Scoping Heritage Impact Assessment for the construction of three 400kV transmission lines between Koeberg 2 and the Omega substation, Cape Town Metro, Western Cape (Ref: 12/12/20/1218)

Prepared for

Savannah Environmental (Pty) Ltd

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First Draft

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Executive summary

The Archaeology Contracts Office of the University of Cape Town was appointed by Savannah Environmental (Pty) Ltd of behalf of Eskom to undertake a scoping report for the construction of three 400kV transmission power lines between the proposed Koeberg 2 nuclear power station and the Omega substation, a distance of 11 km.

The following heritage indicators were identified were identified during this scoping study:

- Significant areas of Cainozoic and Pleistocene palaeontology;
- Significant sites of Pleistocene archaeology and with less information available on the Holocene archaeology of the routes;
- Historical farmsteads such as Vaatjie and Groot Oliphantshoek which will require background research and site visits to determine significance and possible impacts;
- Cultural landscapes characterised as rural agricultural and scenic routes such as the R307.

The impact of the construction of new service roads is likely to be greater than the construction of the towers on below ground heritage resources.

As a preliminary assessment it is recommended that the transmission lines follow the path of the existing transmission lines (southern route) as opposed to constructing new lines across unspoilt landscape. However, the cumulative impact of an additional three transmission lines will need to be assessed by a visual impact specialist.

The HIA component, as part of the EIA process, will need to include:

- A palaeontologist conducts spots checks along the route during construction;
- An archaeological impact assessment will be required for the service roads and spot checks will be needed during the construction of the towers;
- An archival study needs to be undertaken of the farms which will be crossed by the towers to identify significant features;
- A visual impact assessment will be required to determine the visual impact of the transmission lines on the cultural landscape (rural and agricultural), the R307 scenic route and historical farms and associated infrastructure. It is proposed that this is integrated within the heritage study.

Declaration:

Mr Tim Hart and Dr Lita Webley are independent specialist consultants who are in no way connected with the proponent, other than delivery of consulting services.

Tim Hart (MA) is an archaeologist with 22 years of working experience in heritage throughout southern Africa. He is accredited with Principal Investigator status with the Association of Professional Archaeologists of Southern Africa.

Lita Webley (Phd) is an archaeologist with 30 years of working experience. Having served previously as Director of the Albany Museum, she is familiar with the history of the area and local heritage issues. She is also accredited with Principal Investigator status with the Association of Professional Archaeologists of Southern Africa.

Liesbet Schietecatte (MA, MSC) is an archaeologist with 10 years working experience at the ACO offices.

Harriet Clift (MA) is an archaeologist who specializes in historical and archival research and cultural landscape studies.

GLOSSARY

Archaeology: *Remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.*

Early Stone Age: *The archaeology of the Stone Age between 700 000 and 2500 000 years ago.*

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 (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999.*

Holocene: *The most recent geological time period which commenced 10 000 years ago.*

Late Stone Age: *The archaeology of the last 20 000 years associated with fully modern people.*

Middle Stone Age: *The archaeology of the Stone Age between 20-300 000 years ago associated with early modern humans.*

National Estate: *The collective heritage assets of the Nation*

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 which contains such fossilised remains or trace.*

Pleistocene: *A geological time period (of 3 million – 20 000 years ago).*

SAHRA: *South African Heritage Resources Agency – the compliance authority which protects national heritage.*

Structure (historic:) *Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.*

Wreck (protected): *A ship or an aeroplane or any part thereof that lies on land or in the sea within South Africa is protected if it is more than 60 years old.*

Acronyms

DEA	Department of Environmental Affairs
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LSA	Late Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency

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1. Introduction

The Archaeology Contracts Office of the University of Cape Town was appointed by Savannah Environmental (Pty) Ltd of behalf of the proponent Eskom to conduct a scoping level heritage impact assessment (the identifications of issues) for the construction of three 400kV transmission lines between the HV-yard at the proposed new Nuclear Power Station site (known as Koeberg 2) and the Omega Substation, a distance of approximately 11 km.

This proposal has triggered a full EIA process, this report being the heritage component of the scoping study. There are two alternatives for the line route (Figure 2) and these are discussed more fully below.

1.1 The need for the project

South Africa is currently experiencing an energy crisis with the national electricity provider (Eskom Holdings Limited) being unable to produce enough power to serve the nation's peak demand or projected needs to satisfy a 6% growth rate. Eskom is investigating the feasibility of establishing new conventional nuclear power stations at:

- Duynefontein (next to the existing Koeberg 1 facility)
- Bantamsklip (near Gansbaai)
- Thyspunt (near St Francis Bay)

Eskom Transmission is investigating possible transmission line options for each of these three sites.

1.1.1 The proposal

It is proposed to construct three 400kV transmission power lines between Koeberg 2 and the Omega substation (11 km). The preferred route follows the existing power lines. The alternative route (Deviation 1) travels due east before travelling south alongside the R307 to the Omega substation. The Omega substation is located on the farm Groot Oliphantskop (Farm 81).

The associated infrastructure which will accompany the installation of three 400kV transmission lines from Nuclear 2 to Omega will include the following activities:

- Construction of towers (design to be determined).
- Service roads
- Temporary camp sites for construction crews

The exact location of these activities has not yet been determined.

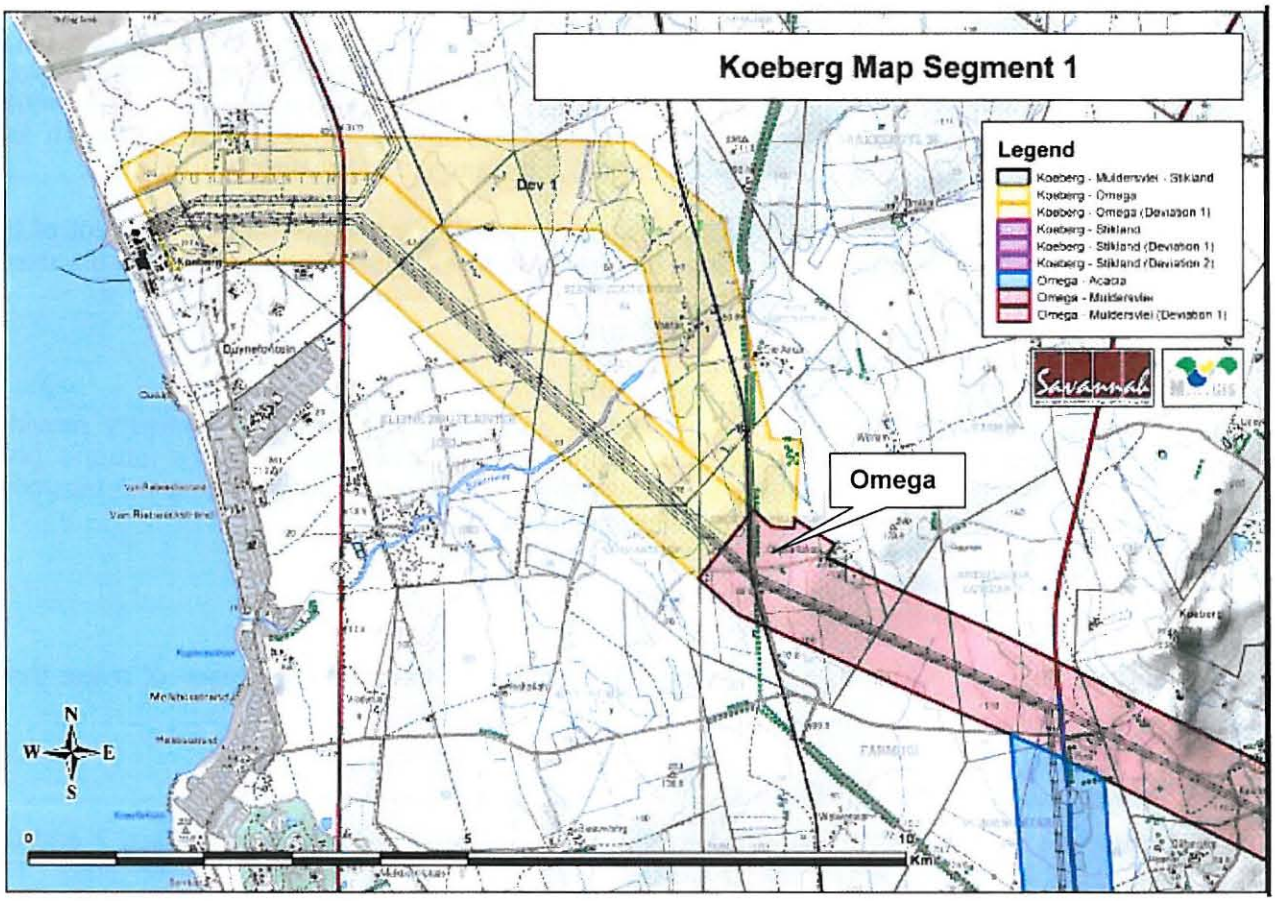

Figure 1: The two yellow corridors are considered in this report. Map of the Study area supplied by Savannah Environmental.

1.2 The receiving environment

The transmission lines commence at Koeberg which is located on the farm Duynefontein 34, some 35km north of Cape Town on the Atlantic coast. The landscape in the vicinity of Duynefontein comprises large tracts of coastal Fynbos and an active dune field. Other than the coastal dunes, the topography is relatively flat. The transmission lines will cross the R27 then onto a rural landscape of undulating plains covered in wheat fields and/or un-cultivated land, often alien infested for stock grazing. There is an existing servitude of 150 m in width that accommodates the existing transmission lines. This is kept clear of large vegetation and structures.

1.2.1 Palaeontological heritage

The transmission lines will commence at the Duynefontein nuclear site. Two occurrences of Pleistocene fossil bone were found on the farm. These are the sites known to archaeologists as Duinefontein 1, a possible Pleistocene Hyena den with an associated fossil fauna assemblage, and Duinefontein 2, a known and important Pleistocene palaeontological site with archaeological material (see below). Their significance is assessed in the ongoing Nuclear 1 EIA.

1.2.2 Pre-colonial heritage

The archaeological site of Duinefontein 2 is significant because of the discovery and scientific excavation of buried late Acheulian land surfaces. Numerous stone artefacts dating to the Acheulian (Early Stone Age) and fossilized animals bones dating between 400 000 and 250 000 years ago have been excavated (Klein et al 1999; Cruz-Uribe et al 2003). This site enjoys international significance.

It is anticipated that the area traversed by the transmission lines will contain artefactual material dating to the Early Stone Age and Middle Stone Age of the Pleistocene epoch (*3 million – 20 000 years ago)*. Indeed, Halkett (2006) has reported on the discovery of an ESA stone tool scatter on the farm Vaatjie (Portion 84 of Kleine Zoute Rivier), which will be crossed by the alternative route (Deviation 1). Early Stone Age material is often noted in eroded areas, or on terraces in river valleys. Under very rare circumstances it is found in undisturbed contexts in association with fossil bone. Such sites enjoy high status in research terms as they have the potential to produce significant information about early human behaviour.

The coastal regions of the South Western Cape were occupied in pre-colonial times by peoples who exploited marine resources for their livelihood. Human occupation of the coast is archaeologically reflected in the thousands of shell midden sites and rock shelter deposits that mostly date after the last 6000 years. This period is called the Later Stone Age. Halkett (2006) has confirmed the present of an LSA site on the farm Vaatjie (Deviation 1) containing stone tools, pottery and marine shell.

About 2000 years ago the economic order changed with appearance of Khoekhoen herder groups in the Western Cape. These peoples included the CochoQua, whose territory stretched from Saldanha Bay to Vredenburg, and the ChariGuriQua or GuriQua who occupied the lower Berg River area, St Helena Bay and points around Piketberg. The Khoekhoen moved seasonally with their herds between coastal and interior grass lands because the Cape soils are deficient in certain minerals.

1.2.3 The colonial period

The landscape inland and to the north of Koeberg is dominated by agricultural land which has its origin in early Dutch East India company grants and quitrents (the Farm Duynefontein 34 being one of them). The freeburgher farmers adopted a similar system of land use to the Khoekhoen and continued into the modern era, when commercially produced feeds and supplements rendered this practice unnecessary.

The VOC established a number of outposts on the boundaries of the settlement to facilitate the exploitation of natural resources (wood, fish etc), trade cattle with the local Khoekhoen as well as control the trade between the freeburgher farmers and the local Khoekhoen. The farm Oliphantskop may be associated with mid 17th century VOC outpost, Keert de Koe c1659.

Some of the original farm boundaries can be still be identified within the contemporary cadastral layout of the area. However, along the southern portion of the west coast many of the early farms have become sub-divided and broken up by developments such as Atlantis Industrial Township. A number of notable farm names and associated structures have survived - Groot Olifantskop (Keert de Koe), Vaatjie, Brakkefontein and Donkergat. Within this area, research into the heritage of early colonial settlement is limited with only site identification surveys being completed to date.

The earliest colonial period history pertaining to the Koeberg study area is reflected in primary archival documentation. Hermanus Dempers became an 'inhabitant and owner of the 'Opstal' on the loan place named **Duynefontein**' in 1799, but it is unclear who the first grantee was. When the property was surveyed in 1834 for the quitrent grant, there is no indication of houses or any built structures. The colonial period history of Duynefontein is interesting; however it does not reveal any particular significance in terms of associations with events, or important historical personalities.

The farm Kleine Oliphantskop (close to the site of the Omega substation under construction) was granted in 1698. The historical farm werf and setting of **Groot Oliphantskop** dates to slightly later. The original T-shape of the main house indicates an origin in the Dutch occupation period of the 18th century (Orton & Hart 2004). Various additions and changes appear to have been made to the building, with most of them probably dating to the early 20th century. This structure can be regarded as the single most important heritage resource on the farm. Three outbuildings of significant antiquity are also present. Two of these barns have gables dated to the 1930's but it is clear that both buildings are much older, probably dating to the mid- to late 19th century. There are also two stone-lined wells and a farmyard cemetery on the property.

While both routes cross the farm **Kleine Zoute Rivier**, Deviation 1 will pass in close proximity to the farmhouse of Vaatjie, a 19th century farmhouse of as yet unestablished significance which is located on Portion 84 of Kleine Zoute Rivier. According to survey diagrams, the Loan Place was granted in 1836 and crossed by a "main wagon route" (The Surveyor General).

1.2.4 Cultural Landscape

The area between Koeberg and Omega falls within the Swartland region and the landscape is characterised as rural and agricultural There are historical villages (Philadelphia) and old farm werfs (such as Vaatjie, Brakkefontein) dotted across the undulating landscape and a number of historic routes bisect the area Hart & Clift (2008). Allmost certainly others will be identified during future studies.

2. Methodology for study

This study has been commissioned as a scoping assessment that attempts to predict the possible range of impacts and identify issues in terms of accumulated knowledge of the area. The source of information that is used for this process is based on scientific publications related to archaeological work undertaken on the farm Duynefontein as well unpublished reports on the history of the area.

A more detailed survey (which will take place during the EIA phase) will be required for a more complete understanding of the historical settlement in the area.

2.1 Restrictions and assumptions

The two alternative routes have not been subjected to a site visit. This will be conducted during the course of the full EIA. The primary heritage resources that represent the issues that will need to receive detailed attention during the EIA phase are determined to be as follows:

- Palaeontology. It is assumed that palaeontological remains recovered from Duinefontein may be uncovered in other areas.
- Pre-colonial archaeology (Stone Age). Scatters of stone tools at Vaatjie suggest that similar material may occur elsewhere.
- Colonial period and historic archaeology – historic farm houses, wagon tracks, early roads, etc. It is assumed that some of the historic farmsteads which have been identified on the survey diagrams for the area, still exist and retain some of their original fabric. Their status will have to be determined through physical insection.
- The cultural landscape – in particular the ability of the landscape to accommodate up to an addition three 400kV transmission lines in terms of the heritage values and scenic qualities of the area will need to be investigated through a site inspection. It is assumed that the impact of the lines, particularly along Deviation 1, will be significant.

2.2 Legislative context

The basis for all heritage impact assessment is the National Heritage Resources Act 25 (NHRA) of 1999, which in turn prescribes the manner in which heritage is assessed and managed.

Loosely defined, *heritage is that which is inherited*. The National Heritage Resources Act 25 of 1999 has defined certain kinds of heritage as being worthy of protection, by either specific or general protection mechanisms. In South Africa the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The National Heritage Resources Act also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage which must be considered in any heritage assessment includes:

- Cultural landscapes
- Buildings and structures (greater than 60 years of age)
- Archaeological sites (greater than 100 years of age)
- Palaeontological sites and specimens
- Shipwrecks and aircraft wrecks
- Graves and grave yards
- Living heritage

Section 38 of the NHRA requires that Heritage Impact Assessments (HIA's) are required for certain kinds of development such as rezoning of land greater than 10 000 sq m in extent or exceeding 3 or more sub-divisions, or for any activity that will alter the character or landscape of a site greater than 5000 sq m. "Standalone HIA's" are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils Section 38 provisions.

3. Findings

A desktop review of the literature suggests the following potential impacts on heritage resources.

3.1.1 Palaeontology

The area around the existing Koeberg nuclear power station was subjected to detailed studies in the 1970s and the palaeontological potential of the area resulted in a number of scientific studies cumulating in significant discoveries. These have been published in academic journals. The palaeontological potential of the area enjoys high significance.

3.1.2 Nature of impacts

It is not anticipated that the construction of the towers will impact on the below ground palaeontological heritage to any significant degree as their footprint is quite small. However, service roads may extend into fossil rich geological strata which rise to the surface in some areas. There are at least three buried horizons (ancient land surfaces) representing different ages in the Pleistocene and Holocene - and these may be uncovered and material may be destroyed.

3.1.3 Extent of impacts

The construction of the transmission lines will impact on relatively small areas of the potential fossil rich area and the extent of the impact is therefore likely to be local.

3.2 Pre-colonial archaeology

The association of Early Stone Age implements with fossil rich bone accumulations is comparatively rare in archaeological terms, and the Duinefontein 2 site is therefore highly significant. Very little archaeological research has been done in the rest of the affected area and we are therefore limited in our ability to predict possible impacts. We know of MSA and LSA stone tools scatters on the farm Vaatjie.

3.2.1 Nature of impacts

Archaeological sites, unlike palaeontological deposits, are generally limited in size and there is therefore greater potential for a pylon to be constructed on a site, resulting in its destruction. Similarly, the construction of service roads may destroy a site.

3.2.2 Extent of impacts

Archaeological sites such as those at Duinefontein 2 are considered to be of national importance and their destruction would impact negatively on the National Estate. Small, localised scatters such as those at vaatjie, are of local interest but a permit from SAHRA will still be required for their destruction and mitigation is likely to be recommended.

3.3 Colonial period heritage

Settlement of the landscape during the colonial period commenced during the 18th century with the establishment of loan farms close to rivers and springs, but rapidly expanded until all the land was sub-divided and under private ownership. Some of the old werfs in this area, such as Groot Oliphantskop, Brakkefontein and Vaatjie retain elements of their 19th century fabric such as farm houses, sheds, wells and family cemeteries. The early maps also indicate the location of old wagon tracks, however it is unlikely that any of these have survived agricultural practices.

3.3.1 Nature of impacts

The construction of transmission lines and service roads generally avoid above ground structures such as houses and they are unlikely to be physically impacted. However, sometimes colonial period heritage sites are not easily identifiable (i.e. the graves of farm workers may lack headstones) and they are accidentally destroyed during construction of towers or roads.

3.3.2 Extent of Impacts

The impact of destruction of heritage sites from the historical period often extends well beyond the immediate site. View of power lines from vantages such as historic places and known scenic area can result in significant changes in sense of place. Physical destruction of places of memory such as a cemetery may halt development for a considerable time period and impact on the attitude of local residents toward the development.

3.4 Cultural landscape and sense of place

Limited agriculture, primarily wheat farming is practiced in the area, but large parts of the landscape are still under indigenous and alien vegetation with some areas utilized for grazing. There has therefore been limited transformation of the rural landscape. This area is termed the Koeberg Farms Cultural Landscape and is characterised by a remote landscape, historical farms dating to as early as the 17th century – predominantly stock farms, a sparse settlement pattern and a surrounding landscape of small holding subdivision.

3.4.1 Nature of impacts

In terms of both visual impact on the cultural landscape and sense of place, transmission lines on both alternatives will be highly intrusive as they approach the R27 (West Coast Road) and the R307 (old Mamre Road). The old Mamre road is considered a scenic route with its historical avenue of trees.

The preferred route will result in an additional three 400kV transmission lines (in addition to the existing four lines) crossing both the R27 and R307. However, the existing route is preferred as it crosses the roads at a slight angle and is only visible for a short distance.

Deviation 1 will take the three 400kV lines through a rural landscape which is currently not bisected by power lines. In addition, the three lines will be visible to motorists traveling along

the scenic route to/from Mamre (R307) for a longer period as the lines will travel parallel to the road.

3.4.2 Extent of impacts

Cultural landscapes are highly sensitive to accumulative impacts and for this reason the southern (preferred) alternative will need to be evaluated against further fragmentation of the landscape, while the northern (Deviation 1) alternative will cross more pristine landscape. The impact is likely to be significant in both cases.

4. Mitigation and conservation

Heritage sites, by their nature, are generally not renewable and once destroyed cannot be recovered. For this reason, a cautious approach is taken and it is recommended that highly significant sites are conserved (no-go option), and if this is not possible, that mitigation is undertaken.

4.1 Palaeontological Heritage

Palaeontologists generally welcome the opportunity to examine new construction holes and road cuttings as buried, fossiliferous geological strata may be exposed. It is recommended that a palaeontologist make spot checks once construction commences.

4.2 Archaeological Heritage

While the Koeberg area is known to be rich in archaeological deposits, little is known of the archaeology to the east and south-east as the two routes cross farmlands. An archaeological impact assessment will be required for the service roads, and spot checks may be required for the construction of the towers.

4.3 Un-identified archaeological material, fossils and fossil bone

All archaeological material is protected by Section 38.5 of the National Heritage Resources Act and it is an offense to destroy material. If archaeological material (including graves) is uncovered, all work must cease in that area, while the relevant heritage authorities are notified. Rescue mitigation may be required, for the cost of the developer.

4.4 Built Environment

While it is unlikely that the transmission lines or access roads will be constructed in such a way that they impact directly on existing buildings (farm houses, sheds, kraals, wells, cemeteries, etc), the visual impact of the lines on these structures needs to be evaluated and mitigated if this is required. Mitigation may involve identifying alternatives that have less impact.

4.5 Cultural landscape and sense of place

It is recommended that a visual impact assessment is conducted and that the practitioner works closely with the heritage practitioner to assess the two routes and to determine the impact of the transmission lines on the cultural landscape (including historic werfs and scenic routes).

5. Conclusions

This desk top study suggests that in terms of palaeontology and archaeology, significant sites do exist and may be negatively impacted by the towers and associated infrastructure. Impact assessments, undertaken during the EIA phase, will identify possible red flag areas and the mitigation measures suggested in this report may need to be refined.

In terms of the built environment and cultural landscape, it is recommended that a visual impact assessment is conducted and that the results are integrated with the heritage study.

In terms of alternatives, the use of existing servitudes is strongly supported as opposed to further incursion into new countryside.

In terms of the information available at this time, no fatal flaws are anticipated.

5.1 Further work

The EIA phase study needs to fulfill the requirements of heritage impact assessment as defined in section 38 of the NHRA. This means that the assessment has to cover the full range of potential cultural heritage as defined by the term "culture" contained in the National Heritage Resources Act 25 of 1999.

The HIA will assess the significance of the heritage resources along both routes. Proposed routes of linear infrastructure (access roads, position of the towers) will need to be ground-proofed to establish the impacts of the proposed activity and determine where mitigation (if any) will be required.

In terms of cultural landscape, the EIA process will need to include a visual impact assessment.

Follow up heritage work such as monitoring of excavations or archaeological sampling may be required as part of an environmental management plan depending on the findings of the EIA.

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HERITAGE RESOURCES	CHARACTERISTICS	HERITAGE SIGNIFICANCE	HERITAGE ISSUES & CONCERNS & COMMENTS
Koeberg Farms Cultural landscape	• Remote landscape • Historical farms dating to 17th century – predominantly stock farms • Relatively poor ecological potential • Sparse settlement pattern illustrated by Dassenberg, Rondeberg, Langerug, Klipvlei and Mesech historical homesteads, • Surrounding landscape of small holding subdivision	• Historical layering • Historical archaeological potential • Significance of individual farmstead	• Retention of sense of sparse settlement pattern and remoteness should be maintained • Development based on large stands with a focus on maintaining open spaces • At minimum of Notification of Intent to Develop required • Special attention would be built environment and visual impact • Low risk archaeological and palaeontological potential
Areas of archaeological potential	• The **coastal zone:** including dune field between Melkbosstrand and Blauwbergstrand, Duynefontein and potentially shell middens against every rocky point along this coastline.	• Ceanozoic coastal palaeontology • Archaeological and palaeontological • Scenic • Nature Reserve	• Protected in part by Nature conservancy • Threat of increased coastal industrial and residential property development. Requires full HIA with palaeontological and archaeological emphasis
	• Flat, featureless landscape partially incorporating Atlantis industrial area	• Early farm at Vaatjie and Brakkefontein, however the landscape has become fragmented and alien invested • Low to moderate archaeological and palaeontological risk	•
Scenic Routes R307	▪ Historical tree avenue ▪ Scenic route	▪ Historical access route from the Cape to the Saldanah	R307 though Atlantis retains historical tree plantings, but surrounds very degraded.

		Bay coastal areas ▪ Association with Mamre originally as VOC outpost and later as Moravian Mission Station	Potential for improvement