeological heritage was encountered by Gaigher (2012) during a HIA for a proposed solar energy farm south of Springbok and no pre-colonial archaeological traces were encountered by Morris during a survey of the proposed upgrading of the Goegap Nature Reserve facilities a few kilometers outside Springbok.

Heritage resources relating to the historic copper railway line, and possible grave markers/alternatively copper prospecting pits covered with rocks, were identified by Webley (2014) during a HIA for the upgrading of the N7 between Okiep and Steinkopf, but no pre-colonial archaeological heritage was recorded during the study.

The majority of the work so far done appears to indicate a paucity of archaeological traces in the Springbok area of the Northern Cape.

7. FINDINGS

A range of heritage resources were documented during the heritage field assessment (Figure 36 & Table 1).

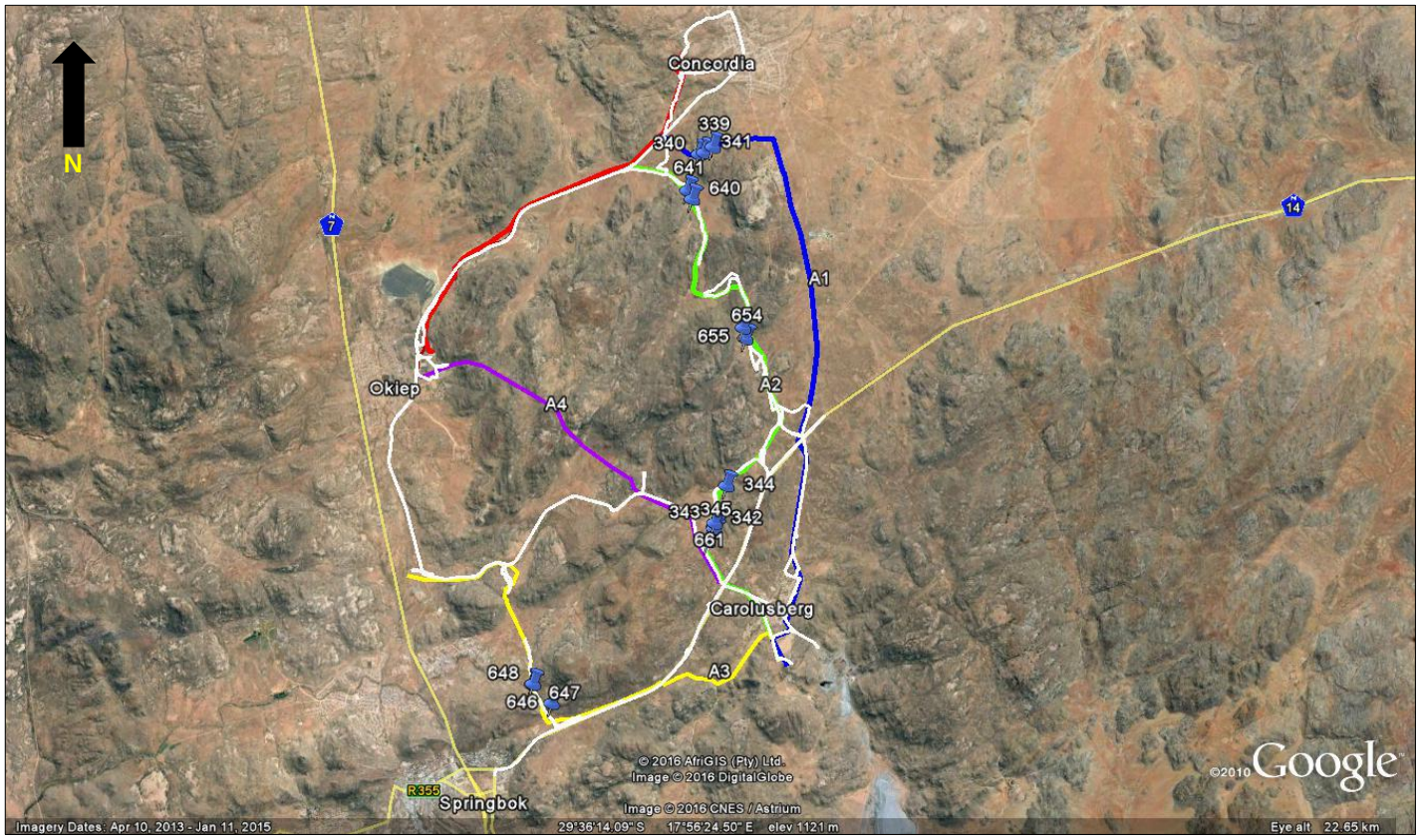

Figure 36. Google satellite map illustrating the proposed route alternatives. The red route between Okiep and Carolusberg is the existing pipeline, which will be replaced by a new pipeline within the same servitude. Carolusberg A1 (blue line) is the preferred route. Carolusberg A2 (green line) and Carolusberg A3 (yellow) are the proposed alternative routes. Carolusberg A4 is an existing pipeline. The white lines are track paths

7.1 Concordia to Okiep

No heritage resources were recorded in the proposed route between the Concordia reservoir and the Okiep reservoir, where the existing pipeline will be replaced by a new pipeline, in the same servitude.

7.2 Carolusberg A1 (preferred alternative)

The following heritage resources were recorded in Alternative Route A1 (Figure 37).

The remains of a stone kraal (Site 339) were recorded 15m from the proposed pipeline route, which will be aligned alongside a gravel farm road (Figure 38). A stone wall has been constructed downslope of an outcropping of granite to create a protected area for domestic stock. The `space' within the enclosure measures about 15 x 10m in diameter. A single entrance has been created, while much of the wall has collapsed. It appears that the kraal is no longer in use. No pre-colonial resources, historic artefacts, or any

dung was found within, or outside the kraal. The surrounding area and granite outcropping was also searched for archaeological remains and rock shelters. No rock art was found.

Grading: *low to moderate* (lllc)

Two graves/stone cairns (Site 340) were recorded at the top of the steep kloof below a rocky ridge, some 40m south of the proposed route (Figure 39). The two cairns, built about 25m apart, are stacked with granite slabs about 1.5m high. No artefactual remains were found in the surrounding area. The distance from the proposed pipeline means that the graves will not be impacted by proposed construction activities.

Grading: *high* (llla)

A stone farm boundary (Site 341) measuring about 150m long and 1.5m wide, built with loose granite slabs, was encountered 60m from the proposed pipeline route (Figure 40), and will therefore not be impacted by proposed construction activities.

Grading: *moderate to high* (lllb)

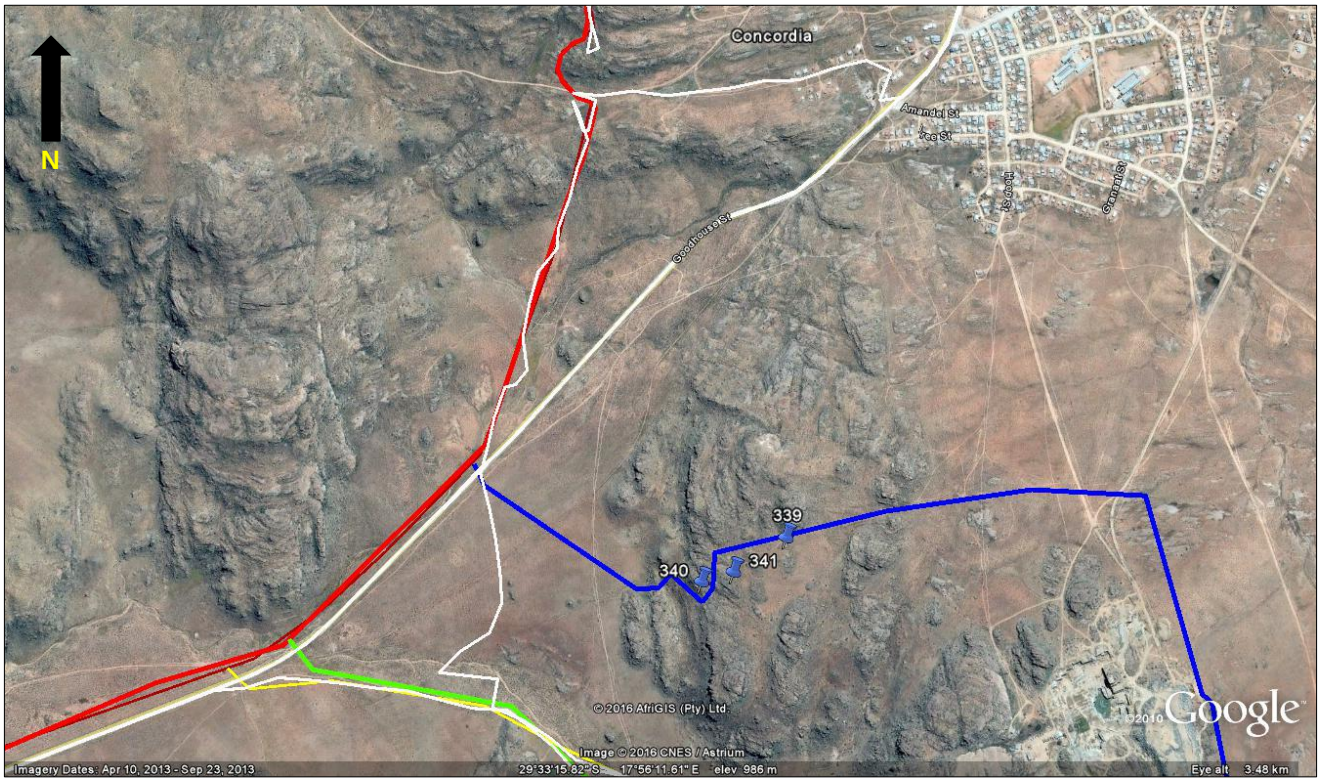

Figure 37. Google satellite map indicating location of heritage sites in Route Option A1 (the preferred alternative).

Figure 38. Remains of kraal (Site 349). View facing north

Figure 39. Graves (Site 340). View facing south

Figure 40. Stone farm boundary line (Site 341). View west

7.3 Carolusberg A2

An abandoned farm house (Site 640), and a cluster of associated features including a drinking trough, water channel, concrete reservoir and concrete/raw stone-lined pit (Site 641) were recorded about 60m from the proposed pipeline route between Concordia and Carolusberg (Figures 41-43). The farm house is about 1km from some faded Bushman paintings and a farm laborer's grave recorded during the HIA for the Springbok wind energy farm (Kaplan 2010). The distance of the farmhouse and associated features from the proposed route, means they will not be impacted by proposed construction activities.

Grading: m*oderate to low* (Grade lllc)

One MSA quartzite flake (Site 664) was recorded in a large wind eroded patch of sand near the proposed route between Carolusberg and Concordia, while a silcrete flake (Site 655) was found in an old farm track in the proposed route leading over the mountain to Concordia.

Grading of the resources: l*ow* (Grade lllc)

A probable Khoekhoen kraal (Site 661) was recorded 15m from the proposed pipeline route, 25m above a small, dry river bed running down the shallow valley. Comprising a large (13 x 8m) circular stone enclosure, alongside a much smaller secondary enclosure, the collapsed kraal has been constructed on top of a hard, flat rock surface on the south bank of the unnamed river (Figures 44 & 45). No artefactual or organic remains such as pottery, bone or ostrich eggshell were found inside the kraal, or in the surrounding area, but a dispersed/low density scatter of LSA flakes, chips and chunks in vein and milky white quartz, silcrete and quartzite, including a quartz bipolar core, and an anvil, were recorded on the shallow sandy soils on the northern bank of the river (Figures 46 & 47). No pottery or ostrich eggshell was found on the weathered soils, suggesting the scatter of tools, and the remains of the herder kraal may be contemporaneous.

Grading: *moderate to high* (Grade lllb)

Site 342: A single grave was recorded 50m south of the proposed pipeline route (Figure 48). The grave comprises a small mound of packed stone, which has been disturbed. No grave goods or items were found. The grave is assumed to be a `Christian' burial as it is located about 60m east of the remains of a dwelling (Site 345). The distance of the grave from the proposed pipeline means that it will not be impacted by proposed construction activities.

Grading: *high* (Grade llla)

A few isolated stone implements (Site 343) of *low* (Grade lllc) significance were found about 50m south of the proposed route.

A well preserved stone kraal (Site 344) was recorded alongside a gravel farm road, 20m north of the proposed pipeline route (Figure 49 & 50). The single entrance kraal will not be impacted by proposed construction activities. No artefactual remains (pre-colonial or historic) were found inside or outside the feature, or in the surrounding landscape.

Grading: *moderate to low* (Grade lllb)

The remains of a dwelling (Site 345 & Figure 51), were recorded 50m south of the proposed pipeline route, and 60m from the grave (Site 342). It is assumed that the two features are contemporaneous. The remains will not be impacted by proposed construction activities.

Grading: *low* (Grade lllc)

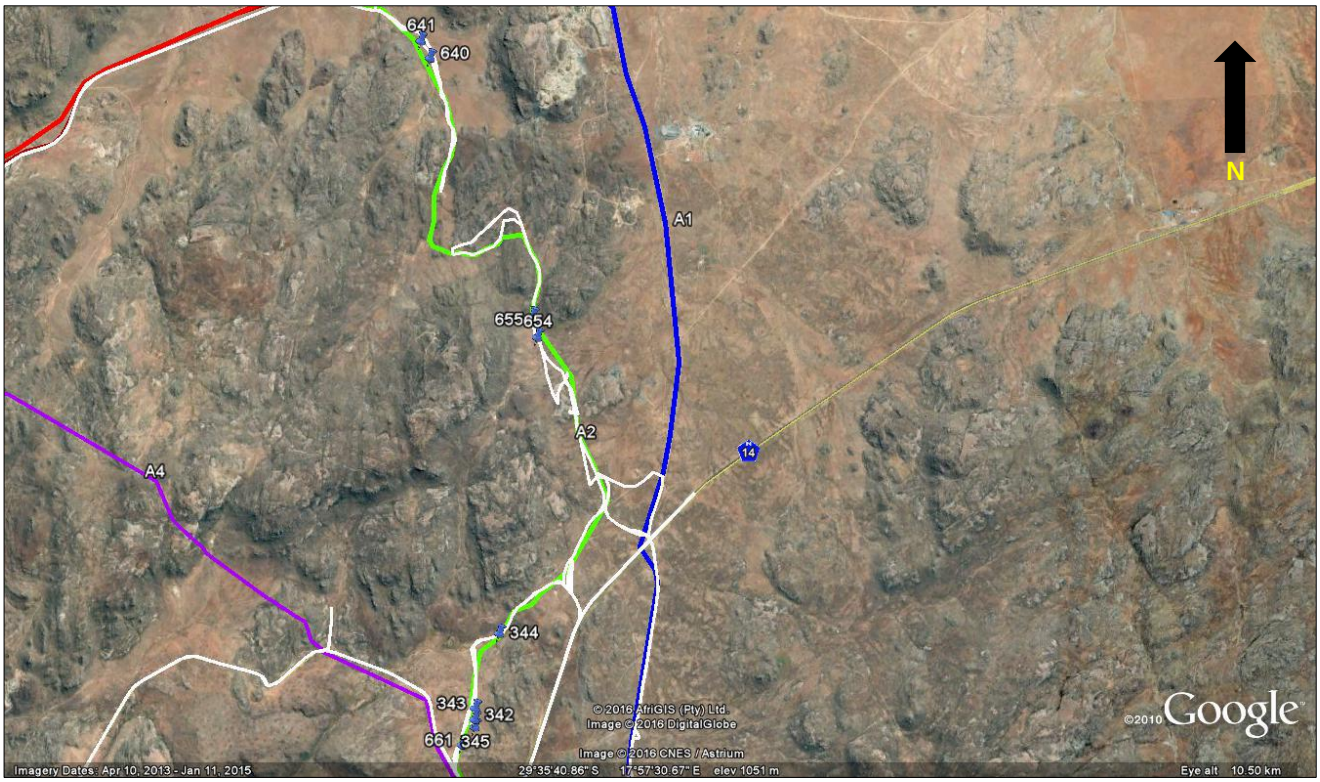

Figure 41. Google satellite map indicating location of heritage site in Alternative A2


Figure 42. Site 640. View facing south east


Figure 43. Site 641. View facing south east

Figure 44. Stone kraal (Site 661) View facing south

Figure 45. Stone kraal (Site 661). View facing north

Figure 45

Figure 46. Site 661. Scale is in cm

Figure 47. Site 661. Scale is in cm

Figure 48. Grave (Site 342). View facing north east

Figure 49. Stone kraal (Site 344). View facing north

Figure 50. Stone kraal (Site 344). View facing west

Figure 51. Remains of dwelling (Site 345). View facing south

7.3 Carolusberg A3

Two graves (Site 648) were recorded 40m east of the proposed pipeline route (Figure 52). The graves, whose location was shown to the heritage practitioner by a local farmer, are located 20m east from the complete ruins of a farmhouse (Site 647). The graves have not been looked after for many years and no grave goods or items were found lying around.

Two graves/alternatively stone cairns marking old copper prospecting pits (Site 646) were recorded 60m east of the proposed route and some 300m from the N14 (Figures 53 & 54). According to Webley (2014), old prospecting pits covered with stones are fairly common in the Springbok area, which was the centre of the historical copper mining industry. No grave goods or items were found lying about.

Grading: *moderate to high* (Grade IIIa & IIIb)

Figure 52. Graves (Site 648)

Figure 53. Site 646 Graves/alternatively cairns marking old copper prospecting pits. View facing south to the N14

Figure 54. Google satellite map indicating location of heritage site in Alternative A3

7.4 Carolusberg A4

No archaeological or any other heritage remains were recorded in the proposed route.

Site	Name of farm	Lat/long	Description of finds	Grading	Suggested mitigation
A1 Preferred					
339		S29 33.303 E17 56.258	Kraal	LIIa	Pipeline to avoid
340		S29 33.344 E17 56.162	Graves	IIIa	None required, will not be impacted by proposed construction activities
341		S29 33.334 E17 56.198	Stone farm boundary (historical)	IIIb	None required, will not be impacted by proposed construction activities
A2					
640		S29 34.021 E17 56.191	Abandoned stone farm house	IIIc	None required, will not be impacted by propose construction activities.
641		S29 33.937 E17 56.139	Concrete drinking trough, water channel & storage pit	IIIc	None required, Features will not be impacted by proposed construction activities.
654		S29 35.405 E17 56.805	MSA quartzite flake in large wind exposed patch of ground	IIIc	None required

655		S29 35.180 E17 56.467	Silcrete flake	IIIc	None required
661		S29 37.256 E17 56.225	Khoekhoe kraal, with associated scatter of LSA tools on the north of bank unnamed stream. Tools comprise quartz, silcrete and quartzite flakes, quartz bipolar core, and pecked anvil. No pottery, bone or ostrich eggshell	IIIb/potential IIIa	Pipeline to avoid kraal. A 15m protective buffer is recommended.
342		S29 37.181 E17 56.269	Grave	IIIa	None required. Grave will not be impacted by proposed construction activities
343		S29 37.147 E17 56.270	Stone implements	IIIc	None required
344		S29 36.524 E17 56.353	Stone kraal alongside road (historical)	IIIa/b	None required, will not be impacted by proposed construction activities
345		S29 37.203 E17 56.269	Remains of dwelling floor	IIIc	None required, will not be impacted by proposed construction activities
A3					
646		S29 39.113 E 1754.322	Grave/alternatively stone cairns marking old prospecting site	IIIb	None required, will not be impacted by proposed construction activities
647		S29 38.852 E17 54.358	Ruins and rubble of farm house	lllc	None required
648		S29 38.847 E17 54.370	X 2 graves	lllb	None required, will not be impacted by proposed construction activities

Table 1. Spreadsheet of waypoints and description of archaeological finds

8. ANTICIPATED IMPACTS

Overall, as long as the recommendations contained in this report are adhered too, no significant impacts to heritage resources are anticipated.

In Carolusberg A1 (i. e. the preferred route) for example, no heritage resources will be directly impacted by proposed construction activities.

9. CONCLUSION

The HIA for the proposed upgrading of the bulk water supply pipeline from the existing Okiep Reservoir, to the existing Concordia and Carolusberg Reservoirs near Springbok has identified no significant impacts to heritage resources that will need to be mitigated prior to construction work commencing.

From a heritage perspective, Carolusberg A1 (i. e. the preferred route), is an acceptable alternative.

Therefore, there are no objections to the authorization of the proposed project.

10. RECOMMENDATIONS

With regard to the proposed upgrading of the bulk water supply pipeline from Okiep to Concordia and Carolusberg near Springbok, the following recommendations are made:

10.1 Concordia to Okiep

1. No mitigation is required.

10.2 Alternative A1

1. Construction of the water pipeline must avoid the stone kraal (Site 339).

10.3 Alternative A2 (preferred route option)

1. Construction of the pipeline must avoid the possible Khoekhoen herder kraal (Site 661). The site has been graded as having *moderate-high* (Grade lllb) significance. A 15m protective buffer is recommended.

2. Should any (unmarked) human remains or buried ostrich eggshell caches for example, be uncovered during excavations for the water pipeline, all work must cease and the remains and finds must be immediately reported to the South African Heritage Resources Agency (Ms Natasha Higgit 021 462 4502), or Jonathan Kaplan (082 321 0172).

3. The recommendations must be included in the Environmental Management (EMP) Plan for the proposed project.

10.4 Alternative A3

1. No mitigation is required.

10.5 Alternative A4

2. No mitigation is required.

11. REFERENCES

Kaplan, 2011a Archaeological scoping the proposed construction of a new water pipeline between Rooiwinkel and Nababeep, Northern Cape. Report prepared for EnviroAfrica. ACRM Cape Town.

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