



PHASE 1 AIA FIELD REPORT PROPOSED DEVELOPMENT OF ESKOM GROMIS-NAMA-AGGENEIS 400KV IPP INTEGRATION, NORTHERN CAPE PROVINCE

PROPOSED DEVELOPMENT OF ESKOM GROMIS-NAMA-AGGENEIS 400KV IPP
INTEGRATION AND ASSOCIATED EXPANSION OF SUBSTATIONS AND
INFRASTRUCTURE FROM KLEINZEE IN THE NAMA KHOI LOCAL MUNICIPALITY,
TO AGGENEYS IN THE KHAI-MA LOCAL MUNICIPALITY,
NAMAKWA DISTRICT MUNICIPALITY, NORTHERN CAPE

PREPARED FOR:
CTS HERITAGE

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Declaration of independence:

We, Jan Engelbrecht and Heidi Fivaz, partners of UBIQUE Heritage Consultants, hereby confirm our independence as heritage specialists and declare that:

- we are suitably qualified and accredited to act as independent specialists in this application;
- we do not have any vested interests (either business, financial, personal or other) in the proposed development project other than remuneration for the heritage assessment and heritage management services performed;
- the work was conducted in an objective and ethical manner, in accordance with a professional code of conduct and within the framework of South African heritage legislation.



Signed:
J.A.C. Engelbrecht & H. Fivaz
UBIQUE Heritage Consultants

Date: 2019-11-05

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ABBREVIATIONS

AIA:	Archaeological Impact Assessment
ASAPA:	Association of South African Professional Archaeologists
BIA:	Basic Impact Assessment
CRM:	Cultural Resource Management
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment*
EIA:	Early Iron Age*
EMP:	Environmental Management Plan
ESA:	Earlier Stone Age
GPS:	Global Positioning System
HIA:	Heritage Impact Assessment
LIA:	Late Iron Age
LSA:	Later Stone Age
MEC:	Member of the Executive Council
MIA:	Middle Iron Age
MPRDA:	Mineral and Petroleum Resources Development Act
MSA:	Middle Stone Age
NEMA:	National Environmental Management Act
NHRA:	National Heritage Resources Act
OWC:	Orange River Wine Cellars
PRHA:	Provincial Heritage Resource Agency
SADC:	Southern African Development Community
SAHRA:	South African Heritage Resources Agency

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations it must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological:	material remains, resulting from human activity, which is in a state of disuse and is in or on land and is older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
–	rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years (as defined and

protected by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999) including any area within 10 m of such representation;

- wrecks, being any vessel or aircraft, or any part thereof, which were wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history, which are older than 75 years and the sites on which they are found.

Stone Age: The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.

Earlier Stone Age: >2 000 000 - >200 000 years ago
Middle Stone Age: <300 000 - >20 000 years ago
Later Stone Age: <40 000 - until the historical period

Iron Age: (Early Farming Communities). The period covering the last 1800 years, when immigrant African farmer groups brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and herded cattle as well as sheep and goats. As they produced their iron tools, archaeologists call this the Iron Age.

Early Iron Age:	AD 200 - AD 900
Middle Iron Age:	AD 900 - AD 1300
Later Iron Age:	AD 1300 - AD 1850

Historic: Period of the arrival of white settlers and colonial contact.
 AD 1500 to 1950

Historic building: Structures 60 years and older.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (historic places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources: These mean any place or object of cultural significance, tangible or intangible.

Holocene: The most recent geological period that commenced 10 000 years ago.

Palaeontology: Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site that contains such fossilised remains or traces

Cumulative impacts: “Cumulative Impact”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Mitigation: Anticipating and preventing negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

A ‘place’: a site, area or region;

- a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure;
- a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures;
- an open space, including a public square, street or park; and
- in relation to the management of a place, includes the immediate surroundings of a place.

‘Public monuments and memorials’: mean all monuments and memorials—

- erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government; or
- which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual;

‘Structures’: any building, works, device or other facility made by people and which are fixed to land, and include any fixtures, fittings and equipment associated therewith.

1. INTRODUCTION

UBIQUE Heritage Consultants were appointed by CTS Heritage as independent heritage specialists to conduct the Phase 1 field surveys for the Archaeological Impact Assessment of the proposed development of the Eskom Gromis-Nama-Aggeneis 400kV IPP integration and associated substation expansion, in the Khai-Ma and Nama Khoi Local Municipalities, Namakwa District Municipality, Northern Cape, as required by Section 38 of the NHRA and the National Environmental Management Act 107 of 1998 (NEMA).

The project involves the construction of a new Gromis-Nama-Aggeneis 400kV line and establishment of a 400/132 kV yard at Nama Substation. The proposed development includes:

- Expansion of the Gromis Substation and installation of 2nd 400/220 kV 500 MVA transformers at Gromis Expansion of Nama MTS;
- Expansion of the Nama MTS and the construction of a Gromis – Nama 400 kV (approximately 76 km) line;
- Construction of the Nama – Aggeneis 400 kV (approximately 104 km) line, and;
- Establishment of a Nama 400/132 kV at existing Nama MTS with associated switchgear and transformation to accommodate renewable evacuation.

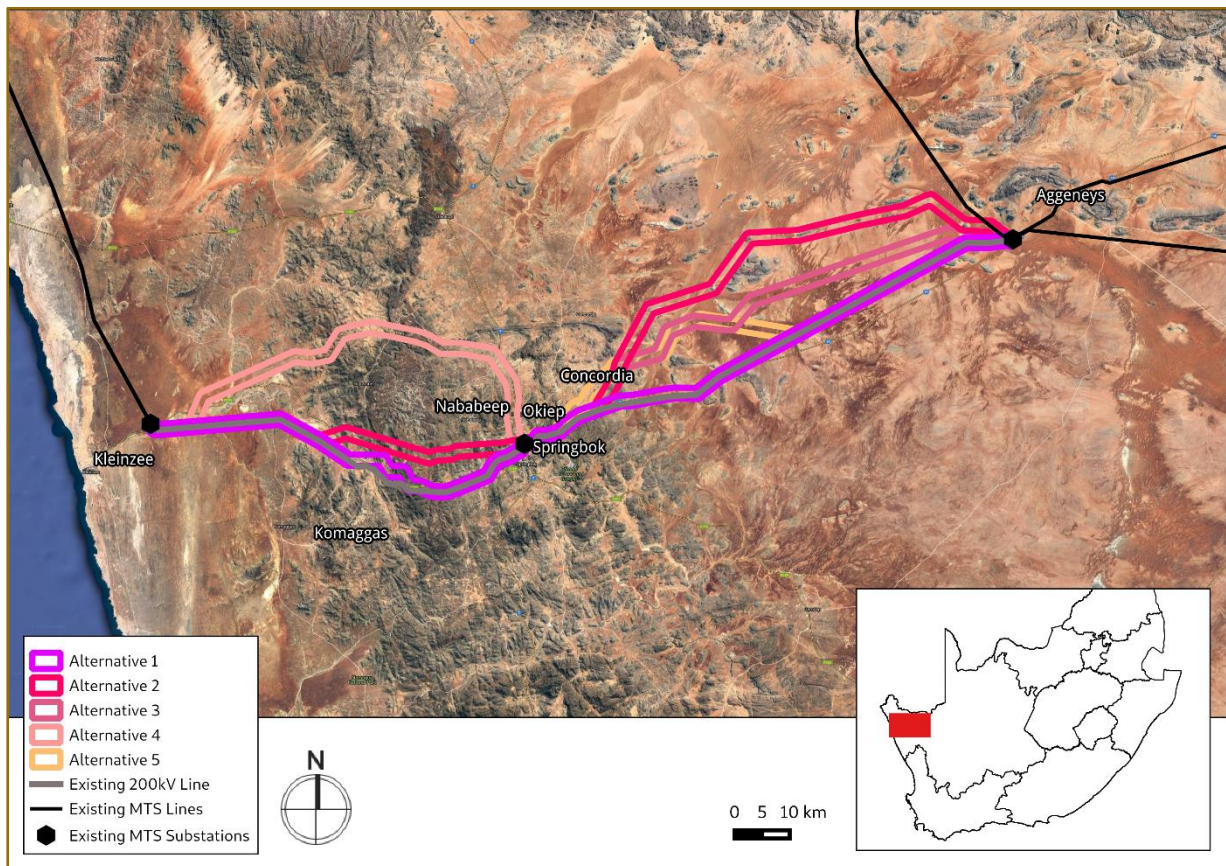


Figure 1 Project locality (Map provided by CTS Heritage)

This report covers the survey of the four alternative project corridors proposed. The identified heritage resources and anticipated, and cumulative impacts that the development of the proposed project may have on the identified heritage resources are presented objectively in this report. Alternatives, should any significant sites be impacted adversely by the proposed project, are offered. All effort will be made to ensure that all studies, assessments and results comply with the relevant legislation and the code of ethics and guidelines of the Association of South African Professional Archaeologists (ASAPA). The report aims to assist the developer in responsibly managing the documented heritage resources, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

2. FIELD ASSESSMENT

2.1 Methodology

2.1.1 Systematic survey

A systematic survey of the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest, was completed.

UBIQUE Heritage Consultants inspected the proposed development corridors and surrounding areas from the 14th to 18th of October 2019. The areas surveyed for the impact assessment was dictated by the Google Earth maps of the development footprints provided by the client, as well as the Heritage Screener compiled by CTS Heritage. The four alternatives were surveyed from a central point established at Springbok. All the study areas were surveyed in transects of approximately 30 - 50m where possible. The development corridors were surveyed on foot and by 4x4 vehicle by a team of three surveyors. Due to time limitation assigned for the project, and while we endeavoured to cover as much ground as possible, the survey concentrated on landscape features such as outcrops and dunes and dry waterways, which typically contain archaeological material in this region.

We conducted an inspection of the surface of the ground, wherever the surface was visible. The archaeological survey was done with no substantial attempt to clear brush, sand, deadfall, leaves or other material that may cover the surface and with no attempt to look beneath the surface beyond the inspection of rodent burrows, cut banks and other exposures fortuitously observed.

2.1.2 Recording significant areas

GPS points of identified significant areas were recorded with handheld Garmin global positioning units (Garmin eTrex 10) and Android Locus Maps application on Samsung Galaxy S9. Photographs were taken with a Canon Ixus 190 20-megapixel camera. Detailed field notes were taken to describe observations (Appendix B).

2.1.3 Determining significance

Levels of the significance of the various types of heritage resources observed and recorded in the project area have been determined according to criteria set out in Appendix A.

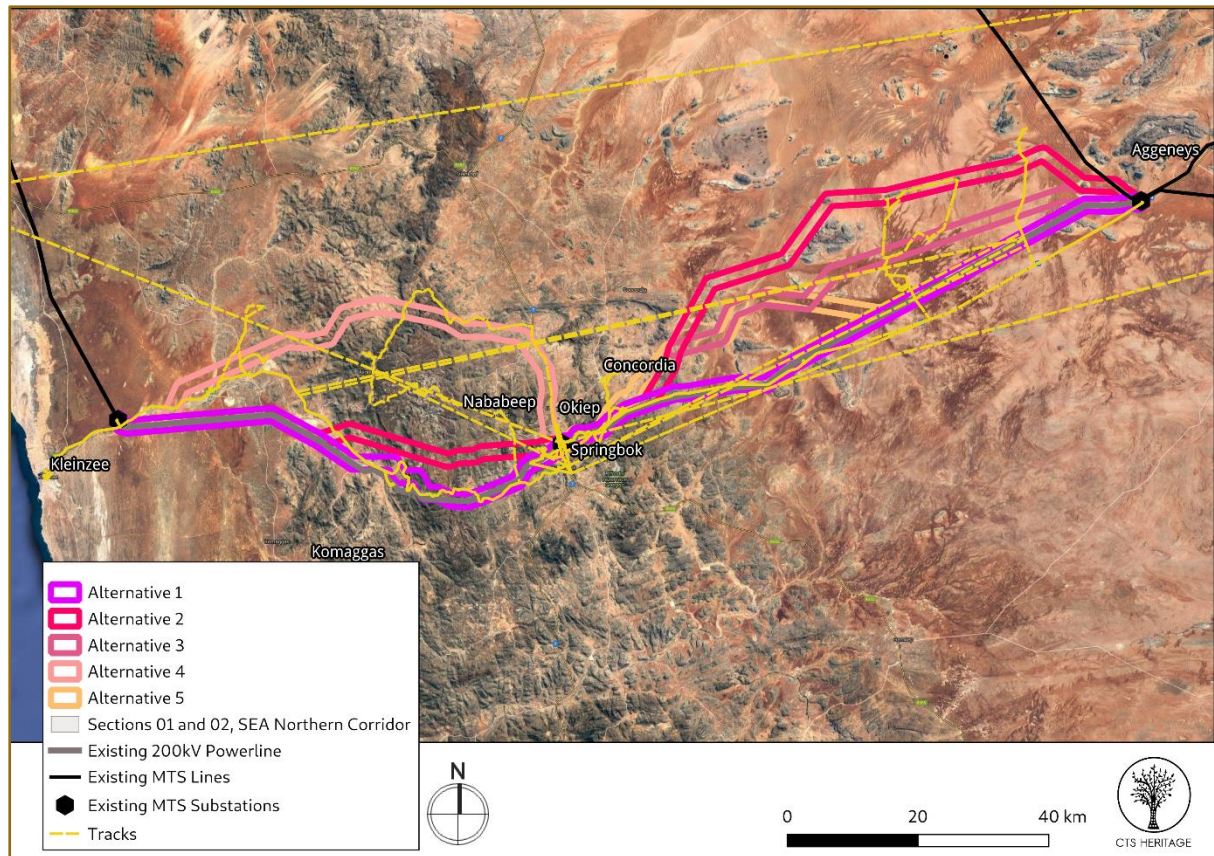


Figure 2 Recorded survey tracks (Map provided by CTS Heritage).

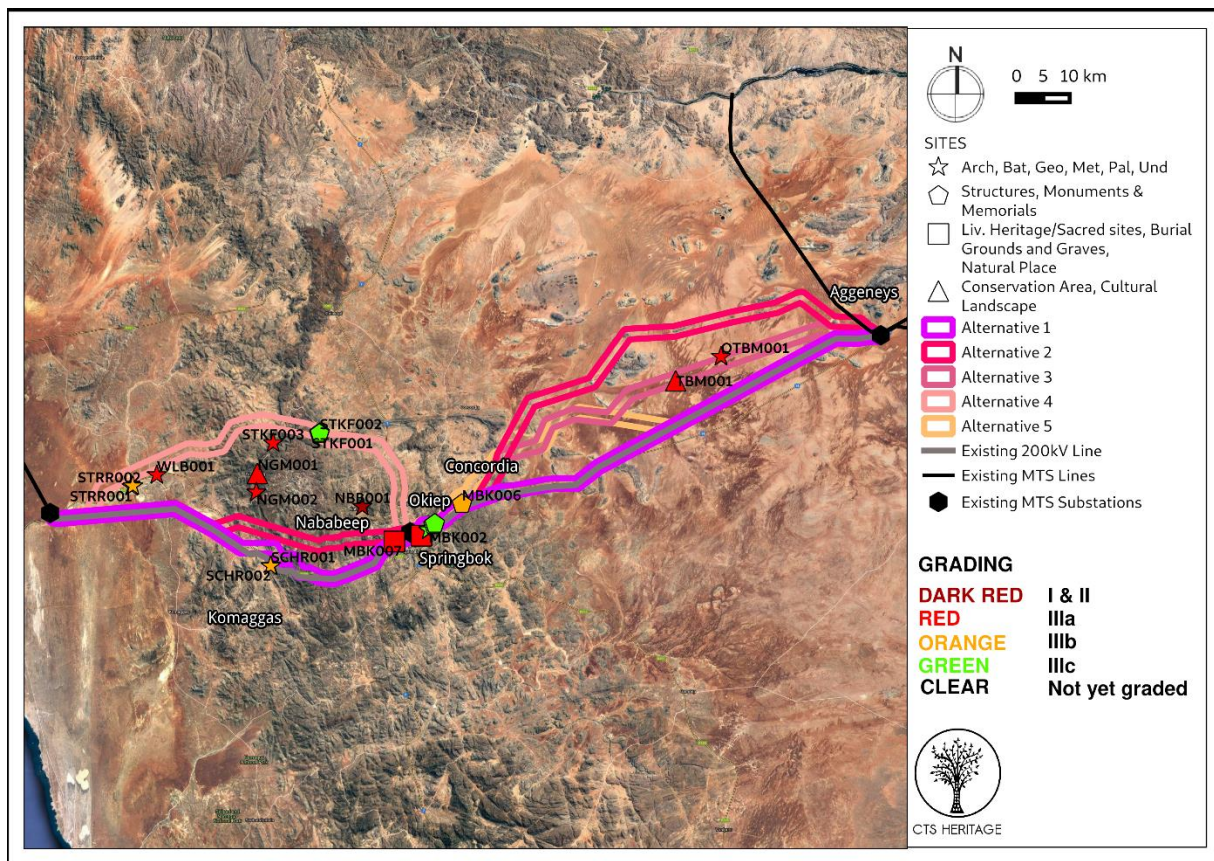


Figure 3 Recorded sites (Map provided by CTS Heritage).

2.2 Description of the affected environment

The landscape of the study areas changes from Bushmanland Sandy Grassland and Bushmanland Arid Grassland vegetation types, with flat sandy terrain around Aggeneys, to the predominant Namaqualand Klipkoppe Shrubland vegetation type surrounding Springbok and Namaqualand Shale Shrubland towards the more mountainous surrounds of Spektakelberg in the west. From Kleinzee eastward towards Spektakelberg, Namaqualand Strandveld vegetation type and a flat to slightly undulating terrain meet typical Namaqualand Coastal Duneveld landscape at the coast.

The Buffels River flows from east to west through the region, primarily outside the development footprint. There are several dry waterways in the area, but none of the waterways is perennial. The five-year drought currently affecting the landscape enabled visibility for surface heritage.



Figure 4. Nama Eskom substation and surrounds.



Figure 5. Panoramic view in the corridor with the existing power line (Alt 1) to the south towards the N14 main road.



Figure 6. Aggeneis Eskom substation and panoramic view of the corridor Alternative 1 with the existing power line.



Figure 7. Panoramic view images of the proposed central corridor (Alt 3) stretching from Aggeneis towards Nama.



Figure 8. Gromis Eskom substation near Kleinzee and panoramic view.



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Figure 10. Panoramic view images of Alt 4 near the Bulletrap and towards Nigramoep settlements.

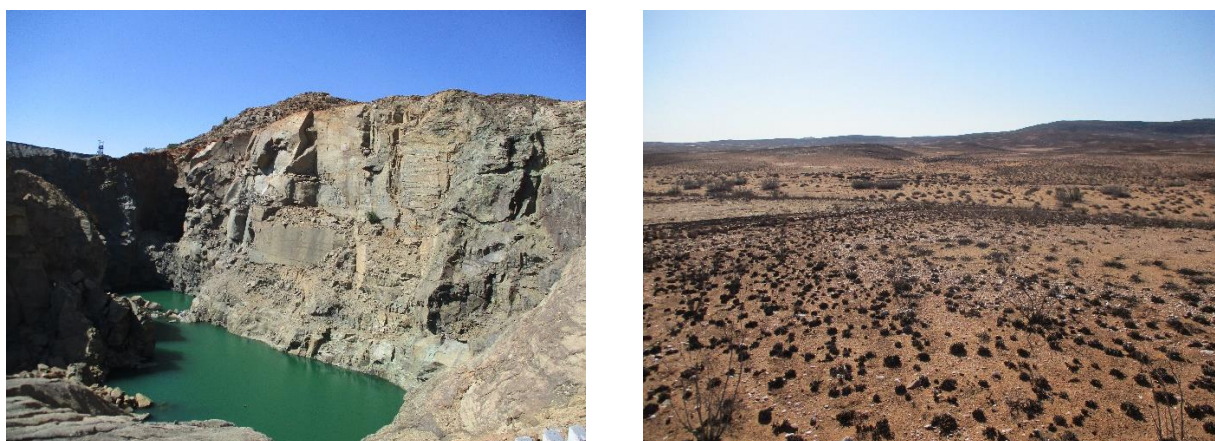


Figure 11 Closed Nababeep copper mine and view of Alternative 4 near Gromis

2.3 Archaeological resources identified

Point ID	Site No.	Site name	Description	Co-ordinates	Grading	Mitigation
002	MBK001	Melkboschkui No. 132/38-001	Informal cemetery. Fenced with at least 50 graves.	29° 38' 51.75" S 17° 52' 58.73" E	IIIA	The site should be included in the heritage register and not be mitigated
003	MBK002	Melkboschkui No. 132/38-002	Stone combined with cement foundation built with vertical packed stones similar to Sotho-Tswana huts. An outer stone circle has a diameter of 4 m with a well-demarcated entrance. Possibly historical/colonial period.	29° 37'44.32" S 17° 55' 10.00" E	IIIC	The site should be recorded before destruction
004	MBK003	Melkboschkui No. 132/38-003	Stone and cement square house foundation approximately 5 m x 2 m. Possibly historical. With prominent midden 50 m east of house foundation. Historical.	29° 37' 42.53" S 17° 55' 09.80" E	IIIC	The site should be mitigated before destruction
005	MBK004	Melkboschkui No. 132/38-004	Stone and daub house ruin with foundation. Possibly historical.	29° 37' 12.73" S 17° 55' 45.69" E	IIIC	The site should be recorded before destruction
006	MBK005	Melkboschkui No. 132/38-005	Stone constructed small stock byre/kraal with prominent entrance ramp to the west of the kraal. Close to Waypoint 005. Historical.	29° 37' 11.22" S 17° 55' 46.03" E	IIIC	The site should be recorded before destruction
007	MBK006	Melkboschkui No. 132/28-006	Round stone-walled shelters on the mountain slope. Most probably Khoi provenance.	29° 35' 03.29" S 17° 59' 05.97" E	IIIB	The site should be included in the heritage register and may be mitigated
008a	MBK007	Melkboschkui No. 132/0-007	Cemetery near Springbok informal settlement (Bergsig). Formal cemetery (municipal).	29° 37' 53.46" S 17° 51' 10.03" E	IIIA	The site should be included in the heritage register and not be mitigated
008b	MBK008	Melkboschkui No. 132/23-008	Livestock byre/kraal most probably for small stock or cattle. Historical.	29° 37' 07.02" S 17° 55' 53.82" E	IIIC	The site should be recorded before destruction
011	SCHR001	Schaap Rivier No. 208/001	Square stone-walled house ruin with a round foundation constructed with vertical stones to the south of the house. Possibly a hearth or additional round hut connected to the house. Historical.	29° 41' 21.08" S 17° 36' 43.59" E	IIIB	The site should be included in the heritage register and may be mitigated
012	SCHR002	Schaap Rivier No. 208/002	Square stone-walled house ruin with historical significance.	29° 41' 22.81" S 17° 36' 40.31" E	IIIB	The site should be included in the heritage register and may be mitigated
015	STRR001	Stryd Rivier No. 188/001	Mud-brick square ruin with historical significance. The contextual artefacts date from the 1870s.	29° 33' 18.44" S 17° 20' 22.77" E	IIIB	The site should be included in the heritage register and may be mitigated
016	STRR002	Stryd Rivier No. 188/002	Mud-brick square ruin with historical significance. The contextual artefacts date from the 1870s.	29° 33' 14.34" S 17° 20' 31.33" E	IIIB	The site should be included in the heritage register and may be mitigated
017a	WLB001	Wolfberg No. 187/001	Mud-brick square house ruin with historical significance. The contextual artefacts date from	29° 32' 06.59" S 17° 23' 19.51" E	IIIA	The site should be included in the

			the 1870s. This house ruin is nearby a closed mine and was probably occupied by some of the first mine workers in the region.			heritage register and not be mitigated
017b	TBM001	Taaibosmond No. 580/001	Existing Nama farmers living and farming on private farmland in the development footprint within Alt 3.	29° 22' 27.94" S 18° 24' 07.38" E	IIIA	The site should be included in the heritage register and not be mitigated
018a	STKF001	Steinkopf No. 22/001	Stone-walled livestock byre/kraal. Possibly historical.	29° 27' 54.72" S 17° 42' 22.53" E	IIIC	The site should be recorded before destruction
018b	OTBM001	Ou Taaibosmond No. 66/2-001	Abandoned farm and settlement within the development footprint.	29° 20' 01.45" S 18° 29' 27.19" E	IIIA	The site should be included in the heritage register and not be mitigated
019	STKF002	Steinkopf No. 22/002	House foundation younger than 60 years. Combination of foundation and dung patches where livestock kraals were presented.	29° 27' 48.67" S 17° 42' 25.99" E	NCW	The phase 1 is seen as sufficient recording and it may be demolished
020	STKF003	Steinkopf No. 22/671-003	Historical stone walls and foundation ruins with artefacts in context. Site is approximately 1 ha in size and proximate to an abandoned mine and Alt 4. The contextual objects are historical ca. 1889-1910.	29° 28' 51.41" S 17° 36' 57.83" E	IIIA	The site should be included in the heritage register and not be mitigated
021	NGM001	Nigramoep No. 136/5-001	Nigramoep settlement ca. 1904. Site is outside the development footprint but is very sensitive in terms of Historical heritage, living heritage and architecture.	29° 31' 56.71" S 17° 35' 07.12" E	IIIA	The site should be included in the heritage register and not be mitigated
022	NGM002	Nigramoep No. 136/6-002	Nigramoep closed/abandoned copper mine. Outside development footprint, but a heritage site.	29° 33' 52.45" S 17° 35' 59.49" E	IIIA	The site should be included in the heritage register and not be mitigated
023	NBB001	Nababeep No. 134/001	Nababeep closed copper mine. Outside development footprint, but still a heritage site. Images of mine and Nababeep museum.	29° 35' 19.26" S 17° 47' 24.72" E	II	Site significance should be managed as part of the provincial Estate

2.3.1 Alternative 1.

Ten incidences of heritage finds were recorded within and near the corridor of Alternative 1. Eight of these are located between Springbok and O'kiep, in the overlap between Alternatives 1 and 2. On the Farm Melkboschkuil No. 132 Portion 38, we recorded an informal fenced cemetery consisting of at least 50 graves (MBK001) and several historic structural remains. Structure MBK002 has a stone cement foundation built with vertically packed stones similar to Sotho-Tswana huts. The outer stone circle has a diameter of 4 m with a well-demarcated entrance. Close by is MBK003, which includes the remains of a rectangular house with a stone and cement foundation approximately 5 m x 2 m and a prominent ash midden 50 m east of the house's foundation. About 1.26 km to the northeast lies MBK004, a stone and daub house ruin with foundation, and two associated small stock byres or kraals constructed from stone (MBK005 and MBK008). MBK008 is situated on the Farm Melkboschkuil No. 132 Portion 23. These remains are probably associated with the historical farmscape predating the establishment of the town of Springbokfontein in 1862.

On the Farm Melkboschkuil No. 132 Portion 28, 10.6 km east of O'kiep, the remains of round stone-walled shelters were recorded on the mountain slope (MBK006). These features are of probable Khoi provenance.

Approximately 5.2 km west of MBK001, lies MBK007, a municipal cemetery near Bergsig, an informal settlement, northeast of Springbok.

The remaining two sites recorded within the Alternative 1 corridor, lie to the north of Buffelsrivier, on the Farm Schaap Rivier No. 208. Sites SCHR001 and SCHR002 are both rectangular stone-walled structures. SCHR001 also contains a circular foundation constructed with vertical stones to the south of the house. The round structure could have been a hearth or additional living space connected to the house. Both these structures are of historical significance.

2.3.2 Alternative 2.

Apart from the heritage discussed above in the convergence of the Alternatives 1 and 2 corridors, no other heritage resources were recorded within Alternative 2.

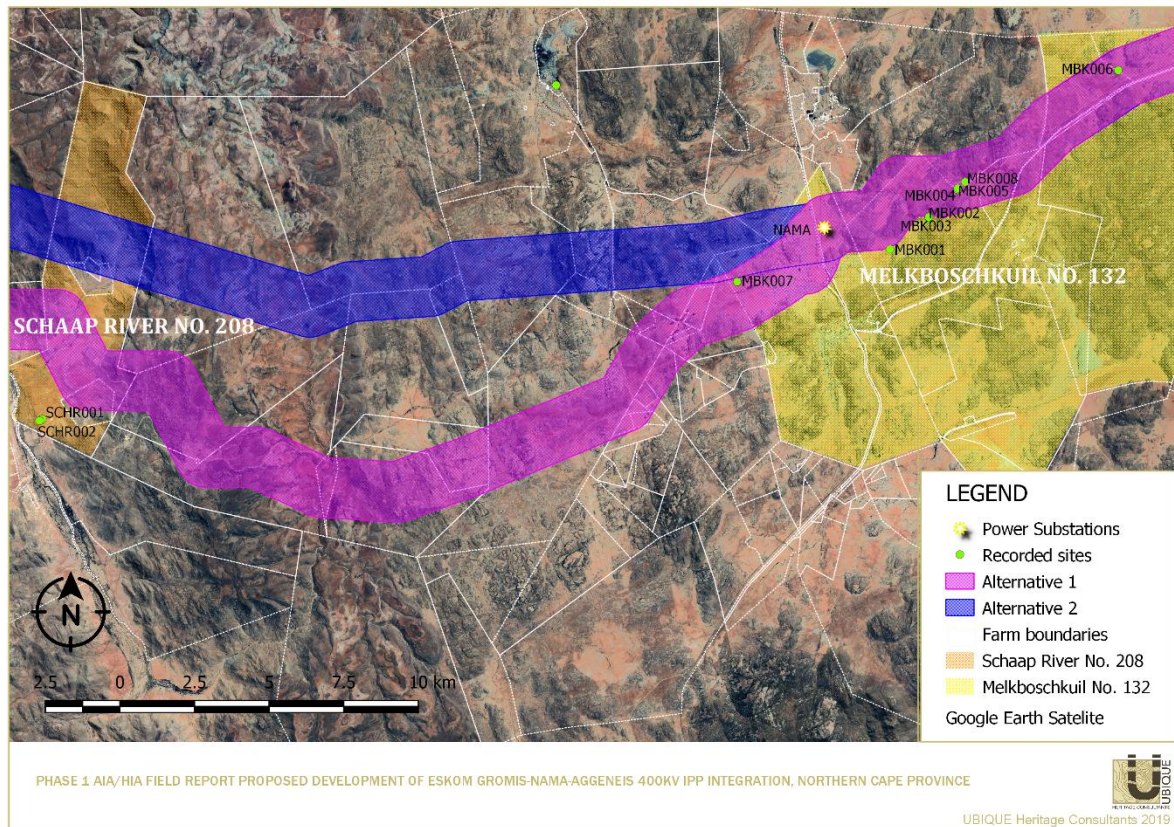


Figure 12 Identified heritage resources Alternatives 1 and 2

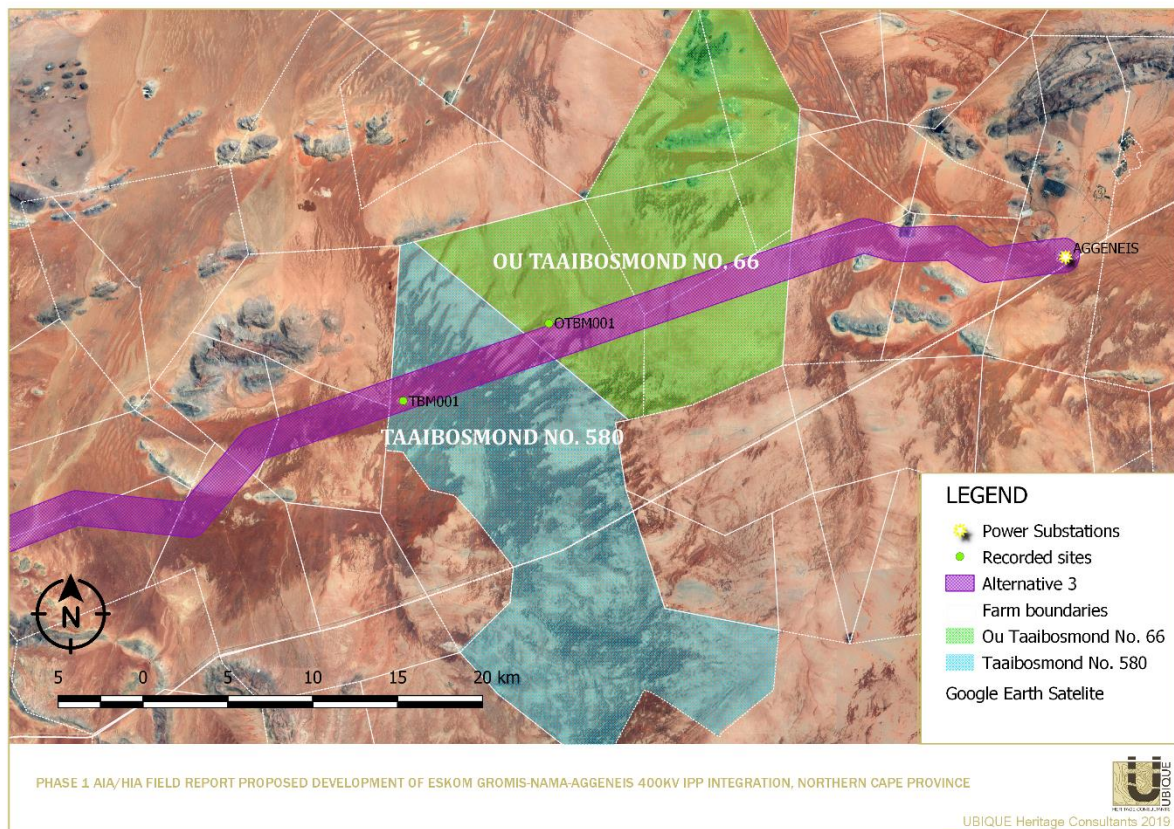


Figure 13 Identified heritage resources Alternative 3

2.3.3 Alternative 3.

The Nama community currently living and farming within the footprint of Alternative 3, is representative of living heritage. On the Farm Taaibosmond No. 580, privately owned farmland is being utilised by Nama farmers (TBM001), and on Ou Taaibosmond No. 66 Portion 2, an abandoned farming settlement has been recorded (OTBM001). The communities in the area, their cultural practices and their body of knowledge, is the result of generations of continuity and social memory. They are a living connection to not only the historic copper mining period but pre-colonial settlement as well.

2.3.4 Alternative 4.

A total of five incidences of heritage resources were documented within and adjacent to the development corridor of Alternative 4. On the Farm Stryd Rivier No. 188, approximately 16.28 km northeast from Gromis substation, two rectangular mud-brick structures (STRR001 and STRR002) with associated cultural material scattered around the structures are located just outside the development corridor. The contextual artefacts date from the late 19th century and include hole-in-cap hand-soldered tins, and historical glass and ceramics.

Further northwest, another mud-brick structure, WLB001, is located on the Farm Wolfberg No. 187, just south of the development footprint. This house ruin is close to a shut-down mine and was probably occupied by some of the first copper mine workers in the region. Artefacts from the late 19th century are scattered around the structure.

Located within the Alternative 4 corridor, 12.98 km west of the N7, on the Farm Steinkopf No. 22, the surveyors documented a stone-walled livestock byre/kraal (STKF001) of undetermined age and a house foundation younger than 60 years, and evidence of further livestock farming (STKF002).

2.3.5 Other

Outside of the development corridors, in an area framed by Alternatives 1, 2, and 4, are four sites associated with the historic Namaqualand Copper Mining Landscape. These sites are of historical significance and are sensitive with regards to living heritage and regional importance. These sites include the Nigramoep settlement, ca. 1904, (NGM001) located on the Farm Nigramoep No. 136 Portion 5, the Nigramoep closed/abandoned copper mine (NGM002) located on the Farm Nigramoep No. 136 Portion 6, and the Nababeep closed copper mine (NBB001) situated on the Farm Nababeep No. 134. Furthermore, the remains of a settlement, approximately 1 ha in size, is located south of the development footprint of Alternative 4 on the Farm Steinkopf No. 22 Portion 671 (STKF003), but its extent and association with the copper mining boom in the region during the 19th century warranted documentation. The site consists of historical stonewalling and foundations with contextual artefacts, ca. 1889-1910.

The O'kiep en Nababeep copper district is regarded as the oldest mining district of colonial southern Africa, even though indigenous people have mined the area for 100s of years before the arrival of Europeans. Prospecting has been documented since 1685. The area is a historically

significant industrial landscape, not only for the copper mining but also for railway history and the extent of the labour footprint, which included both local and global stakeholders.

The Namaqualand Copper Mining Landscape, which includes O'kiep and NababEEP, was placed on the UNESCO Tentative World Heritage Listing in 2009. However, formal proclamation of the Namaqualand Copper Mining Landscape (NCML) did not take place, and in 2015, the NCML was removed from the World Heritage Listing, along with six other sites, including Pilgrim's Rest Reduction Works Industrial Heritage Site and the Kimberley Mines and Associated Early Industries.

It has been suggested that the NCML be graded as a Grade II Provincial Heritage Site/Area or Grade IIIa of Local Importance (SAHRIS). The O'kiep Mining Area is currently a proposed Grade II Provincial Heritage site. The sites NGM001, NGM002, and NBB001, should be considered as part of this application and treated with the same reference and significance until official grading has been assigned.

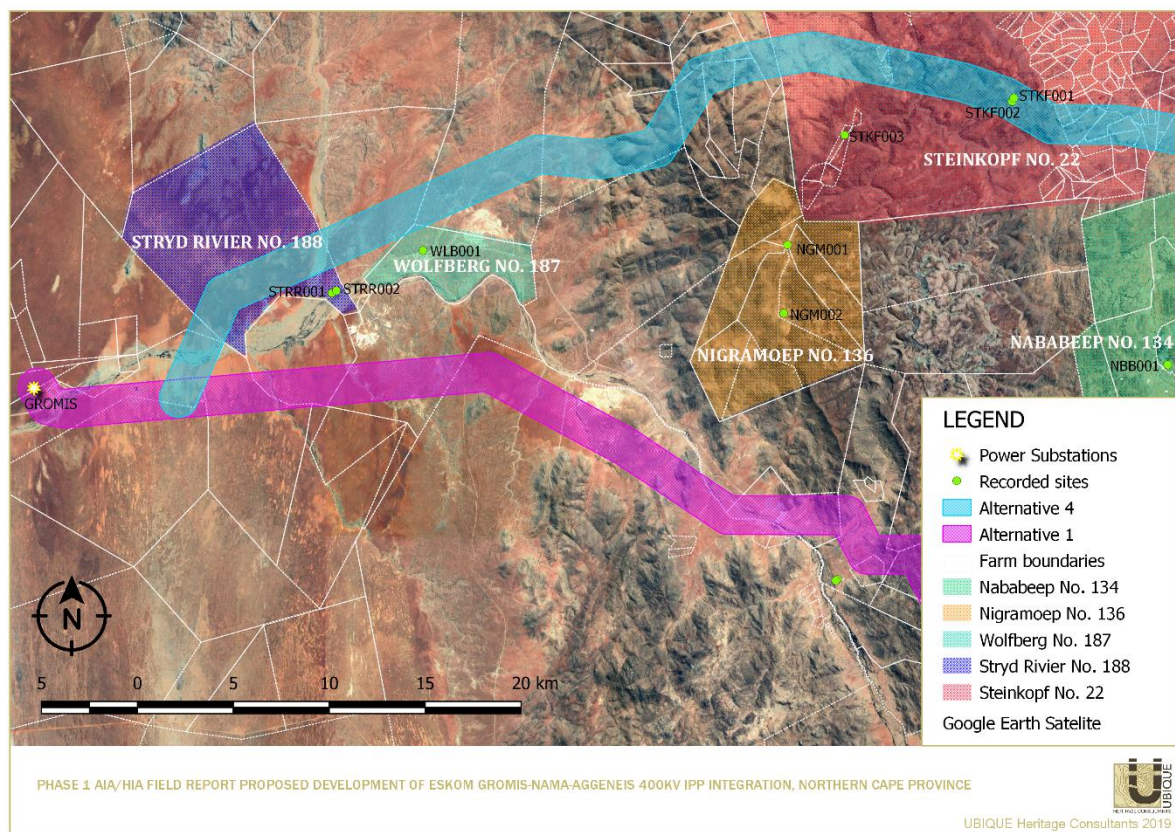


Figure 14 Identified heritage resources Alternative 4

2.3.6 Selected photographic record



MBK001



MBK002



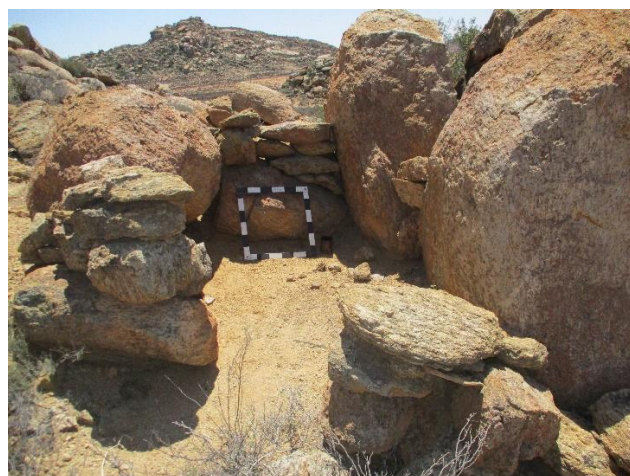
MBK003



MBK004



MBK005



MBK006



MBK007



MBK008



SCHR001



SCHR002

Figure 15 Heritage recorded within Alternative 1.



TBM001



OTBM001

Figure 16 Heritage recorded within Alternative 3.



STRR001



STRR002



WLB001



STKF001



STKF002



STKF003

Figure 17 Heritage recorded within Alternative 4.



Historical period tins



Historical period glass



European ceramics



Metal sheeting



European ceramics and glass



The historic steam locomotive known as Clara, at the entrance to the museum at Nababeep, has been declared a heritage object.

Figure 18 Collection of surface artefacts within the corridors of Alternatives 1 and 4.

3. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

Description	Development Impact		Mitigation	Field rating/ Significance
Alternative 1 & 2				
1. Eight sites with structural remains, associated with historical Farmscape, and Khoi provenance.	Nature	Negative	Sites should be recorded and mitigated before destruction	Field Rating Local Grade IIIB, IIIC (medium significance)
	Extent	Low		
	Duration	High		
	Intensity	High		
	Potential of impact on irreplaceable resource	High		
	Consequence	High		
	Probability of impact	Low		
2. Two local cemeteries	Significance	High	Sites should be included in the heritage register and may not be mitigated	Field Rating of Local Grade IIIA (high significance)
	Nature	Negative		
	Extent	High		
	Duration	High		
	Intensity	High		
	Potential of impact on irreplaceable resource	Low		
	Consequence	High		
Alternative 3	Probability of impact	Low	Site significance should be managed as part of the provincial estate	Field Rating Local Grade IIIA (high significance)
	Significance	High		
	Nature	Negative		
	Extent	High		
	Duration	High		
	Intensity	High		
	Potential of impact on irreplaceable resource	High		
Alternative 4	Consequence	High	Sites should be recorded and mitigated before destruction	Field Rating of Local Grade IIIA, IIIB (high significance)
	Probability of impact	High		
	Significance	High		
	Nature	Negative		
	Extent	High		
	Duration	High		
	Intensity	High		
4. Three sites with historical mud-brick structures and artefact scatter, associated with historic Namaqualand Copper Mining Landscape.	Potential of impact on irreplaceable resource	High	No mitigation required	Field Rating of Local Grade IVC or NCW (low significance)
	Consequence	High		
	Probability of impact	High		
	Significance	High		
	Nature	Negative		
	Extent	Low		
	Duration	High		
5. A modern foundation and livestock kraal of indeterminate age.	Intensity	High		
	Potential of impact on irreplaceable resource	Low		
	Consequence	Low		
	Probability of impact	Low		
	Significance	Low		

The proposed development will have a negative impact on the heritage resources situated on the four different alternative corridors proposed for this project. The majority of the resources can and should be mitigated, especially sites associated with the historic Namaqualand Copper Mining Landscape and historic farmscape before they can be destroyed. The cemeteries and living heritage areas should be avoided as far as possible. Even though no lithic material was documented during this survey, the presence of background scatter, or the probability of subsurface material should be taken into consideration during the construction phase of the project.

4. RECOMMENDATIONS AND CONCLUSIONS

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

1. Taken into account the archaeology and heritage resources recorded, the Alternative 1 corridor is deemed the most feasible and provided that the recommended mitigations are implemented on sites that may be negatively impacted upon, there are no objections to the proposed development proceeding.
2. It is recommended that sites graded as II and IIIA and IIIB should be considered as no-go areas.
3. If it is not possible to avoid the sites mentioned above, they must be mitigated by a qualified archaeologist. A permit in terms of section 35 of the NHRA and Chapter II and IV of the NHRA Regulations must be applied for from SAHRA via SAHRIS before construction;
4. Other areas that should be treated as no-go and potentially sensitive areas include:
 - Rocky outcrops
 - Mountains
 - Waterways
 - Living heritage sites
5. The sites graded as II, and IIIA and IIIB should be added to the provincial register;
6. Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA.
7. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted

immediately as per section 36(6) of the NHRA. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;

8. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or costs incurred as a result of such omissions.

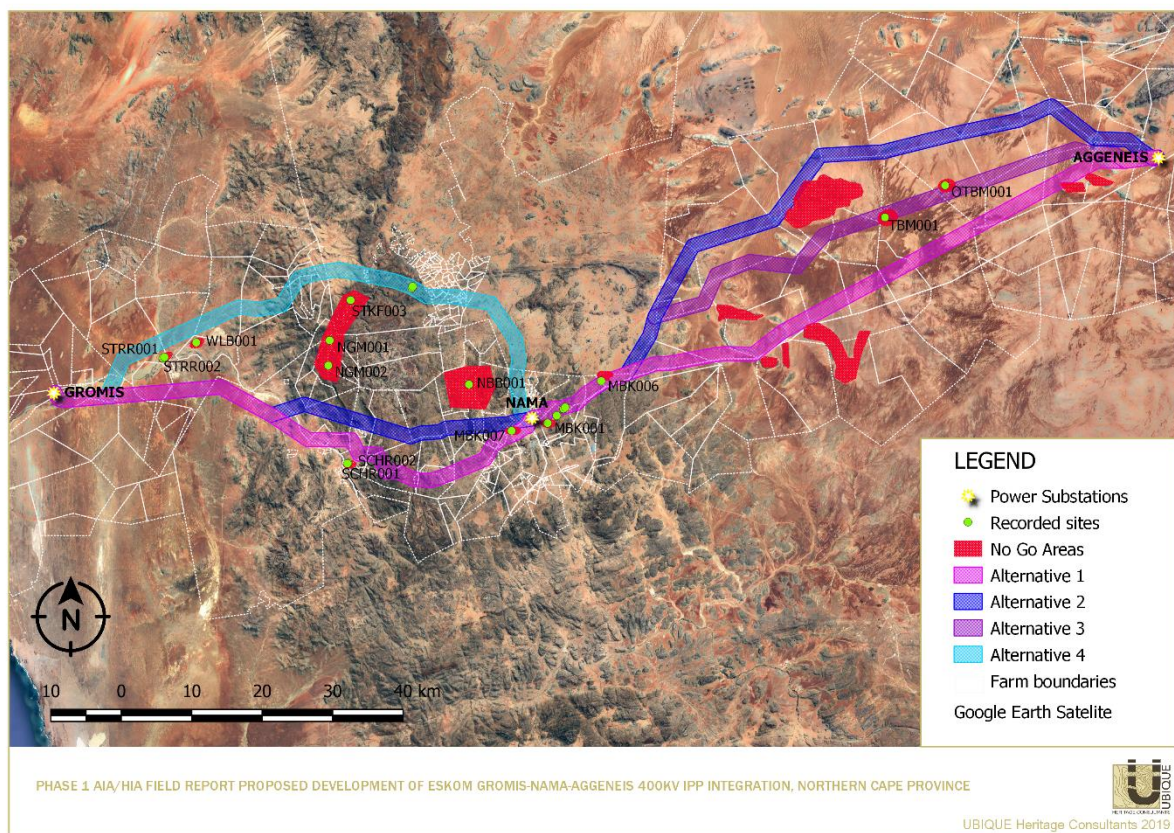


Figure 19 "No Go" areas (approximated extent)

APPENDIX A

Determining significance and development impacts

Levels of the significance of the various types of heritage resources observed and recorded in the project area will be determined to the following criteria:

Cultural significance:

- Low A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings.
- Medium Any site, structure or feature being regarded as less important due to several factors, such as date and frequency. Likewise, any important object found out of context.
- High Any site, structure or feature regarded as important because of its age or uniqueness. Graves are always categorised as of high importance. Likewise, any principal object found within a specific context.

Heritage significance:

- Grade I Heritage resources with exceptional qualities to the extent that they are of national significance
- Grade II Heritage resources with qualities giving it provincial or regional importance although it may form part of the national estate
- Grade III Other heritage resources of local importance and therefore worthy of Conservation

Field ratings:

- i. National Grade I significance should be managed as part of the national estate
- ii. Provincial Grade II significance should be managed as part of the provincial estate
- iii. Local Grade IIIA should be included in the heritage register and not be mitigated (high significance)
- iv. Local Grade IIIB should be included in the heritage register and may be mitigated (high/ medium significance)
- v. General protection A (IV A) site should be mitigated before destruction (high/ medium significance)

- | | | |
|------|-----------------------------|--|
| vi. | General protection B (IV B) | site should be recorded before destruction (medium significance) |
| vii. | General protection C (IV C) | phase 1 is seen as sufficient recording, and it may be demolished (low significance) |

Heritage value, statement of significance:

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

Assessment of development impacts

A heritage resource impact may be defined broadly as the net change, either beneficial or adverse, between the integrity of a heritage site with and without the proposed development. Beneficial impacts occur wherever a proposed development actively protects, preserves or enhances a heritage resource, by minimising natural site erosion or facilitating non-destructive public use, for example. More commonly, development impacts are adverse and can include:

- destruction or alteration of all or part of a heritage site;
- isolation of a site from its natural setting; and/or
- introduction of physical, chemical or visual elements that are out of character with the heritage resource and its setting.

Beneficial and adverse impacts can be direct or indirect, as well as cumulative, as implied by the examples. Although indirect impacts may be more difficult to foresee, assess and quantify, they must form part of the assessment process. The following assessment criteria have been used to assess the impacts of the proposed development on possible identified heritage resources:

Criteria	Rating Scales	Notes
Nature	Positive	An evaluation of the type of effect the construction, operation and management of the proposed development would have on the heritage resource.
	Negative	
	Neutral	
Extent	Low	Site-specific affects only the development footprint.
	Medium	Local (limited to the site and its immediate surroundings, including the surrounding towns and settlements within a 10 km radius);
	High	Regional (beyond a 10 km radius) to national.
Duration	Low	0-4 years (i.e. duration of construction phase).
	Medium	5-10 years.
	High	More than 10 years to permanent.
Intensity	Low	Where the impact affects the heritage resource in such a way that its significance and value are minimally affected.
	Medium	Where the heritage resource is altered, and its significance and value are measurably reduced.
	High	Where the heritage resource is altered or destroyed to the extent that its significance and value cease to exist.
Potential for impact on irreplaceable resources	Low	No irreplaceable resources will be impacted.
	Medium	Resources that will be impacted can be replaced, with effort.
	High	There is no potential for replacing a particularly vulnerable resource that will be impacted.
Consequence, (a combination of extent, duration, intensity, and the potential for impact on irreplaceable resources).	Low	A combination of any of the following: - Intensity, duration, extent and impact on irreplaceable resources are all rated low. - Intensity is low and up to two of the other criteria are rated medium. - Intensity is medium, and all three other criteria are rated low.
	Medium	Intensity is medium, and at least two of the other criteria are rated medium.
	High	Intensity and impact on irreplaceable resources are rated high, with any combination of extent and duration. Intensity is rated high, with all the other criteria being rated medium or higher.
Probability (the likelihood of the impact occurring)	Low	It is highly unlikely or less than 50 % likely that an impact will occur.
	Medium	It is between 50 and 70 % certain that the impact will occur.

Criteria	Rating Scales	Notes
	High	It is more than 75 % certain that the impact will occur, or it is definite that the impact will occur.
Significance (all impacts including potential cumulative impacts)	Low	Low consequence and low probability. Low consequence and medium probability. Low consequence and high probability.
	Medium	Medium consequence and low probability. Medium consequence and medium probability. Medium consequence and high probability. High consequence and low probability.
	High	High consequence and medium probability. High consequence and high probability.

APPENDIX B

Fieldnotes



FIELD NOTES

Phase 1 Archaeological/Heritage Impact Assessment

Site ID: Aggeneys-Nama-Gromis Eskom Line Development

Phase 1 survey conducted				
CRM Archaeologist	Jan Engelbrecht		Date/s	2019-10-14 to 2019-10-18
Additional surveyors	N. Titus, P. de Hart			
Type of survey	Pedestrian/Vehicular		Transects	30m to 50m where possible
Technical equipment	GPS	Etrex 10 Garmin and Samsung S9 Galaxy Locus maps	Camera	Canon Ixus

Technical information

Project description	
Project name	Proposed development of Eskom Gromis-Nama-Aggeneis 400kV IPP Integration, Northern Cape Province
Description	The proposed development of a new power line from Aggeneys to Gromis substations via Nama substation.
Developer	
Eskom (Khululwa)	
Contact information	(+27) 072 444 3513
Development type	Linear power line
Landowner	
Various	
Contact information	(+27) 072 444 3513
Consultants	
Environmental	Enviroworks
Heritage and archaeological	CTS and UBIQUE Heritage Consultants
Paleontological	N/A
Property details	
Province	Northern Cape
District municipality	Namakwa
Local municipality	Nama Khoi
Topo-cadastral map	1:2 50 000
Farm name	Various
Closest town	Aggeneys, Springbok and Kleinsee
GPS Co-ordinates	29° 35'29.40"S; 17° 10'34.51"E (western most extent) 29° 17'44.08"S; 18° 48'48.94"E (eastern most extent)
Property size	N/A
Development footprint size	Approximately 400 ha and 200 km in length

Land use	
Previous	Agriculture
Current	Agriculture
Rezoning required	Yes
Sub-division of land	Yes
Development criteria in terms of Section 38(1) NHRA	
	Yes/No
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.	Yes
Construction of bridge or similar structure exceeding 50m in length.	No
Construction exceeding 5000m ² .	No
Development involving three or more existing erven or subdivisions.	No
Development involving three or more erven or divisions that have been consolidated within the past five years.	No
Rezoning of site exceeding 10 000m ² .	No
Any other development category, public open space, squares, parks, recreation grounds.	No

Site description

Description of the general area affected by development
Type of environment
Namakwa- Karoo type vegetation. Flat and sandy to the east towards Aggeneis. Mountainous in the Springbok region and to the west and north towards Gromis. From Kleinsee to approximately Spektakel Mountain it is also quite flat and sandy plains.
Terrain description
The terrain is rather flat and sandy with some rocky outcrops at several places. The terrain varies in vegetation cover, from grasslands and shrubs towards the west and more bush and shrub field to the east and north in mountainous areas. The terrain is diverse: from flat and sandy Kalahari type landscape to mountainous and coastal environments to the west.
Geology
There are several quartz and quartzite outcrops throughout the site footprint. Dolomite outcrops could also be seen but in a lesser degree/density. Numerous Limestone (calcrete) outcrops as well. Spekularite and Shale also observed.
Vegetation
Various types of vegetation were observed throughout the development footprint: Camel Thorn trees (<i>Acacia erioloba</i>), Black Thorn trees (<i>Acacia mellifera</i>), Three Thorn/Driedoring (<i>Rhigozum trichotomum</i>), Skaapbossie (<i>Aizoon schellenbergii</i>), Shepherd tree (<i>Boscia albitrunca</i>), Suurgras (<i>Enneapogon desvauxii</i>), Pencil Milkbush (<i>Euphorbia lignose</i>), <i>Helichrysum tomentosulum</i> , Wild Basil (<i>Ocimum americanum</i>), Honey Locust (<i>Prosopis glandilosa</i>), Tall Bushman grass (<i>Stipagrostis hirtigluma</i>), Silky Bushman grass (<i>Stipagrostis uniplumis</i>), Kortbeen Boesmangras (<i>Stipagrostis obtuse</i>), Vygies, Eucalyptus trees at specific areas, Aloes, Quiver trees.
Waterways/sources
The Buffels River flows from east to west through the region, but mostly outside the development footprint. There are several dry waterways in the area, but none of the waterways is perennial due to a five-year drought currently agonising the landscape.

Site boundaries	
North: Bounded by mountains and open field South: Bounded by the N14 National road and open fields, West: Bounded by the Atlantic Ocean and Grootmis area, East: Bounded by Aggeneis mine.	
Site access	GPS Co-ordinates
Various entrances indicated by Eskom entering from the N14, N7 and R355. Mostly gravel roads.	N/A
Disturbances	
Natural erosion	
Trenches due to previous rainfall are present at several places. Dry waterways are present.	
Human-made	
Some areas are eroded by mining activities and construction.	
Notes	
The corridor with the current Eskom overhead lines (Alt. 1) stretches along a dry waterway through a Kloof and after that continues on flat sandy areas from Nama towards Aggeneis. The current route is constructed predominantly to avoid rocky outcrops and mountainous regions. Rocky outcrops and the mountainous areas should, in general, be avoided with the new proposed development.	

Environmental recording

Way point	Description Date	Photo No		Grid Ref	Field rating/ Significance
Site-specific points of interest/ natural significance					
001	Nama Eskom substation and surroundings. Panoramic view and disturbed areas. Taken from various angles.	1 - 6	2019-10-14	29° 37' 53.46" S 17° 52' 58.73" E	N/A Disturbed area
N/A	Panoramic view images of Nama Eskom substation taken from various angles.	1-8	2019-10-15	N/A	N/A
N/A	Panoramic view images of Nama Eskom substation taken from various angles.	9-12	2019-10-15	N/A	N/A
N/A	Panoramic view images were taken in the corridor with the existing power line (Alt 1) to the south towards the N14 main road.	13-18	2019-10-15	N/A	N/A
N/A	Panoramic view in the corridor with the current power line (Alt 1) near the Concordia turnoff and towards the central corridor on the Concordia road towards Concordia. Taken from various angles.	29-32	2019-10-15	N/A	N/A
009 & 010	Aggeneis Eskom substation. Images taken from various angles.	33-36	2019-10-15	29° 17' 55.37" S 18° 48' 18.55" E	N/A Disturbed area
N/A	Panoramic view images of the corridor with the existing power line (Alt 1) taken from various angles.	37-39	2019-10-15	N/A	N/A

N/A	Panoramic view images of the proposed central corridor (Alt 3) stretching from Aggeneis towards Nama, taken from various angles.	40-41	2019-10-15	N/A	N/A
N/A	Panoramic view images in the area west of the N7 main road within the corridor with the existing power line (Alt 1). Taken from various angles.	42-46	2019-10-16	N/A	N/A
N/A	Panoramic view images of the corridor with the existing power line (Alt 1) towards Gromis at Buffelsrivier settlement. Taken from various angles.	52-55	2019-10-16	N/A	N/A
013	Gromis Eskom substation near Kleinzee. The area was initially called Grootmis but later abbreviated to "Gromis". Panoramic view images were taken from various angles at Gromis substation.	61-66	2019-10-16	29° 35' 58.66" S 17° 10' 43.88" E	N/A
N/A	Panoramic view images of Alt 1 and 3 close to Aggeneis East of Springbok, but west of Aggeneis. Taken from various angles.	2-7 (also 8-13)	2019-10-17	N/A	N/A
N/A	Panoramic view images of Alt 2 and 3 close to Aggeneis east of Springbok but west of Aggeneis. Taken from various angles.	14-21	2019-10-17	N/A	N/A
N/A	Panoramic view images of Alt 4 near the Bulletrap settlement. Pictures taken from various angles	18-24	2019-10-18	N/A	N/A
N/A	Panoramic view images of Alt 4 towards Nigramoep settlement. Taken from various angles.	43-46	2019-10-18	N/A	N/A

HISTORICAL HERITAGE FINDS					
Waypoint	Description	Photo No.	Date	Grid Ref.	Field rating
014	Memorial stone to commemorate the mine workers of the region.	67-68	2019-10-16	29° 33' 52.61" S 17° 19' 15.55" E	IIIA
N/A	Images of artefacts found at most of the historical sites, especially at ruins and middens. General historical artefacts ca. 1860-1950's.	1-17	2019-10-18	See waypoints	IVA
021	Nigramoep settlement ca. 1904. Site is outside the development footprint but is very sensitive i.t.o. historical heritage, living heritage and architecture. Images taken from various angles.	45-58	2019-10-18	29° 31' 56.71" S 17° 35' 07.12" E	IIIA
022	Nigramoep closed/abandoned copper mine. Outside development footprint, but a heritage site.	59-60	2019-10-18	29° 33' 52.45" S 17° 35' 59.49" E	IVC
023	Nababeep closed copper mine. Outside development footprint, but still a heritage site. Images of mine and Nababeep museum.	61-109	2019-10-18	29° 35' 19.26" S 17° 47' 24.72" E	II
N/A	Panoramic view images of Alt 4 closer to Gromis area in the west and central section of the corridor. Pictures taken from various angles.	110-117	2019-10-18	N/A	N/A
ARCHITECTURE OF INTEREST					
003	Stone combined with cement foundation built with vertical packed stones similar to Sotho-Tswana huts. An outer stone circle has a diameter of 4 m with a well-demarcated entrance. Possibly historical/colonial period. Within Alt 1.	10 - 13	2019-10-14	29° 37' 44.32" S 17° 55' 10.00" E	IVB
004	Stone and cement square house foundation approximately 5 m x 2 m. Possibly historical. With prominent midden 50 m east of house foundation. Historical. Within Alt 1.	14-16	2019-10-14	29° 37' 42.53" S 17° 55' 09.80" E	IVB
005	Stone and daub house ruin with foundation. Possibly historical. Within Alt 1.	17-18	2019-10-14	29° 37' 12.73" S 17° 55' 45.69" E	IVB
006	Stone constructed small stock byre/kraal with prominent entrance ramp to the west of the kraal. Close to Waypoint 005. Historical. Within Alt 1.	19-23	2019-10-14	29° 37' 11.22" S 17° 55' 46.03" E	IVB
007	Round stone-walled shelters on the mountain slope. Most probably Khoi provenance. Close to Alt 2 and 3.	24-27	2019-10-14	29° 35' 03.29" S 17° 59' 05.97" E	IIIB
008b	Livestock byre/kraal most probably for small stock or cattle. Historical. Within Alt 1.	19-28	2019-10-15	29° 37' 07.02" S 17° 55' 53.82" E	IVA

011	Square stone-walled house ruin with a round foundation constructed with vertical stones to the south of the house. Possibly a hearth or additional round hut connected to the house. Historical. Close to Alt 1.	47-51	2019-10-16	29° 41' 21.08" S 17° 36' 43.59" E	IIIB
012	Square stone-walled house ruin with historical significance. Close to Alt 1.	56-60	2019-10-16	29° 41' 22.81" S 17° 36' 40.31" E	IIIB
015	Mud-brick square ruin with historical significance. The contextual artefacts date from the 1870s. Close to Alt 1.	69-72	2019-10-16	29° 33' 18.44" S 17° 20' 22.77" E	IIIB
016	Mud-brick square ruin with historical significance. The contextual artefacts date from the 1870s. Close to Alt 1 and 4.	73-75	2019-10-16	29° 33' 14.34" S 17° 20' 31.33" E	IIIB
017a	Mud-brick square house ruin with historical significance. The contextual artefacts date from the 1870s. This house ruin is nearby a closed mine and was probably occupied by some of the first mine workers in the region. Close to Alt 1 and 4.	76-79	2019-10-16	29° 32' 06.59" S 17° 23' 19.51" E	IIIA
018	Stone-walled livestock byre/kraal. Possibly historical. Within Alt 4.	25-30	2019-10-18	29° 27' 54.72" S 17° 42' 22.53" E	IVB
019	House foundation younger than 60 years. Combination of foundation and dung patches where livestock kraals were presented. Close to Alt 4.	31-33	2019-10-18	29° 27' 48.67" S 17° 42' 25.99" E	IVC
020	Historical stone walls and foundation ruins with artefacts in context. Site is approximately 1 ha in size and proximate to an abandoned mine and Alt 4. The contextual objects are historical ca. 1889-1910.	34-42	2019-10-18	29° 28' 51.41" S 17° 36' 57.83" E	IVA

GRAVES					
Waypoint	Description	Photo No.	Date	Grid Ref.	Field Rating
002	Informal cemetery. Fenced with at least 50 graves. Cemetery close to Alt 1.	7 - 9	2019-10-14	29° 38' 51.75" S 17° 52' 58.73" E	IIIA
008a	Cemetery near Springbok informal settlement (Bergsig). Formal cemetery (municipal). Close to Alt 1 and 4.	28-32	2019-10-14	29° 37' 53.46" S 17° 51' 10.03" E	IIIA

Living Heritage

The Buffelsrivier settlement has diverse living heritage, and it developed due to the various mines such as Spektakel mine. The local population worked as labourers at these mines. Some of the mines had already closed down, and the settlement continued to exist. It is located on the shore of the Buffels River flowing from east to west towards Kleinsee.

Way point	Description	Photo No.	Date	Grid Ref.	Field Rating
017b	Existing Nama farmers living and farming on private farmland in the development footprint within Alt 3.	1	2019-10-17	29° 22' 27.94" S 18° 24' 07.38" E	II
018b	Abandoned farm and settlement within the development footprint. Within Alt 3.	8-13	2019-10-17	29° 20' 01.45" S 18° 29' 27.19" E	II

Discussion

Stone Age finds
No stone age artefacts were identified along the corridors. Due to the prolonged drought in the region, there is minimal vegetation cover in most areas of the development footprints, and windy conditions might have covered artefacts with sand. Subsurface material might be present, and that should be considered. Only one Khoi - related stone structure site was recorded along a mountain slope (see waypoint 007 above).
Historical finds
Historical heritage sites were dominant in the region. The region has a rich history of colonialism which coincided with mining since ca. the 1860s, the Anglo Boer War, the 1914 Rebellion, the First and Second World Wars. Many stone walls, ruins and historical foundations cover the landscape, and those near the development footprints were recorded. Historical artefacts were also identified and recorded which dates since ca. 1860's in some instances.
Identified graves
Two cemeteries in proximity to the development footprints were recorded. These cemeteries are well fenced, and it seems like they are well managed as well.

Recommendation

We recommend that the project can continue within the corridor identified as Alternative 1 i.t.o the impact of development on heritage.

Stone Age finds
No visible artefacts were identified, but the chances of subsurface material are possible, and the developer should keep this in mind when constructing the new OHL. If during construction, large knapping sites or settlement sites are exposed, work should immediately be seized, and an archaeologist should investigate before development can proceed.
Historical finds
Historical sites and artefacts are of medium to high significance in most instances. Historical sites close to the development footprints should be avoided at all cost during construction.
Identified graves
Cemeteries recorded must be avoided, and it is a "no-go" area.
Other
Living heritage should also be avoided and mitigated if necessary.

Additional notes

The time limitations for the surveying of all the alternatives for this project were very tight and unreasonable. Eskom should budget and plan for extra time with future projects, especially for heritage surveys, where surveys often consist of pedestrian surveys. Accessibility should be well designed and arranged ahead of surveys. Farmers' unions and other stakeholders should be briefed well before studies and not on the day when investigations commence.

Declaration of independence:

I, Jan Engelbrecht, hereby confirm my independence as a heritage specialist and declare that:

- I am suitably qualified and accredited to act as an independent specialist in this application;
- I do not have any vested interests (either business, financial, personal or other) in the proposed development project other than remuneration for the heritage assessment and heritage management services performed;
- the work was conducted in an objective and ethical manner, in accordance with a professional code of conduct and within the framework of South African heritage legislation.



Signed

J.A.C. Engelbrecht

Date: 2019-10-24

UBIQUE Heritage Consultants